

A billion beats in a lifetime...

Stanford Cardiovascular Institute

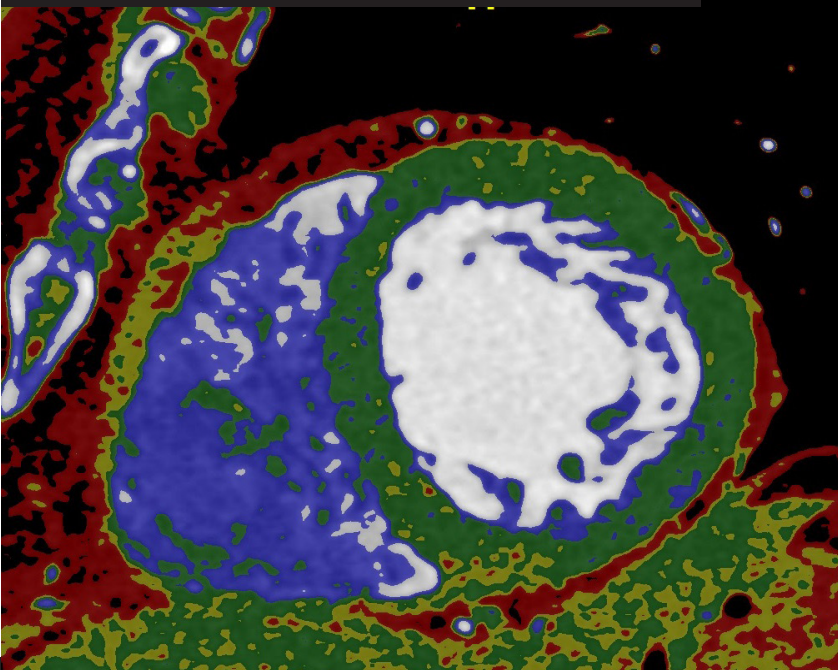
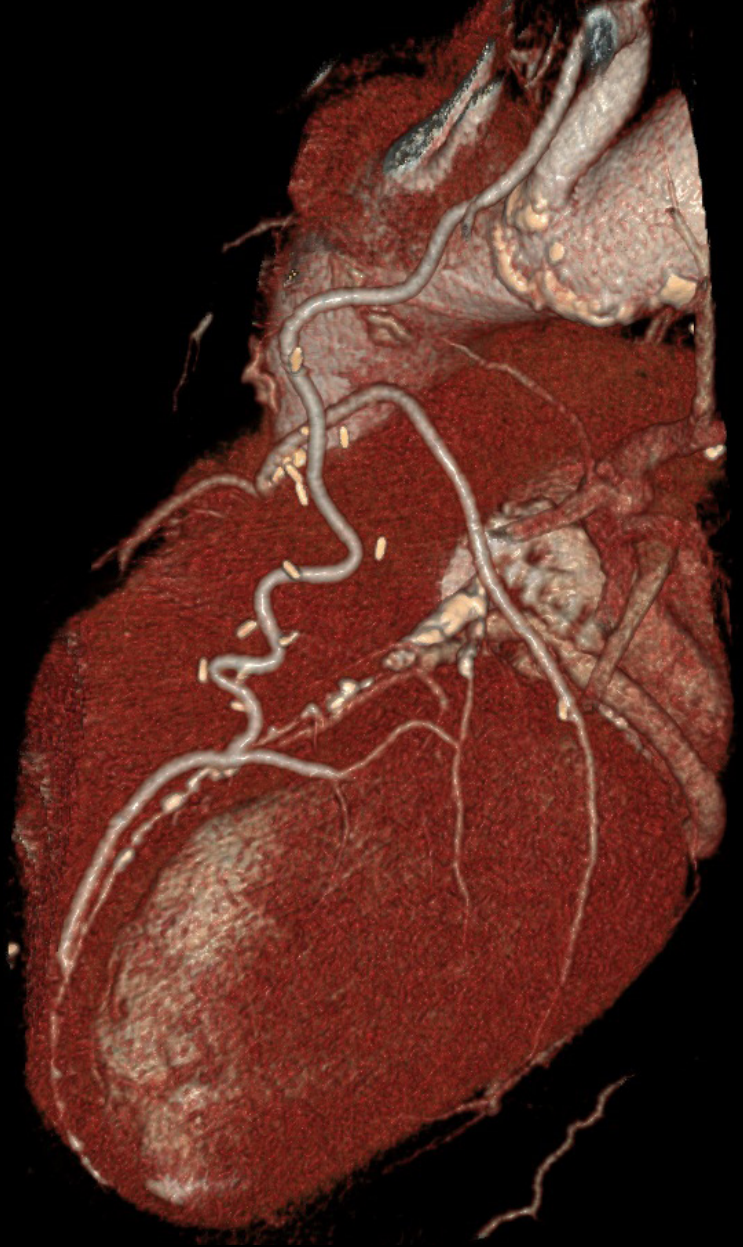
Annual Report



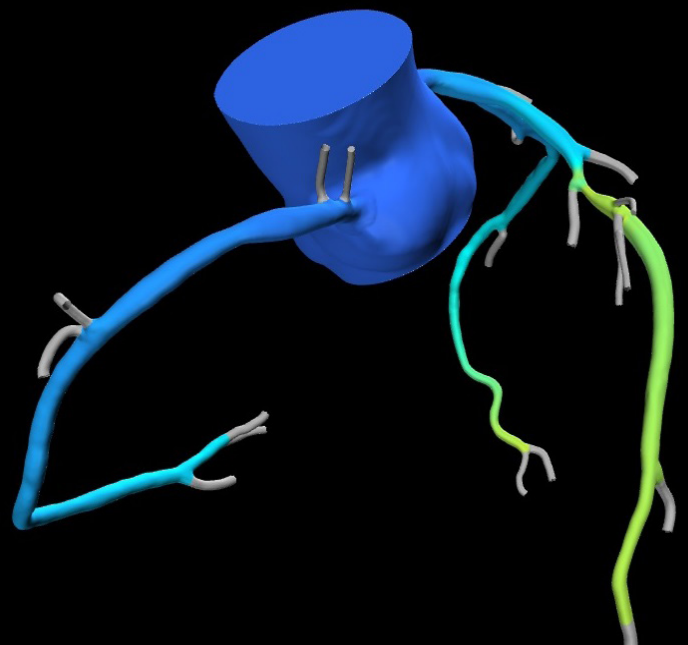
Top: CT angiograph showing non-calcified atherosclerotic plaque in the right coronary artery. Right: Cardiac CT after bypass graft surgery.

Front Cover: Cardiac CT of a patient with stents in two coronary branches.

Koen Nieman



Top Left: Cross-section of the heart



Top Right: CT angiograph-based simulation of fractional flow reserve in patient with moderate narrowing of the LAD

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Dean's Letter



Lloyd B. Minor, MD

The Carl and Elizabeth Naumann
Dean of the School of Medicine and
Professor of Otolaryngology - Head
& Neck Surgery and, by courtesy, of
Neurobiology and Bioengineering

In 2018, we celebrated the 50th anniversary of Stanford Medicine performing the first adult human heart transplant in North America — a truly transformative moment for our university and people around the world. Today, we are advancing medicine in a similarly meaningful but more all-encompassing way. We are realizing Stanford Medicine's Precision Health vision in which we use new technologies, machine learning, and genomics to not just treat disease but to predict it, prevent it, and cure it — precisely. Nowhere is this sea change more apparent than the Stanford Cardiovascular Institute.

Led by Joseph C. Wu, MD, PhD, Simon H. Stertz, MD, Professor of Cardiovascular Medicine and of Radiology, and Robert Harrington, MD, Arthur L. Bloomfield Professor of Medicine and Chair of the Department of Medicine, the Cardiovascular Institute is a true collaborative force that has brought together a driven group of engineers, surgeons, physicians, scientists, fellows, and students who are committed to improving cardiovascular health and developing tomorrow's leaders.

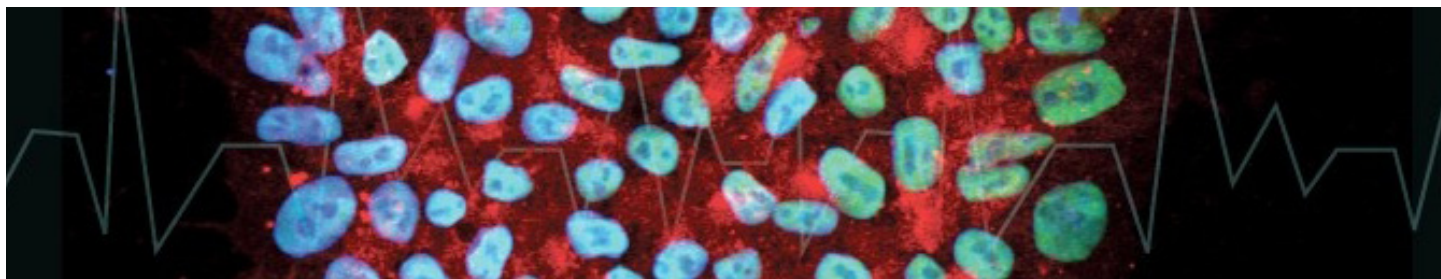
In 2018, much like every year since its founding in 2004, members of the Cardiovascular Institute reshaped our understanding of the heart and blood vessels. They opened a new line of research and of drug discovery when they found that patients with cardiomyopathy have abnormally short telomeres in certain heart muscle cells. They identified how genome sequencing can forecast the risk of abdominal aortic aneurysm. They determined the best use cases for mechanical and biological heart valves with insights gleaned from the electronic health records of 25,000 patients — overturning decades-old recommendations. And they promoted knowledge exchange by hosting the Stanford-Duke Cardiovascular Research Symposium.

Those are just some of the remarkable ways that the Stanford Cardiovascular Institute is advancing their field. I am confident that they will continue building upon this momentum to remain a leader in cardiovascular medicine for years and decades to come.

Sincerely,

Lloyd B. Minor, MD

Director's Letter



Joseph C. Wu, MD, PhD

Director, Stanford Cardiovascular
Institute and Simon H. Stertzer, MD,
Professor of Medicine & Radiology

Stanford is recognized for realizing the unthinkable. Our ability to innovate is driven by a collaborative spirit and an open-minded philosophy in which disciplines have no boundaries. At the Stanford Cardiovascular Institute, this approach has yielded incredible biomedical advances, as evidenced by the over 1,000 manuscripts published by our members in 2018. In this report, we highlight some of the most significant research conducted by our Institute members, and how their work is changing the landscape of cardiovascular medicine.

Since its establishment in 2004, the Cardiovascular Institute has grown to include over 250 Stanford faculty members and hundreds of the brightest fellows and students in the country. Members focus on diverse topics in cardiovascular biology and disease, including but not limited to: utilizing endogenous repair systems to heal damaged heart tissue; elucidating the complexities of immunology to eliminate organ rejection; remodeling the heart and vasculature with novel surgical techniques; embracing personal genomes and exploring every detail of human genetics to aid in clinical decisions; applying personalized cell-based approaches to therapy; and promoting innovative methods of delivering factors that reverse the harmful consequences of aging. As the Cardiovascular Institute Director, I am tremendously proud of the transformative advances in knowledge and novel approaches to cardiovascular disease therapy that our members and collaborators have been able to achieve.

The core strength of our Cardiovascular Institute comes from our talented students and postdoctoral and clinical fellows. We make their training and professional development a top priority to ensure that they pursue funding opportunities by offering grant writing support through courses like “Tackling your K” and “Rolling into your R,” as well as providing a junior faculty mentorship program. We are committed to building the best infrastructure to promote the growth and curiosity of all of our trainees, and to that end we appreciate the generous endowment of the Dorothy Dee and Marjorie Helene Boring Trust, which supports Stanford students dedicated to cardiovascular research. The late Dr. Lawrence Cohen has provided generous donations for the Lawrence H. and Roberta Cohen Lectureship, led by Y. Joseph Woo, MD, as a tribute to Dr. Norman Shumway's pioneering work in cardiovascular medicine. In partnership with the Maternal and Child Health Research Institute and the Steven M. Gootter Foundation, the Institute awarded twelve seed grants this autumn to ignite inventive projects that are otherwise considered too risky by most funding agencies, but that are just right for Stanford's innovative spirit.

At the heart of our mission is the integration and communication of top-level research. We have invested great effort into the Frontiers of Cardiovascular Science seminar series, which has been instrumental in disseminating groundbreaking cardiovascular biology from global leaders in the field. Our invited speakers for these seminars are extraordinary scientists who are transforming cardiovascular research and clinical practice. In 2018, we partnered with the Duke Cardiovascular Institute to explore the latest research during our two-day Stanford-Duke Cardiovascular Symposium in October. We also hosted the 3rd annual Stanford Drug Discovery Conference, featuring presentations from leading academic researchers, titans of the pharmaceutical industries, and federal and foundation policy makers. For 2019, we again look forward to bringing our community together for two outstanding conferences. In April, we will host the highly regarded Stanford Drug Discovery Conference, featuring an outstanding list of speakers from academia, industry, and federal institutions. Later in the year, we will partner with University of Pennsylvania Cardiovascular Institute in a joint Symposium. These events will generate unparalleled networking opportunities for our trainees, spur international collaborations, and accelerate scientific advances.

Much work remains ahead of us in these exciting times for ground-breaking research, and I am confident that the CVI will continue to play a vital and leading role in the advances to come.

Sincerely,

A handwritten signature in black ink, consisting of a stylized 'J' and 'W' followed by a horizontal line.

Joseph C. Wu, MD, PhD



Joseph C. Wu, MD, PhD

Director, Stanford Cardiovascular Institute
Simon H. Stertz, MD, Professor of Medicine
(Cardiovascular) and Radiology



Robert A. Harrington, MD

Arthur L. Bloomfield Professor of Medicine
Chair, Dept. of Medicine



Ronald L. Dalman, MD

Walter C. and Elsa R. Chidester
Professor of Surgery
Chief, Division of Vascular Surgery



Stephen J. Roth, MD, MPH

Professor and Chief, Pediatric Cardiology
Director, Children's Heart Center



Dominik Fleischmann, MD

Professor, Dept. of Radiology
Chief, Cardiovascular Imaging



Michael Snyder, PhD

Professor and Chair, Dept. of Genetics
Director, Stanford Center for Genomics
and Personalized Medicine



Kenneth Mahaffey, MD

Professor, Dept. of Medicine
Vice Chair of Medicine
for Clinical Research



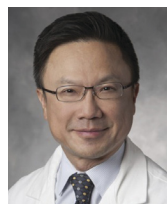
Y. Joseph Woo, MD

Norman E. Shumway Professor
in Cardiothoracic Surgery
Chair, Dept. of Cardiothoracic Surgery



Mark Nicolls, MD

Professor of Pulmonary and Critical
Care Medicine, Dept. of Medicine, Chief,
Pulmonary and Critical Care Medicine



Alan Yeung, MD

Li Ka Shing Professor of Medicine
Co-Chief (Clinical), Division of Cardiovascular
Medicine



Tom Quertermous, MD

William G. Irwin Professor of Medicine
Co-Chief (Research),
Division of Cardiovascular Medicine



Paul Yock, MD

Martha Meier Weiland Professor,
Bioengineering and Medicine;
and Professor, by courtesy,
of Mechanical Engineering,
Director, Byers Center for Biodesign



Marlene Rabinovitch, MD

Dwight and Vera Dunlevie Professor
in Pediatric Cardiology

Executive Committee

The Stanford Cardiovascular Institute Executive Committee oversees Cardiovascular Institute operations. Its members represent cardiovascular research, education, and clinical care, ensuring that the Cardiovascular Institute remains the home for cardiovascular health at Stanford. The committee is comprised of the Director and Associate Directors in different disciplines as listed below.

Basic Research

Marlene Rabinovitch, MD
Mark Nicolls, MD

Cardiothoracic Surgery

Y. Joseph Woo, MD

Cardiovascular Imaging

Dominik Fleischmann, MD

Clinical Research

William Fearon, MD
Kenneth W. Mahaffey, MD

Cardiovascular Medicine

Alan C. Yeung, MD
Thomas Quertermous, MD

Education and Training

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Finance and Administration

Jason Irwin, MBA

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Paul Yock, MD

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Marcia Stefanick, PhD
Paul A. Heidenreich, MD, MS

Translational Research

Philip S. Tsao, PhD
Sean M. Wu, MD, PhD

Vascular Surgery

Ronald L. Dalman, MD

Junior Faculty Development

Edda Spiekerkoetter, MD

Steering Committee

The CVI Steering Committee is responsible for providing guidance on the overall strategic direction of the institute. This advisory committee, which includes representatives from the major areas of cardiovascular disease research and clinical care, provides support, guidance and oversight of progress on CVI objectives and initiatives.

Joseph C. Wu, MD, PhD

Euan A. Ashley, MRCP, DPhil

Daniel Bernstein, MD

Ronald L. Dalman, MD

Alexander Dunn, PhD

William Fearon, MD

Dominik Fleischmann, MD

Francois Haddad, MD

Robert A. Harrington, MD

Sarah Heilshorn, PhD

Paul A. Heidenreich, MD, MS

Mark Hlatky, MD

Ngan F. Huang, PhD

Erik Ingelsson, MD, PhD

Michael Kapiloff, MD, PhD

Ioannis Karakikes, MD, PhD

Joshua W. Knowles, MD, PhD

Brian Kobilka, MD

Mark A. Krasnow, MD, PhD

Ronglih Liao, PhD

Nicholas Leeper, MD

David Liang, MD, PhD

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Mark Mercola, PhD

Daria Mochly-Rosen, PhD

Patricia Nguyen, MD

Koen Nieman, MD, PhD

Thomas Quertermous, MD

Marlene Rabinovitch, MD

Jayakumar Rajadas, PhD

James Spudich, PhD

Marcia Stefanick, PhD

Jennifer A. Tremmel, MD, MS

Philip S. Tsao, PhD

Minang 'Mintu' Turakhia, MD, MAS

Paul J. Utz, MD

Paul J. Wang, MD

Y. Joseph Woo, MD

Sean M. Wu, MD, PhD

Phillip C. Yang, MD

Alan C. Yeung, MD

Paul Yock, MD

Education & Training Committee

The Cardiovascular Institute Education and Training Committee oversees and defines the educational goals of the Cardiovascular Institute. The committee reflects multiple specialties of cardiovascular medicine and research, including surgery, pulmonary, development, genomics and engineering. The Institute strives to provide students and fellows with an atmosphere of growth and mentorship throughout their careers at Stanford.

Euan A. Ashley, MCRP, DPhil

Professor of Medicine (Cardiovascular), of Genetics and, by courtesy, of Pathology

Daniel Bernstein, MD

Alfred Woodley Salter and Mabel Smith Salter Endowed Professor in Pediatrics

Crystal Botham, PhD

Director of Strategic Research Development, Medicine - Med/Cardiovascular Medicine
Director, Grant Writing Academy

Terra Coakley

Program Manager, Center for Inherited Cardiovascular Disease, Division of Cardiovascular Medicine

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Francois Haddad, MD

Clinical Associate Professor, Medicine - Cardiovascular Medicine

Nicholas Leeper, MD

Associate Professor of Surgery (Vascular Surgery) and Medicine (Cardiovascular)

Patricia Nguyen, MD

Assistant Professor of Medicine (Cardiovascular) at the Palo Alto Veterans Affairs Health Care System

Koen Nieman, MD, PhD

Associate Professor of Medicine (Cardiovascular) and of Radiology (CV Imaging)

Marlene Rabinovitch, MD

Dwight and Vera Dunlevie Professor in Pediatric Cardiology

Michal Bental Roof, PhD

Academic and Research Program Officer, Pediatric Cardiology and Stanford Cardiovascular Institute

Marcia Stefanick, PhD

Professor (Research) of Medicine (Stanford Prevention Research Center) and of Obstetrics and Gynecology

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Professor (Research) of Medicine (Cardiovascular)

PJ Utz, MD

Professor of Medicine (Immunology and Rheumatology)

Paul J. Wang, MD

Professor of Medicine (Cardiovascular) and, by Courtesy, of Bioengineering

Joseph C. Wu, MD, PhD

Simon H. Stertz, MD, Professor of Medicine (Cardiovascular) and of Radiology

Sean M. Wu, MD, PhD

Associate Professor of Medicine (Cardiovascular) and, by courtesy, of Pediatrics

Scientific Advisory Board



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Director, Barbra Streisand Women's Heart Center
Director, Preventive Cardiac Center
Professor of Medicine
Cedars-Sinai Medical Center



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Hersey Professor of the Theory and Practice
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Professor of Medicine, University of Colorado
CEO, Arca Biopharma



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Welch Distinguished Chair in Science
UT Southwestern Medical Center



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President, National Academy of Medicine
Chancellor Emeritus and James B. Duke
Professor of Medicine,
Duke University



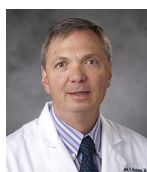
Robert C. Robbins, MD

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Scientific Director, Penn Cardiovascular Institute
University of Pennsylvania



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Professor in Molecular Genetics, Microbiology,
and Cell Biology
Duke University School of Medicine
Editor, JCI Insight



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Senior Associate Dean for Clinical Sciences
Co-Director, NYU-HHC Clinical and
Translational Science Institute
Harold Snyder Family Professor and Associate
Director of Cardiology
New York University School of Medicine



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Director, Scripps Translational Science Institute
Chief Academic Officer, Scripps Health
Gary and Mary West Endowed Chair of Innovative
Medicine
The Scripps Research Institute



Leslie Leinwand, PhD

Chief Scientific Officer, BioFrontiers Institute
Professor, Department of Molecular
Cellular, and Developmental Biology
University of Colorado



Clyde Yancy, MD

Vice Dean for Diversity and Inclusion
Magerstadt Professor of Medicine
Chief, Division of Cardiology
Northwestern University Feinberg School of Medicine
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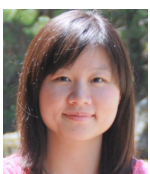
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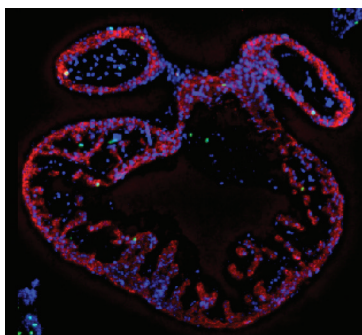
Ying Wong
Financial Analyst
yiwong@stanford.edu

Research Disciplines

The Stanford Cardiovascular Institute (CVI) provides a home for cardiovascular research across the Stanford campus. As a center of intellectual and scientific activity, the CVI provides resources to its members to stimulate discovery, translation, and implementation of new treatments, diagnostics, and preventive medicine.

BIOENGINEERING:

Sarah Heilshorn, PhD
Ngan F. Huang, PhD
Ellen Kuhl, PhD
Ronglih Liao, PhD
Alison Marsden, PhD
Nick Melosh, PhD
Ada Poon, PhD
Stephen Quake, PhD
Fan Yang, PhD
Peter Yang, PhD
Richard Zare, PhD



BIOMARKERS:

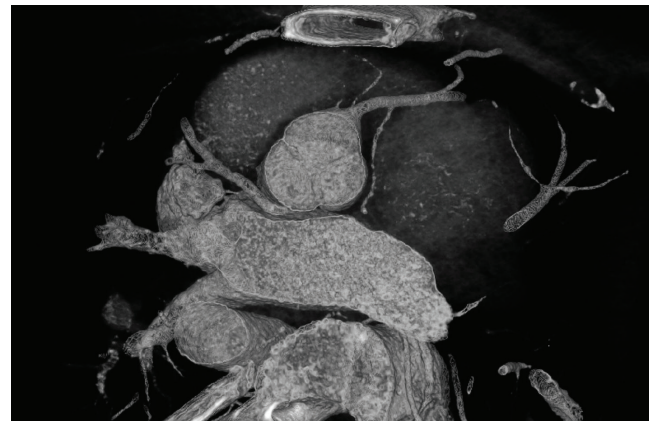
Themistocles Assimes, MD, PhD
Mark M. Davis, PhD
Francois Haddad, MD
Holden Maecker, PhD
Stanley G. Rockson, MD
Paul J. Utz, MD
Cornelia M. Weyand, MD, PhD

CARDIOVASCULAR IMAGING:

Rajesh Dash, MD, PhD
Dominik Fleischmann, MD
Sanjiv 'Sam' Gambhir, MD, PhD
Ronglih Liao, PhD
Craig Levin, PhD
Koen Nieman, MD, PhD
Patricia K. Nguyen, MD
Joseph C. Wu, MD, PhD
Phillip C. Yang, MD

CELLULAR & MOLECULAR BIOLOGY:

Alexander Dunn, PhD
Michael Kapiloff, MD, PhD
Ioannis Karakikes, PhD
Brian Kobilka, MD
Ronglih Liao, PhD
Matthew Porteus, MD
James Spudich, PhD



CLINICAL (ADULT):

William Fearon, MD
Michael Fischbein, MD, PhD
Robert A. Harrington, MD
Sharon Hunt, MD
Anson M. Lee, MD
David Lee, MD
George Lui, MD
Kenneth W. Mahaffey, MD
David J. Maron, MD
Philip E. Oyer, MD
Latha Palaniappan, MD, MS
Stanley G. Rockson, MD
Paul J. Wang, MD
Ronald Witteles, MD
Y. Joseph Woo, MD
Alan C. Yeung, MD

CLINICAL (PEDIATRICS):

Daniel Bernstein, MD
Anne Dubin, MD
Frank Hanley, MD
Doff McElhinney, MD
David Rosenthal, MD
Stephen J. Roth, MD, MPH

Research Disciplines cont.

DEVELOPMENTAL BIOLOGY:

Daniel Bernstein, MD
Gerald R. Crabtree, MD
Mark A. Krasnow, MD, PhD
Mark Mercola, PhD
Hiromitsi 'Hiro' Nakauchi, MD, PhD
Kristy Red-Horse, PhD
Sean M. Wu, MD, PhD

GENOMICS & BIOINFORMATICS:

Russ B. Altman, MD, PhD
Themistocles Assimes, MD, PhD
Euan A. Ashley, MRCP, PhD
Carlos Bustamante, PhD
Erik Ingelsson, MD, PhD
Joshua W. Knowles, MD, PhD
Thomas Quertermous, MD
Michael Snyder, PhD

ION CHANNELS & ARRHYTHMIAS:

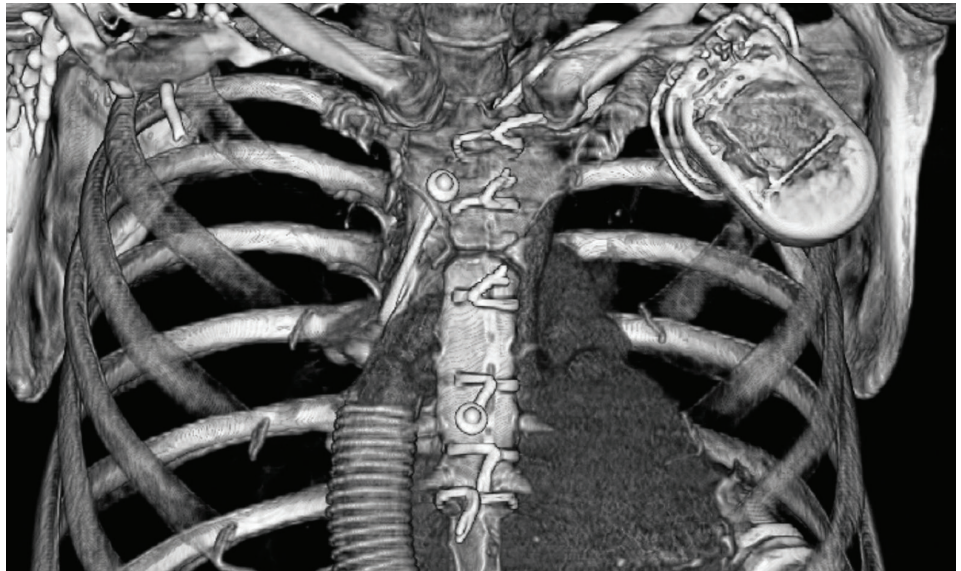
Bianxiao Cui, PhD
Merritt Maduke, PhD
Sanjiv Narayan, MD
Ada Poom, PhD
Paul J. Wang, MD
Minang 'Mintu' Turakhia, MD, MAS

INNOVATION:

Peter J. Fitzgerald, MD, PhD
Yasuhiro Honda, MD
Jayakumar Rajadas, PhD
Daria Mochly-Rosen, PhD
Paul Yock, MD

METABOLIC DISEASES:

Erik Ingelsson, MD, PhD
Fred Kraemer, MD
Thomas Quertermous, MD



OUTCOMES & PREVENTION:

Themistocles Assimes, MD, PhD
Glenn Chertow, MD, PhD
Victor Froelicher, MD
Christopher Gardner, PhD
Robert A. Harrington, MD
Paul Heidenrich, MD, MS
Mark Hlatky, MD
John P. A. Ioannidis, MD, DSc
Philip Lavori, PhD
Kenneth W. Mahaffey, MD
David J. Maron, MD
Doff McElhinney, MD
Jonathan Myers, PhD
Marcia L. Stefanick, PhD
Minang 'Mintu' Turakhia, MD, MAS

PULMONARY BIOLOGY:

Vinicio A. de Jesus Perez, MD
Mark A. Krasnow, MD, PhD
Mark R. Nicolls, MD
Marlene Rabinovitch, MD

STEM CELL BIOLOGY:

Helen M. Blau, PhD
Ioannis Karakikes, PhD
Rongli Liao, PhD
Michael Longaker, MD
Mark Mercola, MD
Hiromitsu 'Hiro' Nakauchi, MD, PhD
Irving Weissman, MD
Y. Joseph Woo, MD
Joseph C. Wu, MD, PhD
Sean M. Wu, MD, PhD
Phillip C. Yang, MD

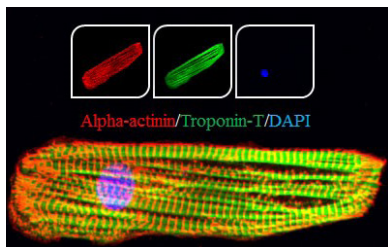
VASCULAR BIOLOGY:

Ronald L. Dalman, MD
Calvin Kuo, MD, PhD
Jason T. Lee, MD
Nicholas Leeper, MD
Stanley G. Rockson, MD
Philip S. Tsao, PhD

WOMEN'S HEALTH:

Kiran Khush, MD
Patricia Nguyen, MD
Marcia L. Stefanick, PhD
Jennifer A. Tremmel, MD, MS

Stanford CVI Human iPSC Biobank Service



Normal and diseased human induced pluripotent stem cell-derived cardiomyocytes are a tremendous resource for researchers and physicians here at Stanford and around the country. Understanding the disease process directly at the population level and observing these cells as surrogates under a myriad conditions has the potential to be a game-changer for cardiovascular medical research.

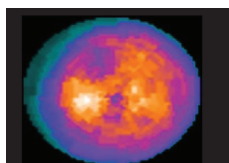
To facilitate research in a dish that allows screening of new compounds or characterization of human disease phenotypes using cardiomyocytes, the Institute created a service by which de-identified peripheral blood mononuclear cell (PBMC) samples from selected patients can be sent to Stanford CVI for reprogramming.

SCVI biobank is supported in part by National Heart, Lung and Blood Institute (NHLBI) and the Stanford Cardiovascular Institute (CVI).

Stanford iPSC Biobank was recently mentioned in Nature Methods news: nature.com/nmeth/journal/v12/n2/full/nmeth.3263.html.

Contact: Joseph Wu, MD, PhD / joewu@stanford.edu
or Biobank manager, **Yan Zhuge** / yanzhuge@stanford.edu with any questions.

Clinical Biomarker & Phenotyping Core Lab (BPCL)



BPCL provides quantitative assessment of clinical cardiovascular phenotypes for translational research and clinical trials. These cardiovascular phenotypes include evaluating cardiac structure and function, measuring carotid intimal thickness and arterial stiffness, and testing endothelial function and cardiopulmonary exercise testing.

In collaboration with the Human Immune Monitoring Center at Stanford and members of the Cardiovascular Institute, we also offer central blood processing and banking capabilities. In addition, we develop new biomarker platforms and imaging modalities.

Contact: Francois Haddad, MD / fhaddad@stanford.edu

CVI Clinical Trials Core

The CVI Clinical Trials Core provides full spectrum of support to CVI members and their clinical trials. The coordinators has extensive clinical research experience in both industry and academia. The team provides services and support to principal investigators and sponsors, including:

- Consultation
- Study start-up management, including IRB applications, budget development
- Subject recruitment, site visits, and follow-ups (AE reporting and queries)
- Data management
- Regulatory compliance and documentation
- Closeout

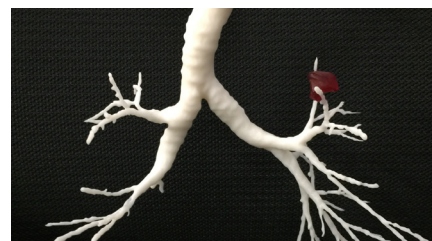
Contact: Ed Finn, Clinical Trials Manager or **Hoa Ly**, Clinical Research Coordinator at (650) 498-6279



Cardiovascular Pharmacology (BioADD)

The Cardiovascular Pharmacology/Biomaterials and Advanced Drug Delivery (BioADD) Laboratory is a cutting edge research facility that specializes in the creation of biomaterials and drug delivery agents. The lab lends its expertise toward designing and analyzing biomaterials, developing drug delivery devices and formulations, pharmacokinetic and pharmacodynamic studies, and developing smart materials for biomedical applications. The CVI Cardiovascular Pharmacology also offers trainings and lectures.

Contact: Jayakumar Rajadas, PhD
jayraja@stanford.edu



3DQ Imaging Laboratory

Stanford's 3DQ Imaging Laboratory develops new approaches to exploration, analysis and quantitative assessments of diagnostic images that result in new and/or more cost-effective diagnostic approaches, and new techniques for the design and monitoring of therapy. The lab processes over 1,200 clinical cases to deliver relevant visualization and analysis of medical imaging data at Stanford.

The lab is co-directed by Dominik Fleischmann, MD; Roland Bammer, PhD, and Sandy Napel, PhD.

Contact: Dominik Fleischmann, MD
d.fleischmann@stanford.edu

Education & Training Programs

The Stanford Cardiovascular Institute offers a unique platform to train the next generation of basic and translational scientists by exposing them to cardiovascular imaging research, mechanisms, and innovations in vascular disease and myocardial biology. Mentors for the programs are drawn from members of this collaborative Institute, including faculty in medicine, materials science, bioengineering, imaging, and health research and policy.

Multi-Disciplinary Program in Cardiovascular Imaging

PROGRAM DIRECTOR

Joseph C. Wu, MD, PhD

CO-DIRECTORS

John Pauly, PhD and Koen Nieman, MD, PhD

The Multi-Disciplinary Training Program in Cardiovascular Imaging at Stanford is funded by the National Institute of Biomedical Imaging and Bioengineering of the National Institutes of Health. The program is designed to train the next generation of CV imaging investigators by exposing them to three complementary areas – clinical, engineering, and molecular imaging. The program trains a total of four fellows in three complementary areas: Clinical, Engineering, and Molecular Imaging. With the impact of cardiovascular disease on US and world health and the rapid advances in imaging technologies and cardiovascular biology, it is critical that fellows be provided a broad, multi-disciplinary, and collaborative training program to foster their ability to translate CV imaging research into clinical applications. The faculty mentors are a critical component of the program, with a balance of MD and PhD mentors across the core collaborative departments.



ADAM BUSH, PHD

Project: Rosette MRI Trajectories for Motion Robust and Resolved Myocardial Iron and Blood Oxygenation Imaging



GENNIFER SMITH, PHD

Project: Risk stratification of atherosclerotic plaques through DNA methylation profiling.



DAVID T. PAIK, PHD

Project: To determine the effects of low-dose radiation on cellular responses in patients undergoing cardiac CTA, and determine novel gene expression signatures for radiosensitivity in response to low dose radiation.



PRIYANKA GARG, PHD

Project: Elucidating pathogenicity of a novel variant of unknown significance in LQTS using genome-editing and patient-specific iPSCs.

Education & Training Programs

Mechanisms and Innovation in Vascular Disease

PROGRAM DIRECTOR

Ronald Dalman, MD

CO-DIRECTOR

Philip Tsao, PhD

CO-DIRECTOR

Nicholas Leeper, MD

The Mechanisms & Innovation in Vascular Disease program trains a total of six fellows over two years through an NIH training grant in the following areas of vascular medicine & research: Vascular Reactivity & Thrombosis, Vascular Regeneration & Development, Metabolic or Lifestyle Influences on Vascular Outcomes, Proteomic Markers & Genetic Determinants of Vascular Disease, Gender & Ethnicity Differences in Vascular Disease, and Vascular Bioengineering. Twenty-nine faculty mentors from eighteen different departments within the School of Medicine and the University provide a variety of angles from which to address fundamental questions about vascular disease.

Courtesy of Daniel Bernstein, MD



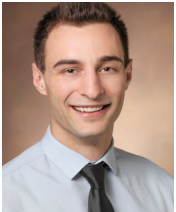
MARCY MARTIN, PHD

Project: Vascular organoids as a model of pulmonary hypertension.



STEPHANIE LINDSEY, PHD

Project: Quantification and Optimization of Tissue Engineered Vascular Graft Growth and Remodeling.



IAN WILLIAMS, PHD

Project: Differentiation of human induced pluripotent stem cells to mature cardiac arterial and venous endothelium.



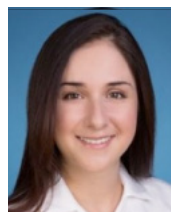
XIAOMING OUYANG, PHD

Project: Modeling Tyrosine Kinase Inhibitor-Induced Vascular Dysfunction Using Human iPSCs.



ALEXANDER KAISER, PHD

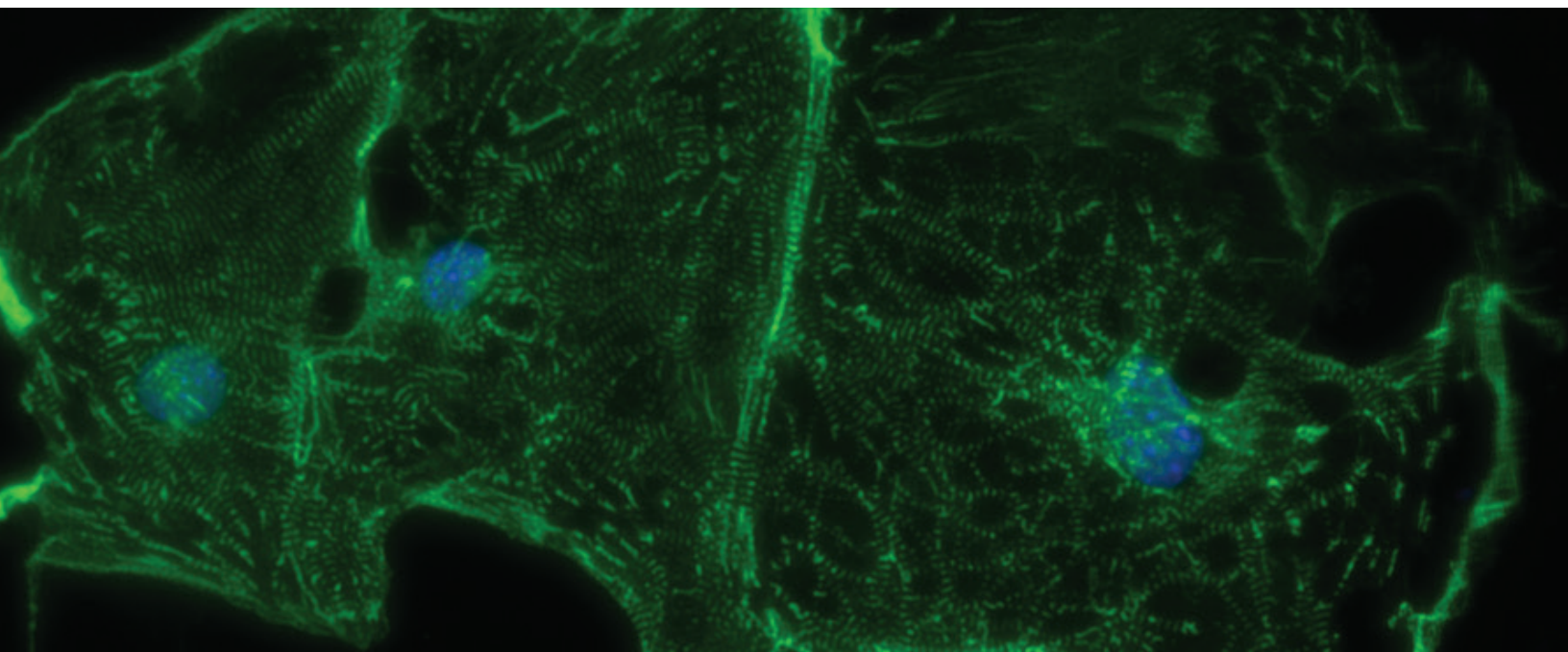
Project: Personalized Virtual Surgery for Precision Treatment of Hypertrophic Cardiomyopathy.



SHEEVA RAJAEI, MD

Project: Lactation duration and women's cardiovascular disease.

Education & Training Programs



Research Training in Myocardial Biology

PROGRAM DIRECTOR

Daniel Bernstein, MD

CO-DIRECTOR

Tom Quertermous, MD

TRAINING COORDINATOR

Euan Ashley, MRCP, DPhil

Myocardial biologists at Stanford are found in diverse departments and divisions, providing a natural vehicle for multidisciplinary training. This program is funded by the National Institutes of Health to bring together post-doctoral fellows and faculty from six complementary areas – genetics and genomics, cellular signaling and molecular imaging, physiology and cardiac development and regeneration, outcomes research and population science.



WILLIAM GOODYER, MD

Project: Elucidation of the development and regenerative capacity of the cardiac conduction system.



ROSHNI MADHVANI, PHD

Project: HCM-causing cTnT mutations and arrhythmias: a mechanistic analysis.



JACK O'SULLIVAN, PHD

Project: A computational assessment of diagnostic tools to identify atrial fibrillation and the creation of a genetically-enhanced risk score to predict the thromboembolic risks of atrial fibrillation



ALISON SCHROER, PHD

Project: Investigating myosin and myofibril mechanobiology in human induced pluripotent stem cell-derived cardiomyocyte.



SARA RANJBARVAZIRI, PHD

Project: Investigating the effect of β -MHC mutations on cardiomyocyte hypertrophy and altered cardiac energetics



SHARON PAIGE, MD, PHD

Project: Human induced pluripotent stem cells for modeling congenital heart disease.

The Impact of Philanthropy

Sudden Cardiac Death



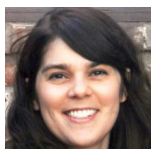
The support from the Steven M. Gootter Foundation allows seed funding of research projects that advance current knowledge of sudden cardiac death (SCD) such as development of molecular tests that can identify

genetic mutations associated with SCD. Hypertrophic cardiomyopathy, in which a portion of the myocardium is thickened, is the most common cause of sudden death in the United States. The Foundation supported the 2016 Stanford Biodesign New Arrhythmia Technologies Conference, 2017 and 2018 Seed Grant research projects, and other ongoing efforts.



2017 Award: Oscar J. Abilez, MD, PhD

"Early Detection of Arrhythmogenesis due to Cardiac Fibrosis via Correlation of In Vitro Modeling and Clinical Assessment"



2018 Award: Kristy Red-Horse, PhD

"Does enhancing coronary artery development promote recovery from cardiac injury?"

Visit the Gootter Foundation www.stevenmgootterfoundation.org



Education

Through a generous \$2.2 million gift from the Dorothy Dee and Marjorie Helene Boring family, the Stanford Cardiovascular Institute awards medical students with demonstrated excellence and dedication to cardiovascular medicine at Stanford.

"We are very grateful for this generous endowment by the Boring Family Trust. Philanthropy enhances our educational mission and helps support the best and brightest young trainees within the Cardiovascular Institute."

— Joseph C. Wu, MD, PhD, Stanford Cardiovascular Institute Director

Visit: med.stanford.edu/cvi/research/i-heart-research-award.html

Lawrence H. and Roberta Cohn Lecture Series

Lawrence H. and Roberta Cohn endowed lectureship, held annually in the area of cardiovascular surgery, brings together physician-scientists from around the country to Stanford. Dr. Cohn graduated from Stanford School of Medicine in 1962 and trained under Dr. Norman Shumway. Dr. Cohn is a pioneer in the field of heart valve repair and replacement surgery and a passionate educator. David Adams, MD from Mount Sinai Hospital gave the inaugural lecture.

The support from our donors is critical for the Institute to provide a wide variety of programs to advance investigation of cardiovascular disease and development of innovative patient care programs. To learn more about how you can support the Stanford Cardiovascular Institute please contact:

Cathy Hutton, MBA
Senior Associate Director,
Medical Center Development
cathy.hutton@stanford.edu

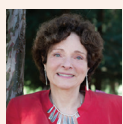


cvi.stanford.edu/waystogive

CVI Seed Grants 2018-2019 (FY 2019)

The Stanford Cardiovascular Institute has provided over **\$2.7 million** in seed funding to support research in cardiovascular research and innovation since 2004. Our goal is to ignite and support new ideas that will change how we diagnosis and treat cardiovascular diseases. Together with Stanford Maternal and Children's Health Research Institute (MCHRI) and the Gootter Foundation, the CVI is excited to support research for nine outstanding projects in 2018.

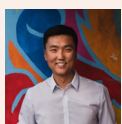
Research Funded by Maternal & Child Health Research Institute



PIs: Helen Blau, PhD; Yu Xin Wang, PhD

Co-Investigators: Mingxia Gu, MD, PhD; Marlene Rabinovich, MD

Multiparametric imaging to study cellular dynamics in Duchenne muscular dystrophy-associated dilated cardiomyopathy



PIs: Michael Snyder, PhD; Mads Melbye, MD

Co-Investigators: Liang Liang, PhD

Identification of metabolic markers during early pregnancy associated with the risk of congenital heart defects in the offspring



PI: Philip Tsao, PhD

Co-Investigators: Joshua M. Sping, MD, PhD; Ronglih Liao, PhD; Nicholas J. Leeper, MD; Juyong Brian Kim, MD

Influence of e-cigarette vapor on experimental aortic aneurysm



PI: Erik Ingelsson, MD, PhD, FAHA

Co-Investigator: Mark Mercola, PhD

Harnessing big data to reduce peripheral evaluation of orphan G-protein-coupled receptor GPR151 as a novel obesity drug



PI: Detlef Obal, MD, PhD

Co-Investigator: Ian Yang-Li Chen, MD, PhD

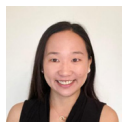
Anesthetics induced myocardial depression through TRPA1 signaling pathway



PI: Kristy Red-Horse, PhD

Co-Investigator: Daniel Bernstein, MD

Does enhancing coronary artery development promote recovery from cardiac injury?



PIs: June-Wha Rhee, MD; Stanley Qi, MD, PhD

Co-Investigator: Masataka Nishiga, MD, PhD

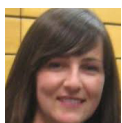
Genome-scale CRISPR interference approach to investigate statin-induced myotoxicity



PIs: Michael Fowler, MB, FRCP; Petra Mamic, MD

Co-Investigators: Michael Snyder, PhD; Thomas Quertermous, MD

Characterization of the gut microbe-host metabolism in heart failure-related insuline resistance



PIs: Alison Marsden, PhD; Jack Boyd, MD

Co-Investigators: Hanjay Wang, MD; Muhammad Owais Khan, PhD; Alexa Wnorowski, MS

A bioabsorbable external mesh to prevent vein graft failure after voronary artery bypass graft surgery



PIs: Jeremy Dahl, PhD; Matthew Lungren, MD, MPH

Co-Investigators: Arsenii Telichko, PhD; Carl Herickhoff, PhD

Novel intervascular ultrasound array catheter for quantitative imaging of vulnerable plaque



PIs: Charles KF Chan, MD; Irving Weissman, MD; Patricia K. Nguyen, MD

Co-Investigator: Andrew Lee

Functional characterization of distinct bone marrow sub-fractions for treatment of myocardial infarction





A Sensitized Genetic Association Study for Congenital Heart Disease

James Priest, MD, Assistant Professor of Pediatrics (cardiology).

Collaborator: Mads Melbye, MD, DMSc

This research was funded by MCHRI

Addressing the Obesity and Diabetes Epidemic Through Understanding Personalized Energy Expenditure

Christopher Gardner, PhD, Rehnborg

Farquhar Professor of Medicine.

Collaborators: Michael Snyder, PhD

(Genetics) & Francois Haddad, MD

(Medicine/Cardiology)

This research was funded by MCHRI

Psychosocial, Cognitive, and Quality of Life Outcomes in Children and Adults with Repaired Tetralogy of Fallot with Pulmonary Atresia and Major Aortopulmonary Collateral Arteries

Doff McElhinney, MD, Professor of Cardiothoracic Surgery (Pediatric Cardiac Surgery) and of Pediatrics (Cardiology).

This research was funded by MCHRI

Early Detection of Arrhythmogenesis due to Cardiac Fibrosis via Correlation of In Vitro Modeling and Clinical Assessment

Oscar Abilez, MD, PhD, Instructor, Medicine (Cardiovascular Medicine).

Collaborators: Huaxiao Yang, PhD, Hung-Ta Wo, MD, Sanjiv Narayan, MD, PhD (Medicine/Cardiology)

Harnessing Big Data to Reduce Peripheral Artery Disease-Related Leg Amputation in Chronic Kidney Disease

Tara Chang, MD, MS, Assistant Professor of Medicine (Nephrology).

Collaborators: Venita Chandra, MD (Surgery), Nicholas Leeper, MD (Surgery/Medicine), Maria Montez-Rath, PhD (Medicine)

Stem Cell-derived Exosomes as Potential Therapy for Acute Myocardial Infarction

Sarah Heilshorn, PhD, Associate Professor of Materials Science and Engineering and (by courtesy) of Chemical Engineering and Bioengineering.

Collaborators: Y. Joseph Woo, MD (CT Surgery)

A Genomic Approach for Early Noninvasive Detection of Post-Transplant Malignancies

Kiran Khush, MD, Associate Professor of Medicine (Cardiovascular Medicine).

Collaborators: Ash Alizadeh, MD, PhD (Medicine/Oncology)

Integrating MultiOmic Data in Coronary Heart Disease: A Pilot Study for New Statistical Methods

Laura Lazzeroni, PhD, Professor (Research) of Psychiatry and Behavioral Sciences and (by courtesy) of Biomedical Data Science.

Collaborators: Thomas Quertermous, MD (Medicine/Cardiology)

Computed Tomography Guided Revascularization of Chronic Coronary Occlusions

Koen Nieman, PhD, Associate Professor of Medicine (Cardiovascular Medicine) and Radiology (CV Imaging).

Collaborators: Jennifer Tremmel, MD (Medicine/Cardiology), Dominik Fleischmann, MD (Radiology)

Study of Aggregation Mechanism of Ig Light Chains from Light Chain Amyloidosis Patients

Jayakumar Rajadas, PhD, Director, BioADD, and Assistant Director of CV Pharmacology, Biomaterials & Advanced Drug Delivery.

Collaborators: Rongli Liao, PhD (Medicine/Cardiology)

Bridging the Gap: The Impact of a New Virtual Preventive Cardiology Clinic on Cardiovascular Risk Reduction in Two High Risk Ethnic Populations

Fatima Rodriguez, MD, MPH, Clinical Instructor, Medicine-Cardiovascular Medicine.

Collaborator: Rajesh Dash, MD, PhD (Medicine/Cardiology)

A Perfusion Bioreactor for Understanding Endocardial-Myocardial Interactions in Hypoplastic Left Heart Syndrome

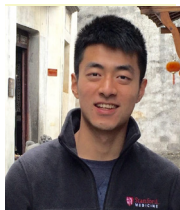
Sean Wu, MD, PhD Associate Professor of Medicine (Cardiovascular Medicine) and (by courtesy) of Pediatrics.

Collaborator: Marlene Rabinovitch, MD (Pediatrics/Cardiology)

Seed grants are essential for opening doors to discovery. With this support, our investigators can pursue their boldest ideas and shift paradigms to create new treatments for cardiovascular disease. Stanford revolutionized heart treatment before, and we are poised to do it again. —Joseph C. Wu, MD, PhD

iHeart Research Award

The iHeart Research award, supported by the Boring Family Trust, supports Stanford medical students excited about research solutions that impact how we treat and prevent cardiovascular diseases.



DANNY HUANG

Project: Rapid detection of intracranial large vessel occlusion and prediction of treatment outcomes using deep convolutional neural networks.



KEVIN CYR

Project: A Novel Patient- Specific Device for Atrial Fibrillation Mapping and Therapy.



ANNIKA DRIES

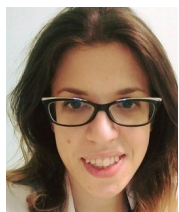
Project: Evaluating the regional pathogenicity of genetic variants in arrhythmogenic right ventricular cardiomyopathy (ARVC).

iHeart Research

Dorothy Dee & Marjorie Helene Boring Trust Award

Manuscript Awards 2018

Each winter, CVI recognizes the authors of outstanding publications.



Right Heart End-Systolic Remodeling Index Strongly Predicts Outcomes in Pulmonary Arterial Hypertension: Comparison with Validated Models.

MYRIAM AMSALLEM, MD

Amsallem M, Sweatt AJ, Aymami MC, Kuznetsova T, Selej M, Lu H, Mercier O, Fadel E, Schnittger I, McConnell MV, Rabinovitch M, Zamanian RT, Haddad F. **Circ Cardiovasc Imaging.** 2017 Jun;10(6).



Agreement of the Resting Distal to Aortic Coronary Pressure with the Instantaneous Wave-Free Ratio.

YUHEI KOBAYASHI, MD

Kobayashi Y, Johnson NP, Zimmermann FM, Witt N, Berry C, Jeremias A, Koo BK, Esposito G, Rioufol G, Park SJ, Nishi T, Choi DH, Oldroyd KG, Barbato E, Pijls NHJ, De Bruyne B, Fearon WF; CONTRAST Study Investigators. **J Am Coll Cardiol.** 2017 Oct 24;70(17):2105-2113.



Genome-Wide Temporal Profiling of Transcriptome and Open Chromatin of Early Cardiomyocyte Differentiation Derived from hiPSCs and hESCs.

QING LIU, PHD

Liu Q, Jiang C, Xu J, Zhao MT, Van Bortle K, Cheng X, Wang G, Chang HY, Wu JC, Snyder MP. **Circ Res.** 2017 Aug 4;121(4):376-391.



Molecular and Functional Resemblance of Differentiated Cells Derived from Isogenic Human iPSCs and SCNT-Derived ESCs.

MINGTAO ZHAO, PHD

Zhao MT, Chen H, Liu Q, Shao NY, Sayed N, Wo HT, Zhang JZ, Ong SG, Liu C, Kim Y, Yang H, Chour T, Ma H, Gutierrez NM, Karakikes I, Mitalipov S, Snyder MP, Wu JC. **Proc Natl Acad Sci USA.** 2017 Dec 26;114(52):E11111-E11120.

Manuscript Awards 2016-17

2017

Patient-Specific iPSC-Derived Endothelial Cells Uncover Pathways that Protect against Pulmonary Hypertension in BMPR2 Mutation Carriers.

MINGXIA GU, PhD

Gu M, Shao NY, Sa S, Li D, Termglinchan V, Ameen M, Karakikes I, Sosa G, Grubert F, Lee J, Cao A, Taylor S, Ma Y, Zhao Z, Chappell J, Hamid R, Austin ED, Gold JD, Wu JC, Snyder MP, Rabinovitch M. **Cell Stem Cell**. 2016 Apr 6;20(4):490-504.

Transcriptome Profiling of Patient-Specific Human iPSC-Cardiomyocytes Predicts Individual Drug Safety and Efficacy Responses In Vitro.

ELENA MATSA, PhD

Matsa E, Burridge PW, Yu KH, Ahrens JH, Termglinchan V, Wu H, Liu C, Shukla P, Sayed N, Churko JM, Shao N, Woo NA, Chao AS, Gold JD, Karakikes I, Snyder MP, Wu JC. **Cell Stem Cell**. 2016 Sep 1;19(3):311-25.

Attenuated-Singal Plaque Progression Predicts Long-Term Mortality After Heart Transplantation: IVUS Assessment of Cardiac Allograft Vasculopathy.

KOZO OKADA, MD

Okada K, Fearon WF, Luikart H, Kitahara H, Otagiri K, Tanaka S, Kimura T, Yock PG, Fitzgerald PJ, Yeung AC, Valentine HA, Khush KK, Honda Y. **J Am College Cardiol**. 2016 Jul 26;68(4):382-92.

Association Between Intensity of Statin Therapy and Mortality in Patients with Atherosclerotic Cardiovascular Disease.

FATIMA RODRIGUEZ, MD, MPH

Rodriguez F, Maron DJ, Knowles JW, Virani SS, Lin S, Heidenreich PA. **JAMA Cardiol**. 2017 Jan 1;2(1):47-54.

2016

Contractility of Single Cardiomyocytes Differentiated from Pluripotent Stem Cells Depends on Physiological Shape and Substrate Stiffness.

Alexandre J. S. Ribeiro, PhD

Ribeiro AJ, Ang YS, Fu JD, Rivas RN, Mohamed TM, Higgs GC, Srivastava D, Pruitt BL. **Proc Natl Acad Sci**. 2015 112(41):12705-10.

Epicardial FSTL1 Reconstitution Regenerates the Adult Mammalian Heart.

Ke Wei, PhD

Wei K, Serpooshan V, Hurtado C, Diez-Cuñado M, Zhao M, Maruyama S, Zhu W, Fajardo G, Nosedá M, Nakamura K, Tian X, Liu Q, Wang A, Matsuura Y, Bushway P, Cai W, Savchenko A, Mahmoudi M, Schneider MD, van den Hoff MJ, Butte MJ, Yang PC, Walsh K, Zhou B, Bernstein D, Mercola M, Ruiz-Lozano P. **Nature**. 525, 479–485.

Epigenetic Regulation of Phosphodiesterases 2A and 3A Underlies Compromised Beta Adrenergic Signaling in an iPSC Model of Dilated Cardiomyopathy.

Haodi Wu, PhD

Wu H, Lee J, Vincent LG, Wang Q, Gu M, Lan F, Churko JM, Sallam KI, Matsa E, Sharma A, Gold JD, Engler AJ, Xiang YK, Bers DM, Wu JC. **Cell Stem Cell**. 17, 89–100.

The Prognostic Value of Residual Coronary Stenoses After Functionally Complete Revascularization.

Yuhei Kobayashi MD

Kobayashi Y, Nam CW, Tonino PA, Kimura T, De Bruyne B, Pijls NH, Fearon WF; FAME Study Investigators. **J Am College Cardiol**. Apr 12;67(14):1701-11.

Frontiers in Cardiovascular Science

The Frontiers in Cardiovascular Science lecture series is the flagship colloquium of the Stanford Cardiovascular Institute. Distinguished local, national and international scientists performing cutting-edge cardiovascular research (in both industry and academia) are invited to present their research and network with the CVI community. By convening thought leaders in cardiovascular science, this seminar series facilitates the initiation of new collaborations and accelerates science at Stanford.

January 8, 2019

MARK T. GLADWIN, MD

Jack D. Myers Professor and Chair
Department of Medicine Director
Pittsburgh Heart, Lung, and Blood Vascular
Medicine Institute

January 22, 2019

TIMOTHY J. NELSON, MD, PHD

Associate Professor of Pharmacology,
Associate Professor of Medicine, and
Director of Research, NWWI, Mayo Clinic
Health System in Eau Claire, Mayo Clinic
Health System

January 29, 2019

DAVID J. PINSKY, MD

Professor
Division Chief of Cardiovascular Medicine,
University of Michigan
Director, Frankel Cardiovascular Center

February 5, 2019

DAN M. RODEN, MD

Professor of Medicine, Pharmacology, and
Biomedical Informatics
Sam L. Clark, MD, PhD Endowed Chair
Senior Vice President for Personalized
Medicine, Vanderbilt University

February 12, 2019

STEPHEN MONTGOMERY, PHD

Associate Professor of Pathology and of
Genetics, Stanford University

February 26, 2018

KENNETH B. MARGUILES, MD

Professor of Medicine, Hospital of the
University of Pennsylvania
Research Director, Heart Failure/
Transplantation

March 5, 2019

**PROF. DR. RER. NAT. VIACHESLAV
NIKOLAEV**

Director, Institute Center for Experimental
Medicine
Universitätsklinikum Hamburg-Eppendorf

March 12, 2019

PAUL WANG, MD

Professor of Medicine (Cardiovascular
Medicine), Stanford University Medical
Center

SANJIV NARAYAN, MD

Professor of Medicine (Cardiovascular
Medicine), Stanford University Medical
Center

March 26, 2019

TODD MCDEVITT, PHD

Senior Investigator, Gladstone Institute of
Cardiovascular Disease
Professor, Department of Bioengineering &
Therapeutic Sciences, UC San Francisco
Investigator, Roddenberry Center for Stem
Cell Biology & Regenerative Medicine at
Gladstone

April 9, 2019

**CHRISTOPHER NEWTON-CHEH,
MD, PHD**

Assistant Professor of Medicine, Harvard
Medical School
Faculty Member, Massachusetts General
Hospital

April 16, 2019

DOUG SAWYER, MD, PHD

Co-Director, Myocardial Biology & Heart
Failure Research
Lab Chief, Cardiovascular Services, Maine
Medical Center

April 30, 2019

LESLIE LEINWAND, PHD

Professor, Department of Molecular,
Cellular, and Developmental Biology
Chief Scientific Officer, BioFrontiers
Institute, University of Colorado, Boulder

May 7, 2019

PETER J. SCHWARTZ, MD

Professor and Head, Center for Cardiac
Arrhythmias of Genetic Origin IRCCS
Istituto, Auxologico Italiano

MAY 14, 2019

RALPH SHOHEIT, MD

Director, Center for Cardiovascular
Research Professor of Medicine, University
of Hawaii

May 21, 2019

NIPAVAN CHIAMVIMONVAT, MD

Professor, Department of Internal Medicine
(Cardiology), School of Medicine, UC Davis

May 28, 2019

ADAM J. ENGLER, PHD

Professor and Vice Chair of Bioengineering,
University of California, San Diego

June 11, 2019

JANE E. FREEDMAN, MD

Edward Budnitz Professor of Cardiovascular
Medicine, Director of Translational
Research, UMass Memorial Heart & Vascular
Center, UMass Medical School

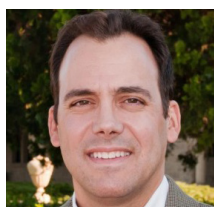


MED 223: Cardiovascular Research & Medicine

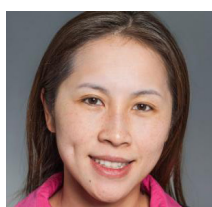
Winter 2019

The focus of MED223 is to fine tune critical thinking skills by analyzing original publications and understand the current complexities of the cardiovascular system.

Directors:



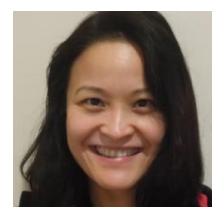
Tim Assimes, MD, PhD



Ngan Huang, PhD



Ioannis Karakikes, PhD



Patricia Nguyen, MD

January 10, 2019

NATALIE LUI, MD

Associate Professor of Cardiothoracic Surgery (Thoracic Surgery)

January 17, 2019

PHILIP C. YANG, MD

Associate Professor of Medicine (Cardiovascular Medicine)

January 24, 2019

DANIEL ENNIS, PHD

Associate Professor of Radiology (Veterans Affairs)

January 31, 2019

KOEN NIEMAN, MD, PHD

Associate Professor of Medicine (Cardiovascular Medicine) and of Radiology (CV Imaging)

February 7, 2019

ROBERT WIRKA, MD

Instructor, Medicine - Cardiovascular Medicine

February 14, 2019

MICHAEL S. KAPILOFF, PHD

Associate Professor (Research) of Ophthalmology and, by courtesy, of Medicine (Cardiovascular Medicine)

February 21, 2019

SEAN WU, MD, PHD, FACC

Associate Professor of Medicine (Cardiovascular Medicine) and, by courtesy, of Pediatrics

February 28, 2019

NAZISH SAYED, MD, PHD

Instructor, Cardiovascular Institute

March 7, 2019

DUNG NGUYEN, MD, PHARM.D

Clinical Associate Professor, Surgery - Plastic & Reconstructive Surgery

March 14, 2019

ELAN BURTON, MD

Clinical Assistant Professor, Cardiothoracic Surgery

Vera Moulton Wall Center for Pulmonary Vascular Disease



VERA MOULTON WALL CENTER
FOR PULMONARY VASCULAR DISEASE
AT STANFORD

Our Mission

To eradicate pulmonary vascular disease by discovering fundamental causes, developing innovative therapies, disseminating crucial knowledge, and delivering transformative care.

Our Vision

To transform the way pulmonary vascular disease is understood and treated, both locally and globally.

Who We Are

An international leader in the field of pulmonary vascular disease with an established tradition of innovative research, exceptional teaching, and outstanding patient care. A pioneer of new and novel clinical therapies, the Vera Moulton Wall Center is uniquely positioned to lead the field translating research into effective pulmonary hypertension (PH) therapies.

What We Do



Steering Committee



Mark Krasnow, MD, PhD

Endowed Chair, The Paul and Mildred Berg Professorship Investigator, Howard Hughes Medical Institute Executive Director, Wall Center for Pulmonary Vascular Disease



Jeffrey Feinstein, MD, MPH

Endowed Chair, The Dunlevie Family Professorship in Pulmonary Vascular Disease and Professor, by courtesy, of Bioengineering at Lucile Packard Children's Hospital Director, Vera Moulton Wall Center



Mark Nicolls, MD

Endowed Chair, The Stanford Professor of Pulmonary and Critical Care Medicine; Professor, Immunology and Rheumatology; Chief, Division of Pulmonary and Critical Care Medicine; Director, Lung Immunology



Roham Zamanian, MD, FCCP

Associate Professor, Pulmonary & Critical Care Medicine Director, Adult Pulmonary Hypertension (PH) Program

Contact Us

Phone: 800.640.9255

Email: wallcenter@stanford.edu

Web: wallcenter.stanford.edu

RESEARCHER PROFILES





Christopher Almond, MD

Associate Professor of Pediatrics (Cardiology)
at the Lucile Salter Packard Children's Hospital
Director, Cardiac Anticoagulation Services, Stanford Children's Health

EMAIL calmond@stanford.edu

PROFILE med.stanford.edu/profiles/Christopher-Almond

EDUCATION/TRAINING

MD University of Connecticut

INTERNSHIP

Boston Children's Hospital (2000)

RESIDENCY

Boston Children's Hospital (Combined
Residency in Pediatrics) (2002)

FELLOWSHIPS

Boston Children's Hospital (2005)

Boston Children's Hospital (2006)

BOARD CERTIFICATION

Pediatrics, American Board of Pediatrics
(2002)

Pediatric Cardiology, American Board of
Pediatrics (2014)

CURRENT RESEARCH

Dr. Almond's clinical research efforts focus on improving outcomes for children with end-stage heart failure, specifically in the areas of pediatric ventricular assist devices, cardiac transplantation, medical management of decompensated heart failure, and anticoagulation. He has a special interest in the design of multicenter clinical trials to evaluate promising drugs and devices seeking FDA approval for rare diseases. Dr. Almond served as the national PI for the Berlin Heart EXCOR Pediatric VAD multicenter clinical trial. He currently serves as PI for the TEAMMATE Trial, a randomized clinical trial evaluating Everolimus to prevent long-term complications after pediatric heart transplantation, and the PumpKIN trial, evaluating the Jarvik 2015, a miniaturized continuous flow durable VAD for bridge to heart transplant in children.

We have had a longstanding interest in how to use ventricular assist devices (VAD) in children, and we want to carry that into the future, as well.

SELECTED PUBLICATIONS

Impact of the 18th birthday on waitlist outcomes among young adults listed for heart transplant: A regression discontinuity analysis. Peng DM, Qu Q, McDonald N, Hollander SA, Bernstein D, Maeda K, Kaufman BD, Rosenthal DN, McElhinney DB, Almond CS. *J Heart Lung Transplant*. 2017 May 19.

Temporary Circulatory Support in U.S. Children Awaiting Heart Transplantation. Yarlagadda VV, Maeda K, Zhang Y, Chen S, Dykes JC, Gowen MA, Shuttlesworth P, Murray JM, Shin AY, Reinhartz O, Rosenthal DN, McElhinney DB, Almond CS. *J Am Coll Cardiol*. 2017 Oct 31;70(18):2250-2260.

Hemodynamic Profiles of Children with End-Stage Heart Failure. Chen S, Dykes CJ, McElhinney DB, Gajarski RJ, Shin AY, Hollander SA, Everitt ME, Price JF, Thiagarajan RR, Kindel SJ, Rossano JW, Kaufman BD, May LJ, Pruitt E, Rosenthal DN, Almond CS. *European Heart Journal* 2017 Oct 7;38(38):2900-2909.

Development and validation of a major adverse transplant event (MATE) score to predict late graft loss in pediatric heart transplantation. Almond CS, Hoen H, Rossano JW, Castleberry C, Auerbach SR, Yang L, Lal AK, Everitt MD, Fenton M, Hollander SA, Pahl E, Pruitt E, Rosenthal DN, McElhinney DB, Daly KP, Desai M; Pediatric Heart Transplant Study (PHTS) Group Registry. *J Heart Lung Transplant*. 2017 Mar 24.

Impact of a modified anti-thrombotic guideline on stroke in children supported with a pediatric ventricular assist device. Rosenthal DN, Lancaster CA, McElhinney DB, Chen S, Stein M, Lin A, Doan L, Murray JM, Gowen MA, Maeda K, Reinhartz O, Almond CS. *J Heart Lung Transplant*. 2017 May 20.



Russ B. Altman, MD, PhD

Kenneth Fong Professor and Professor of Bioengineering, of Genetics, of Medicine (General Medical Discipline) and, by Courtesy, of Computer Science

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EDUCATION/TRAINING

MD Stanford University

PHD Stanford University

BOARD CERTIFICATION Diplomate, ABIM

RESEARCH FOCUS

Biomedical informatics,
pharmacogenomics,
structural informatics,
bioengineering, genetics,
artificial intelligence,
data science,
pharmacology

HONORS & AWARDS

Editor-in-Chief, Annual Reviews of
Biomedical Data Science (2016 -
Present)

Advisor, NIH Advisory Committee to the
Director (ACD) (2013 - 2018)

Member, FDA Commissioner Science
Board (2011 - 2014)

Co-Organizer, Pacific Symposium on
Biocomputing (psb.stanford.edu) (1995-
Present)

Co-PI UCSF-Stanford FDA Center of
Excellence for Regulatory Science &
innovation (2015 - present)

CURRENT RESEARCH

Russ Altman's primary research interests are in the application of computing and informatics technologies to problems relevant to medicine. He is particularly interested in methods for understanding drug action at molecular, cellular, organism, and population levels. His lab studies how human genetic variation impacts drug response (e.g., <http://www.pharmgkb.org/>). Other work focuses on the analysis of biological molecules to understand the actions, interactions and adverse events of drugs (e.g., <http://feature.stanford.edu/>). He helps lead an FDA-supported Center of Excellence in Regulatory Science & Innovation.

SELECTED PUBLICATIONS

Zhou W, A Data-driven human transcriptomic modules determined by independent component analysis. *BMC Bioinformatics*. 2018 Sep 17;19(1):327.

Lo YC, Liu T, Morrissey KM, Kakiuchi-Kiyota S, Johnson AR, Broccatelli F, Zhong Y, Joshi A, Altman RB. Computational Analysis of Kinase Inhibitor Selectivity using Structural Knowledge. *Bioinformatics*. 2018 Jul 9.

Percha B, Altman RB. A global network of biomedical relationships derived from text. *Bioinformatics*. 2018 Aug 1;34(15):2614-2624.

Barbarino JM, Whirl-Carrillo M, Altman RB, Klein TE. PharmGKB: A worldwide resource for pharmacogenomic information. *Wiley Interdiscip Rev Syst Biol Med*. 2018 Jul;10(4):e1417. Review.

Han L, Maciejewski M, Brockel C, Afzelius L, Altman RB. Mendelian Disease Associations Reveal Novel Insights into Inflammatory Bowel Disease. *Inflamm Bowel Dis*. 2018 Feb 15;24(3):471-481.



Euan A. Ashley, BSc, MB ChB, FRCP, DPhil

Professor, Medicine - Cardiovascular Medicine; Professor, Genetics; Professor, Biomedical Data Science; Professor (by courtesy), Pathology; Co-Director, Stanford Data Science Initiative; Director, Stanford Clinical Genomics Program; Co-Director, Center for Digital Health; Director, Stanford Cardiopulmonary Exercise Testing Laboratory

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EDUCATION/TRAINING

MD University of Glasgow

DPhil University of Oxford

MEDICINE INTERNSHIP

University of Glasgow

MEDICINE RESIDENCY

University of Oxford

CARDIOLOGY FELLOWSHIP

Stanford University

BOARD CERTIFICATION MRCP (UK)

CLINICAL FOCUS

Cardiology

Heart Failure

Genomic Medicine

Inherited Cardiovascular Disease

HONORS & AWARDS

White House Honoree

One Brave Idea

NIH Director's New Innovator Award

Innovative Research Award, American Heart Association (AHA)

Faculty Scholar, Donald E. and Delia B. Baxter Foundation

CURRENT RESEARCH

My lab is focused on the application of genomics to medicine. We develop methods for the interpretation of whole genome sequencing data to improve diagnosis of genetic disease and to personalize the practice of medicine. We love big data questions and are obsessed with systems approaches to biology especially analysis of network graphs. The wet bench is where we test causality of key genes and investigate the biology of network modules. It is also the focus of our translational efforts. Therapeutic development is a near term goal, and several of our discoveries are the focus of patents or are being actively pursued by pharmaceutical and biotechnology partners.

If your dreams do not scare you, they are not big enough. — Ellen Johnson Sirleaf

SELECTED PUBLICATIONS

Effect of Genetic Diagnosis on Patients with Previously Undiagnosed Disease. Splinter K, Adams DR, Bacino CA, Bellen HJ, Bernstein JA, Cheattle-Jarvela AM, Eng CM, Esteves C, Gahl WA, Hamid R, Jacob HJ, Kikani B, Koeller DM, Kohane IS, Lee BH, Loscalzo J, Luo X, McCray AT, Metz TO, Mulvihill JJ, Nelson SF, Palmer CGS, Phillips JA 3rd, Pick L, Postlethwait JH, Reuter C, Shashi V, Sweetser DA, Tifft CJ, Walley NM, Wangler MF, Westerfield M, Wheeler MT, Wise AL, Worthey EA, Yamamoto S, Ashley EA; Undiagnosed Diseases Network. *N Engl J Med.* 2018 Nov 29;379(22):2131-2139.

Genome Sequencing in Hypertrophic Cardiomyopathy. Ashley EA, Reuter CM, Wheeler MT. *J Am Coll Cardiol.* 2018 Jul 24;72(4):430-433.

Multidimensional structure-function relationships in human β -cardiac myosin from population-scale genetic variation. Homburger JR, Green EM, Caleshu C, Sunitha MS, Taylor RE, Ruppel KM, Metpally RP, Colan SD, Michels M, Day SM, Olivetto I, Bustamante CD, Dewey FE, Ho CY, Spudich JA, Ashley EA. *PNAS USA*; 2016;113(24):6701-6.

Early somatic mosaicism is a rare cause of long-QT syndrome. Priest J. R., Gawad, C., Kahlig, K. M., Yu, J. K., O'Hara, T., Boyle, P. M., Rajamani, S., Clark, M. J., Garcia, S. T., Ceresnak, S., Harris, J., Boyle, S., Dewey, F. E., Malloy-Walton, L., Dunn, K., Grove, M., Perez, M. V., Neff, N. F., Chen, R., Maeda, K., Dubin, A., Belardinelli, L., West, J., Antolik, C., Macaya, D., Quertermous, T., Trayanova, N. A., Quake, S. R., Ashley, E. A. *PNAS USA* ; 2016; 113 (41): 11555-11560



Themistocles (Tim) Assimes, MD, PhD, FRCPC, FAHA

Associate Professor, Medicine - Cardiovascular Medicine
Attending Cardiologist, Palo Alto VA Health Care System

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EDUCATION/TRAINING

MD/PHD McGill University

MEDICINE RESIDENCY

McGill University

CARDIOLOGY FELLOWSHIP

Stanford University

BOARD CERTIFICATION

Cardiovascular Medicine, ABIM

CLINICAL FOCUS

General Cardiology

Primary and Secondary Prevention of
Coronary Artery Disease

Echocardiography

APPOINTMENTS

Associate Director, Epidemiology
Research and Information

Center for Genomics, Palo Alto VA
Hospital (2018 – Present)

Steering Committee, Project Baseline
(2017 - Present)

Leadership Committee, Council of
Genomics and Precision Medicine,
American Heart Assoc (2016 - present)

Membership & Communications, Council
of Epidemiology and Prevention,
American Heart Org. (2016 - present)

Steering Committee,
CARDIoGRAMplusC4D (2012 - Present)

Co-chair, Women's Health Init. Scientific
Interest Group for Genetics, Proteomics
& Biomarkers (2010 - Present)

Member, Ancillary Studies Committee,
Women's Health Init. (2010 - Present)

CURRENT RESEARCH

My investigative focus is the design, conduct, analysis, and interpretation of human molecular epidemiology studies of complex cardiovascular disease (CVD) related traits including coronary atherosclerosis and risk factors for coronary atherosclerosis. In addition to performing discovery and validation population genomic studies, we use contemporary genetic studies to gain important insight on the causal and mechanistic nature of associations between purported risk factors and adverse cardiovascular related health outcomes through instrumental variable analyses and genetic risk score association studies of intermediate phenotypes. I am also actively involved in studies assessing the clinical utility of novel genetic markers in isolation or in combination with other biomarkers.

To crack the code of complex cardiovascular traits, we need collaborative networks almost as complicated as the biological networks we are trying to understand. The CVI allows such networks to seed and flourish.

SELECTED PUBLICATIONS

Genetics of blood lipids among ~300,000 multi-ethnic participants of the Million Veteran Program. Klarin D, Damrauer SM, Cho K, Sun YV, Teslovich TM, Honerlaw J, Gagnon DR, DuVall SL, [30 authors]; Global Lipids Genetics Consortium; Myocardial Infarction Genetics (MIGen) Consortium; Geisinger-Regeneron DiscovEHR Collaboration; VA Million Veteran Program, Concato J, Gaziano JM, O'Donnell CJ, Tsao PS, Kathiresan S, Rader DJ, Wilson PWF, Assimes TL. *Nat Genet.* 2018 Nov;50(11):1514-1523.

Leveraging Multi-ethnic Evidence for Risk Assessment of Quantitative Traits in Minority Populations. Coram MA, Fang H, Candille SI, Assimes TL, Tang H. *Am J Hum Genet.* 2017 Aug 3;101(2):218-226.

Fifteen new risk loci for coronary artery disease highlight arterial-wall-specific mechanisms. Howson JMM, Zhao W, Barnes DR, Ho WK, Young R, Paul DS, Waite LL, Freitag DF, Fauman EB, [60 authors], Chen YI, Nordestgaard BG, Assimes TL, Danesh J, Butterworth AS, Saleheen D. *Nat Genet.* 2017 Jul;49(7):1113-1119.

An epigenetic clock analysis of race/ethnicity, sex, and coronary heart disease. Horvath S, Gurven M, Levine ME, Trumble BC, Kaplan H, Allayee H, Ritz BR, Chen B, Lu AT, Rickabaugh TM, Jamieson BD, Sun D, Li S, Chen W, Quintana-Murci L, Fagny M, Kobor MS, Tsao PS, Reiner AP, Edlefsen KL, Absher D, Assimes TL. *Genome Biol.* 2016 Aug 11;17(1):171.



Leah Backhus, MD, MPH, FACS

Associate Professor of Cardiothoracic Surgery (Thoracic Surgery) at the Palo Alto Veterans Affairs Health Care System
Thoracic Track Residency Associate Program Director
Co-Director, Thoracic Surgery Health Services Research

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EDUCATION/TRAINING

MD University of Southern California
Keck School of Medicine

MPH University of Washington

RESIDENCY UCLA David Geffen School of
Medicine and USC Medical Center

INTERNSHIP USC Medical Center

AB Stanford University, Human Biology

BOARD CERTIFICATION

Thoracic Surgery, ABTS
General Surgery, ABS

HONORS & AWARDS

MEMBER

American Medical Association
Society of Thoracic Surgeons
International Association for the Study
of Lung Cancer
Fellow, American College of Surgeons
Western Thoracic Surgical Association
Women in Thoracic Surgery
Professional member of the Patient
Centered Outcomes Research Institute
(PCORI) Advisory Panel on Improving
Healthcare Systems

CURRENT RESEARCH

Leah Backhus trained in general surgery at the University of Southern California and cardiothoracic surgery at the University of California Los Angeles. She practices at Stanford Hospital and is Chief of Thoracic Surgery at the VA Palo Alto. Her surgical practice consists of general thoracic surgery with special emphasis on thoracic oncology and minimally invasive surgical techniques. She is Co-Director of the Thoracic Surgery Clinical Research Program and has independent grant funding with a VA Merit Award through the Veterans Affairs Administration Health Services Research & Development. Her current research interests are in imaging surveillance following treatment for lung cancer and cancer survivorship. Outside of Stanford, she is also a member of the National Lung Cancer Roundtable in conjunction with the American Cancer Society and serves as the Chair of the Women and Lung Cancer Task Group.

SELECTED PUBLICATIONS

Thirty-day unplanned postoperative inpatient and emergency department visits following thoracotomy. Shaffer R, Backhus L, Finnegan MA, Remington AC, Kwong JZ, Curtin C, Hernandez-Boussard T. *J Surg Res.* 2018 Oct;230:117-124.

Unhealthy alcohol use is associated with postoperative complications in veterans undergoing lung resection. Graf SA, Zeliadt SB, Rise PJ, Backhus LM, Zhou XH, Williams EC. *J Thorac Dis.* 2018 Mar;10(3):1648-1656.

Intraoperative costs of video-assisted thoracoscopic lobectomy can be dramatically reduced without compromising outcomes. Richardson MT, Backhus LM, Berry MF, Vail DG, Ayers KC, Benson JA, Bhandari P, Teymourtash M, Shrager JB. *J Thorac Cardiovasc Surg.* 2018 Mar;155(3):1267-1277. e1.

Patients Reported Outcomes in Thoracic Surgery. Pompili C, Absolom K, Velikova G, Backhus L. *J Thorac Dis.* 2018 Feb;10(2):703-706.

Imaging surveillance and survival for surgically resected non-small-cell lung cancer. Backhus LM, Farjah F, Liang CK, He H, Varghese TK Jr, Au DH, Flum DR, Zeliadt SB. *J Surg Res.*; 2016 Jan; 200(1): 171-6.

Failure to rescue and pulmonary resection for lung cancer. Farjah F, Backhus L, Cheng A, Englum B, Kim S, Saha-Chaudhuri P, Wood DE, Mulligan MS, Varghese TK. *J Thorac Cardiovasc Surg.* 2015 May; 149 (5): 1365-71.

Predictors of imaging surveillance for surgically treated early-stage lung cancer. Backhus LM, Farjah F, Zeliadt SB, Varghese TK, Cheng A, Kessler L, Au DH, Flum DR. *Ann Thorac Surg.*; 2014 Dec; 98 (6): 1944-51; discussion 1951-2.

Appropriateness of imaging for lung cancer staging in a national cohort. Backhus LM, Farjah F, Varghese TK, Cheng AM, Zhou XH, Wood DE, Kessler L, Zeliadt SB. *J Clin Oncol.* 2014 Oct 20; 32 (30): 3428-35.



Hans-Christoph Becker, MD

Professor of Radiology (General Radiology) at the Stanford University Medical Center

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EDUCATION/TRAINING

MD Ludwig-Maximilians-University, Germany

INTERNSHIP Ludwig-Maximilians-University, Germany

RESIDENCY Ludwig-Maximilians-University, Germany

MEMBERSHIP

Radiological Society of North America

North American Society of Cardiovascular Imaging

Society of Computed Tomography & Magnetic Resonance

European Society of Radiology

CURRENT RESEARCH

My current research focus in cardiovascular imaging is on myocardial and tumor perfusion imaging by multi-detector-row computed tomography, and comparison of intravascular ultrasound with computed tomography for the assessment of myocardial coronary artery bridges. From my former work, my area of expertise includes contrast induced nephropathy, new image reconstruction methods and radiation protection strategies, meta-analysis for the predictive value of cardiac CT, as well as large clinical surveys in the field of radiation exposure habits. My primary clinical focus is cardiovascular imaging, particularly cardiac CT as well as congenital cross-sectional imaging. Together with the 3D lab, I am establishing standardized response assessment for different tumor entities and new targeted and immunotherapies with cross sectional imaging for patients in clinical trials.

SELECTED PUBLICATIONS

Myocardial Bridges on Coronary Computed Tomography Angiography Correlation with Intravascular Ultrasound and Fractional Flow Reserve. Forsdahl SH, Rogers IS, Schnittger I, Tanaka S, Kimura T, Pargaonkar VS, Chan FP, Fleischmann D, Tremmel JA, Becker HC. *Circ. J.* 2017 Nov 24.

Contrast Administration in CT: A Patient-Centric Approach. Kalra MK, Becker HC, Enterline DS, Lowry CR, Molvin LZ, Singh R, Rybicki FJ. *J Am Coll Radiol.* 2018 Aug 2.



Daniel Bernstein, MD

Associate Dean for Curriculum and Scholarship
Stanford University School of Medicine
Alfred Woodley Salter and Mabel G. Salter Endowed Professor of Pediatrics
(Cardiology) Stanford University
Former Division Chief, Pediatric Cardiology
Former Director, Children's Heart Center, Lucile Packard Children's Hospital at Stanford

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LAB murinecvcore.stanford.edu

EDUCATION/TRAINING

MD New York University

PEDIATRICS RESIDENCY
Montefiore Medical Center

MEDICAL EDUCATION FELLOWSHIP
Albert Einstein College of Medicine

PEDIATRIC CARDIOLOGY FELLOWSHIP
UCSF

BOARD CERTIFICATION
Pediatrics, ABP

Pediatric Cardiology, ABP

CLINICAL FOCUS

Pediatric Cardiology

Pediatric Heart Failure and Transplantation

HONORS & AWARDS

CHAIR

CVI Education & Training Committee

Best Lecture Award, Stanford University Medical School (2013)

Leo M. Davidoff Society Award for excellence in teaching, Albert Einstein College of Medicine (1982)

HUME FACULTY SCHOLAR Stanford University (1987-88, 1989-90)

MELLON FOUNDATION FELLOW Stanford University (1986-87)

FORMER PRESIDENT
Society for Pediatric Research

ELECTED MEMBER
American Pediatric Society

CURRENT RESEARCH

Our recent work has focused on a novel role for mitochondrial fragmentation, traditionally regarded as pathologic, as an adaptation to the normal energy demands of exercise, and we are examining the different mechanisms of "pathologic" and "physiologic" fragmentation. We are using hiPSC-derived cardiomyocytes to model mechanisms of human cardiomyopathies such as HCM, and as a platform to screen the validity of GWAS hits predicting risk of anthracycline cardiotoxicity. Another focus has been on the molecular mechanisms of RV hypertrophy and its transition to RV failure, and how this differs from LV failure. We are collaborating with Dr. S. Reddy in studies to characterize the role of RV-specific miRs in regulating angiogenesis, cell death and ROS production in the failing RV; and with Dr. E. Spiekeroetter in studies on the role of BMPR signaling in RV failure. I am also involved in several clinical/translational projects: an NIH multi-center clinical study to evaluate two novel biomarkers for post-transplant lymphoproliferative disorder in pediatric solid organ transplant patients; the Pediatric Cardiac Genomics Consortium, an NIH initiative to sequence 10,000 trios for genes associated with congenital heart disease; and a study to use immune profiling to predict adverse outcomes after pediatric left ventricular assist device (LVAD) implantation.

Success is the ability to go from failure to failure without loss of enthusiasm. — Winston Churchill

SELECTED PUBLICATIONS

Physiological mitochondrial fragmentation is a cardiac adaptation to increased demand. Coronado M, Zhao M, Fajardo G, Jung G, Gottlieb R, Bernstein D. *Circulation Research* 122: 282-295, 2018.

Thalidomide treatment prevents chronic graft rejection after aortic transplantation in rats. Miller KK, Wang D, Hu X, Hua X, Deuse T, Neofytou E, Renne T, Velden J, Reichenspurner H, Schrepfer S, Bernstein D. *Transplant. Internat.* 30:1181-1189.

Cancer recurrence and mortality after pediatric heart transplantation for anthracycline cardiomyopathy. Bock MJ, Pahl E, Rusconi PG, Boyle GJ, Parent JJ, Twist CJ, Kirklin JK, Pruitt E, Bernstein D. *Pediatr. Transpl* Aug;21(5), 2017.

Dynamic microRNA expression during the transition from right ventricular hypertrophy to failure. Reddy S, Zhao MM, Fajardo G, Hu S, Wu J, Bernstein D. *Physiol. Genomics* 44(10):562-75, 2012. (Featured cover article.)



Helen M. Blau, PhD

Donald E. and Delia B. Baxter Foundation Professor & Director,
Baxter Laboratory for Stem Cell Biology

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LAB stanford.edu/group/blau

WEB baxterlab.stanford.edu

EDUCATION/TRAINING

PHD Harvard University

HONORS & AWARDS

NIH MERIT Award

NIH Challenge Grant

NIH EUREKA Grant

NIH Director's Transformative Research Award

SmithKline & Beecham Junior Faculty Scholar

Senior WICB Career Recognition Award of the American Society for Cell Biology

FASEB Excellence in Science Award

Fulbright Senior Scholar Award

Yvette Mayent-Rothschild Award

Nobel Forum Lecturer, Karolinska Institute, Sweden

McKnight Technological Innovations for Neuroscience Award

Stanford University's Office of Technology and Licensing Hall of Fame

HONORARY DOCTORATE

University of Nijmegen, Holland

University of York, England

ELECTED MEMBER

National Acad. of Sciences, National Acad. of Medicine, National Acad. of Inventors, Pontifical Acad. of Sciences, Amer. Inst. for Medical & Biological Eng., Amer. Acad. of Arts & Sciences, Amer. Assoc. for the Advancement of Science.

PRESIDENT

International Society of Differentiation;
Society for Developmental Biology

COUNCIL MEMBER

National Academy of Medicine
NIH National Institute on Aging
American Academy of Arts and Sciences

CURRENT RESEARCH

Blau's research area is stem cell biology, aging, and regenerative medicine. She is world renowned for her work on nuclear reprogramming and demonstration of the plasticity of cell fate using cell fusion. Her lab made the unexpected finding that short telomeres are a hallmark of genetic dilated cardiomyopathies and constitute premature aging disorders. Blau's lab identified biomaterials and molecular regulators that synergize to rejuvenate aged muscle stem cell function, augmenting strength. From these studies, new therapeutic paradigms have emerged for cardiac and skeletal muscle disorders.

We dance for laughter, we dance for tears, we dance
for madness, we dance for fears, we dance for
hopes, we dance for screams, we are the dancers,
we create the dreams. — Albert Einstein

SELECTED PUBLICATIONS

Telomere shortening is a hallmark of genetic cardiomyopathies. Chang ACY, Chang ACH, Kirillova A, Sasagawa K, Su W, Weber G, Lin J, Termglinchan V, Karakikes I, Seeger T, Dainis AM, Hinson JT, Seidman J, Seidman CE, Day JW, Ashley E, Wu JC, Blau HM. *Proc Natl Acad Sci USA*. 2018 Sep 11;115(37):9276-9281.

Induction of muscle stem cell quiescence by the secreted niche factor Oncostatin. M. Sampath SC, Sampath SC, Ho ATV, Corbel SY, Millstone JD, Lamb J, Walker J, Kinzel B, Schmedt C, Blau HM. *Nature Commun*. 2018 Apr 18;9(1):1531.

Bioengineering strategies to accelerate stem cell therapeutics. Madl CM, Heilshorn SC, Blau HM. *Nature*. 2018 May;557(7705):335-342.

NKX3-1 is required for induced pluripotent stem cell reprogramming and can replace OCT4 in mouse and human iPSC induction. Mai T, Markov GJ, Brady JJ, Palla A, Zeng H, Sebastiano V, Blau HM. *Nature Cell Biol*. 2018 Aug;20(8):900-908.

Engineered DNA plasmid reduces immunity to dystrophin while improving muscle force in a model of gene therapy of Duchenne dystrophy. Ho PP, Lahey LJ, Mourkioti F, Kraft PE, Filaretto A, Brandt M, Magnusson KEG, Finn EE, Chamberlain JS, Robinson WH, Blau HM, Steinman L. *Proc Natl Acad Sci U S A*. 2018 Sep 4.

Telomere shortening and metabolic compromise underlie dystrophic cardiomyopathy. Chang AC, Ong SG, LaGory EL, Kraft PE, Giaccia AJ, Wu JC, Blau HM. *Proc Natl Acad Sci USA*. 2016 Nov 15; 113 (46):13120-13125.



Carlos Bustamante, PhD

Professor of Biomedical Data Science, Genetics, and (by courtesy) Biology

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EDUCATION/TRAINING

PHD Harvard University

HONORS & AWARDS

Marshall Sherfield Fellow, Marshall Aid Commemoration Commission (2001-2002)

Sloan Research Fellow in Molecular Biology, Sloan Foundation (2007-2009)

Provost Award for Distinguished Research, Cornell University (2008)

MacArthur Fellow, John D. and Catherine T. MacArthur Foundation (2010)

CURRENT RESEARCH

My research focuses on analyzing genome wide patterns of variation within and between species to address fundamental questions in biology, anthropology, and medicine. My group works on a variety of organisms and model systems ranging from humans and other primates to domesticated plant and animals. Much of our research is at the interface of computational biology, mathematical genetics, and evolutionary genomics.

SELECTED PUBLICATIONS

An Unexpectedly Complex Architecture for Skin Pigmentation in Africans. Martin AR, Lin M, Granka JM, Myrick JW, Liu X, Sockell A, Atkinson EG, Werely CJ, Möller M, Sandhu MS, Kingsley DM, Hoal EG, Liu X, Daly MJ, Feldman MW, Gignoux CR, Bustamante CD, Henn BM. *Cell*. 2017 Nov 30;171(6):1340-1353.e14.

Genetic Mapping and Biochemical Basis of Yellow Feather Pigmentation in Budgerigars. Cooke TF, Fischer CR, Wu P, Jiang TX, Xie KT, Kuo J, Doctorov E, Zehnder A, Khosla C, Chuong CM, Bustamante CD. *Cell*. 2017 Oct 5;171(2):427-439.e21.

FIRE: functional inference of genetic variants that regulate gene expression. Ioannidis NM, Davis JR, DeGorter MK, Larson NB, McDonnell SK, French AJ, Battle AJ, Hastie TJ, Thibodeau SN, Montgomery SB, Bustamante CD, Sieh W, Whittemore AS. *Bioinformatics*. 2017 Dec 15;33(24):3895-3901.

Human Demographic History Impacts Genetic Risk Prediction across Diverse Populations. Martin AR, Gignoux CR, Walters RK, Wojcik GL, Neale BM, Gravel S, Daly MJ, Bustamante CD, Kenny EE. *Am J Hum Genet*. 2017 Apr 6;100(4):635-649.

Population genetic analysis of the DARC locus (Duffy) reveals adaptation from standing variation associated with malaria resistance in humans. McManus KF, Taravella AM, Henn BM, Bustamante CD, Sikora M, Cornejo OE. *PLoS Genet*. 2017 Mar 10;13(3):e1006560.



Scott Ceresnak, MD

Associate Professor of Pediatric Cardiology
Associate Program Director, Pediatric Cardiology Fellowship Program Director,
Non-Invasive Electrophysiology

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EDUCATION/TRAINING

BA/MD Rutgers University combined
7-year program / Robert Wood Johnson
Med School (2002)

INTERNSHIP Weill Cornell School of
Medicine (2003)

RESIDENCY Weill Cornell School of
Medicine (2005)

FELLOWSHIP
New York Presbyterian Hospital
Columbia (2008)
Lucile Packard Children's Hospital at
Stanford (2009)

BOARD CERTIFICATION
Pediatric Cardiology, American Board of
Pediatric Cardiology (2008)
Adult Congenital Heart Disease,
American Board of Internal Medicine
(2015)

HONORS & AWARDS

Fellow, American Academy of Pediatrics
Member, American Heart Association

Member, American College of Cardiology
Member, Heart Rhythm Society

Member, Pediatric and Congenital
Electrophysiology Society

Member, Pediatric Society of Greater
New York

Member, New York Pediatric
Electrophysiology Society

CURRENT RESEARCH

My research involves clinical and translational work in heart rhythm disorders in children and adults with congenital heart disease. My primary area of interest is in novel methods of signal analysis and approaches to ablation in children with SVT. I am also involved in efforts to evaluate arrhythmias in adults with congenital heart disease, multi-center collaborations involving the evaluation of children with WPW, and collaborations on device therapies in children and adults with heart disease and cardiomyopathies.

I truly love what I do. It is a privilege to care for my patients and to work with a tremendously bright and motivated group of caregivers and scholars here at Stanford.

SELECTED PUBLICATIONS

Life-Threatening Event Risk in Children with WPW: A Multi-center International Study. Etheridge SP, Escudero CA, Blaufox AD, Law IH, Dechert-Crooks BE, Stephenson EA, Dubin AM, Ceresnak SR, Motonaga KS, Skinner JR, Marcondes LD, Perry JC, Collins KK, Seslar SP, Cabrera M, Uzun O, Cannon BC, Aziz PF, Kubuš P, Tanel RE, Valdes SO, Sami S, Kertesz NJ, Maldonado J, Erickson C, Moore JP, Asakai H, Mill L, Abcede M, Spector ZZ, Menon S, Shwayder M, Bradley DJ, Cohen MI, Sanatani S. *JACC Clin Electrophysiol.* 2018 Apr;4(4):433-444.

Pediatric Cardiology Boot Camp: Description and Evaluation of a Novel Intensive Training Program for Pediatric Cardiology Trainees. Ceresnak, S. R., Axelrod, D. M., Motonaga, K. S., Johnson, E. R., Krawczeski, C. D. *Pediatric Cardiology*, 2016; 37 (5): 834-844.

Electrocardiographic repolarization abnormalities and increased risk of life-threatening arrhythmias in children with dilated cardiomyopathy. Chen, S., Motonaga, K. S., Hollander, S. A., Almond, C. S., Rosenthal, D. N., Kaufman, B. D., May, L. J., Avasarala, K., Dao, D. T., Dubin, A. M., Ceresnak, S. R. *Heart Rhythm*, 2016; 13 (6): 1289-1296.

50 is the new 70: Short ventriculoatrial times are common in children with atrioventricular reciprocating tachycardia. Ceresnak, S. R., Doan, L. N., Motonaga, K. S., Avasarala, K., Trela, A. V., Reddy, C. D., Dubin, A. M. *Heart Rhythm*, 2015; 12 (7): 1541-1547.

Wolff-Parkinson-White syndrome (WPW) and athletes: Darwin at play? Ceresnak, S. R., Dubin, A. M. *Journal of Cardiovascular Electrophysiology*, 2015; 48 (3): 356-361.



Glenn Chertow, MD

Professor of Medicine (Nephrology) and, by courtesy, of Health Research and Policy (Epidemiology)

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EDUCATION/TRAINING

MD Harvard Medical School

MPH Harvard School of Public Health

RESIDENCY Brigham and Women's Hospital

FELLOWSHIP Brigham and Women's Hospital

BOARD CERTIFICATION
Internal Medicine (ABIM); Nephrology (ABIM)

CLINICAL FOCUS

Nephrology, Dialysis, Hypertension, Mineral metabolism

HONORS & AWARDS

Elected Member, American Society of Clinical Investigation (2004)

National Torchbearer Award, American Kidney Fund (2007)

Senior Mentor, Network of Minority Research Investigators, NIDDK (2008-)

Denise O'Leary Award for Clinical Excellence, Stanford Health Care (2014)

Elected Member, Association of American Physicians (2015)

Belding H. Scribner Award, American Society of Nephrology (2015)

Elected Member, National Academy of Medicine (2015)

David M. Hume Memorial Award, National Kidney Foundation (2018)

CURRENT RESEARCH

Dr. Chertow's research interests are focused on clinical epidemiology, health services research, and clinical trials in acute and chronic kidney disease. In addition to his own research program, he devotes considerable effort in collaborative research and in mentoring junior faculty, fellows, residents and other trainees.

You miss 100% of the shots you don't take — Wayne Gretzky

SELECTED PUBLICATIONS

Chronic kidney disease and risk of death, cardiovascular events and hospitalization. Go AS, Chertow GM, Fan D, McCulloch CE, Hsu CY. *N Engl J Med* 2004; 351:1296-1305.

Intensity of renal support for acute kidney injury in the critically ill. Palevsky PM, Zhang JH, O'Connor TZ, Chertow GM, Crowley ST, Choudury D, Finkel K, Kellum JA, Paganini E, Schein RMH, Smith MW, Swanson KM, Vijayan A, Watnick S, Star RA, Peduzzi P. *N Engl J Med* 2008; 359:7-20.

In center hemodialysis six times per week versus three times per week. Chertow GM, Levin NW, Beck GJ, et al.; Frequent Hemodialysis Network Trial Group. *N Engl J Med* 2010; 363:2287-2300.

The effect of cinacalcet on cardiovascular disease in hemodialysis. Chertow GM, Block GA, Correa-Rotter R, Drüeke TB, Floege J, Goodman WG, Herzog CA, Kubo Y, London GM, Mahaffey KW, Mix TCH, Moe SM, Trotman ML, Wheeler DC, Parfrey PS. *N Engl J Med* 2012; 367:2482-2494.

Bardoxolone methyl in type 2 diabetes and stage 4 chronic kidney disease. De Zeeuw D, Akizawa T, Audhya P, Bakris GL, Chin M, Christ-Schmidt H, Goldsberry A, Houser M, Krauth M, Lambers-Heerspink HJ, McMurray JJ, Meyer CJ, Parving HH, Remuzzi G, Toto RD, Vaziri ND, Wanner C, Wittes J, Wrolstad D, Chertow GM. *N Engl J Med* 2013; 369:2492-2503.

Effect of etelcalcetide versus placebo on serum parathyroid hormone in patients receiving hemodialysis with secondary hyperparathyroidism: two randomized clinical trials. Block GA, Bushinsky DA, Cunningham J, Drueke TB, Ketteler M, Kewalramani R, Martin KJ, Mix TC, Moe SM, Patel UD, Silver J, Spiegel DM, Sterling L, Walsh L, Chertow GM. *JAMA* 2017; 317:146-155.



Gerald Crabtree, MD

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and Professor of Developmental Biology

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EDUCATION/TRAINING

MD Temple University

HONORS & AWARDS

Investigator, Howard Hughes Medical
Institute

CURRENT RESEARCH

We are interested in the role of chromatin regulation in development and human cancer. Recent studies have shown that over 20% of all human cancers have mutations in the subunits of an ATP-dependent chromatin regulatory complex we discovered several years ago. The genes behave as tumor suppressors and sometimes as oncogenes. We hope to understand the fundamental mechanisms used by these complex to prevent cancer.

These same chromatin remodeling complexes are frequently mutated in a variety of human neurologic diseases, reflecting their roles in the development of the nervous system. It appears that these specialized roles in the nervous system are due to the use of unique neural specific assemblies in the developing human and mouse brain. We hope to understand their fundamental mechanism of action through biochemical and genetic approaches in combination with genome-wide analysis and genome sequencing studies.

Finally, we are developing new ways of making conditional alleles of mammalian genes using synthetic ligands that we hope will bring about a new fusion of biochemical and genetic approaches to understanding and controlling fundamental biologic processes. Recently we have developed an effective way of both assaying and modifying chromatin regulation in living cells.

SELECTED PUBLICATIONS

Rapid chromatin repression by Aire provides precise control of immune tolerance. Koh AS, Miller EL, Buenrostro JD, Moskowitz DM, Wang J, Greenleaf WJ, Chang HY, Crabtree GR. *Nat Immunol.* 2018 Feb;19(2):162-172.

Dominant-negative SMARCA4 mutants alter the accessibility landscape of tissue-unrestricted enhancers. Hodges HC, Stanton BZ, Cermakova K, Chang CY, Miller EL, Kirkland JG, Ku WL, Veverka V, Zhao K, Crabtree GR. *Nat Struct Mol Biol.* 2018 Jan;25(1):61-72.

Rapid and reversible epigenome editing by endogenous chromatin regulators. Braun SMG, Kirkland JG, Chory EJ, Husmann D, Calarco JP, Crabtree GR. *Nat Commun.* 2017 Sep 15;8(1):560.

TOP2 synergizes with BAF chromatin remodeling for both resolution and formation of facultative heterochromatin. Miller EL, Hargreaves DC, Kadoch C, Chang CY, Calarco JP, Hodges C, Buenrostro JD, Cui K, Greenleaf WJ, Zhao K, Crabtree GR. *Nat Struct Mol Biol.* 2017 Apr;24(4):344-352.



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EDUCATION/TRAINING

PHD University of Chicago

HONORS & AWARDS

Michael and Kate Barany Award,
Biophysical Society, (2018)

NSF INSPIRE award, National Science
Foundation (2013)

NIH New Innovator Award, National
Institutes of Health (2012)

Hellman Scholar, Hellman Foundation
(2011)

NSF CAREER award, National Science
Foundation (2011)

Packard Fellowships for Science and
Engineering, David and Lucile Packard
Foundation (2009)

CURRENT RESEARCH

Our research focuses on developing biophysical and chemical tools to probe fundamental questions in biology. We bring together state-of-the-art nanotechnology, physical science, engineering, and molecular and cell biology, to advance current understandings of biological processes in neurons and cardiomyocytes. Currently, there are two major research directions: (1) Developing nanoscale tools to probe electric activities and cellular processes at the cell-material interface. In this area, we have developed nanoscale electric probes for measuring intracellular action potentials in electrogenic cells, as well as structural probes and optical probes with high sensitivity and subcellular localization. (2) Employing optical, magnetic, and optogenetic tools to understand nerve growth factor (NGF) signaling in neurons. By adapting a variety of microscopy, optogenetic, nanotechnology and biochemical tools, we aim for a deeper understanding of NGF signaling in normal neurons and neurodegenerative diseases.

Life is like riding a bicycle. To keep your balance,
you must keep moving. – Albert Einstein

SELECTED PUBLICATIONS

Understanding CRY2 interactions for optical control of intracellular signaling. Duan L, Hope J, Ong Q, Lou HY, Kim N, McCarthy C, Acero V, Lin MZ, Cui B. *Nature Communications*, 8, 547 (2017).

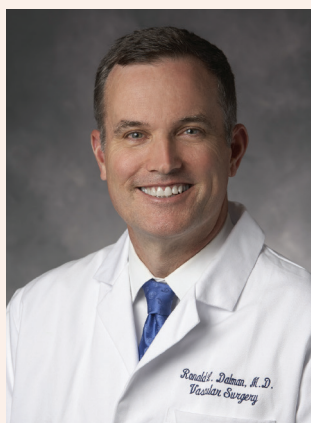
Nanoscale manipulation of membrane curvature for probing endocytosis in live cells. Zhao W, Hanson L, Lou HY, Akamatsu M, Chowdary PD, Santoro F, Marks JR, Grassart A, Drubin DG, Cui Y, Cui B. *Nature Nanotechnology*, 12, 750, (2017).

Accurate nanoelectrode recording of human pluripotent stem cell-derived cardiomyocytes for assaying drugs and modeling disease. Lin ZC, McGuire A, Burridge PW, Matsa E, Lou HY, Wu JC, Cui B. *Microsystems & Nanoengineering*, 3, 16080 (2017).

Vertical nanopillars for in situ probing of nuclear mechanics in adherent cells. Hanson L, Zhao W, Lou HY, Lin ZL, Lee SW, Chowdary PD, Cui Y, Cui B, *Nature Nanotechnology*, 10, 554-562 (2015).

Iridium Oxide Nanotube Electrodes for Intracellular Measurement of Action Potentials. Lin ZL, Xie C, Osakada Y, Cui Y, Cui B. *Nature Communications*, 5, 3206 (2014).

Intracellular recording of action potentials by nanopillar electroporation. Xie C, Lin ZL, Hanson L, Cui Y, Cui B. *Nature Nanotechnology*, 7, 185-190 (2012).



Ronald L. Dalman, MD

Walter C. and Elsa R. Chidester Professor and Chief, Division of Vascular Surgery
Stanford Medicine Associate Dean for Market Development

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DIVISION vascular.stanford.edu

EDUCATION/TRAINING

MD University of Michigan

GENERAL SURGERY RESIDENCY

University of Washington

VASCULAR SURGERY FELLOWSHIP

Oregon Health Sciences University

ENDOVASCULAR FELLOWSHIP

Texas Tech University

BOARD CERTIFICATION

General Vascular Surgery, American

Board of Surgery

Surgery, American Board of Surgery

CLINICAL FOCUS

Abdominal Aortic Aneurysm Disease

HONORS & AWARDS

ASSOCIATE DIRECTOR Cardiovascular Health (CVH) for Quality and Outcome Assessment

CO-DIRECTOR CVI T32: Mechanisms and Innovation in Vascular Disease

FELLOW

American College of Surgeons, American Heart Association

MEMBER

American Surgical Association; Society of University Surgeons;

Vascular Surgery Board, American Board of Surgery (2016 to 2022).

Board of Governors, American College of Surgeons

Society for Vascular Surgery (Vice-President 2018-2019, President 2020-2021)

CURRENT RESEARCH

Stanford Vascular Surgery is recognized worldwide for expertise in aortic aneurysm disease. My laboratory continues to focus on understanding aneurysm pathophysiology, as well as developing innovative treatment, screening and access to care strategies in abdominal aortic aneurysm (AAA) disease management.

We are on the threshold of understanding, and thus eliminating, the threat of premature death from aortic aneurysm disease worldwide.

SELECTED PUBLICATIONS

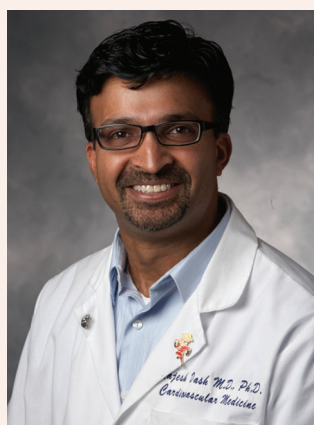
Metformin prescription status and abdominal aortic aneurysm disease progression in the US veteran population. Itoga NK, Rothenberg KA, Suarez P, Ho TV, Mell MW, Xu B, Curtin CM, Dalman RL. *J Vasc Surg* 2018 PMID: 30197158

Decoding the genomics of abdominal aortic aneurysm. Li J, Pan C, Zhang S, Spin JM, Deng A, Leung LLK, Dalman RL, Tsao PS, Synder M. *Cell* 2018 PMID: 30193110

Episode-based cost reduction for endovascular aneurysm repair. Itoga NK, Tang N, Patterson D, Ohkuma R, Lew R, Mell MW, Dalman RL. *J Vasc Surg* 2018 PMID: 30185384

Pathogenic and therapeutic significance of angiotensin II type I receptor in abdominal aortic aneurysms. Xu B, Xuan H, Iida Y, Miyata M, Dalman RL. *Curr Drug Targets* 2018 PMID 29359665

The Society for Vascular Surgery practice guidelines on the care of patients with an abdominal aortic aneurysm. Chaikof EL, Dalman RL, Eskandari MK, Jackson BM, Lee WA, Mansour WA, Mastracci TM, Mell MW, Murad MH, Nguyen LL, Oderich GS, Patel MS, Schermerhorn ML, Starnes BW. *J Vasc Surg* 2018 PMID: 29268916.



Rajesh Dash, MD, PhD

Assistant Professor, Medicine – Cardiovascular Medicine
Medical and Scientific Director, Stanford South Asian Translational Heart Initiative (SSATHI)
Co-Director, Falk Cardiovascular MRI Facility

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EDUCATION/TRAINING

MD University of Cincinnati

PHD University of Cincinnati

MEDICINE RESIDENCY

University of Washington Medical Center

CARDIOLOGY FELLOWSHIP UCSF

BOARD CERTIFICATION

Cardiovascular Medicine, ABIM

Echocardiography, NBE

Nuclear Cardiology, CBNC

CLINICAL FOCUS

Non-Invasive Cardiac Imaging
Preventive Cardiology

HONORS & AWARDS

Best Poster Award, American College of Cardiology (ACC) Scientific Sessions (2013)

CVI Seed Grant (2012)

Finalist, Jeremiah Stamler Distinguished Young Investigator Award, Northwestern University (2012)

Melvin Judkins Young Investigator Award, American Heart Association (AHA) Scientific Sessions (2009)

AHA Cardiovascular Radiology and Intervention Travel Award (2009)

Finalist, Society of Cardiovascular Magnetic Resonance (SCMR) Young Investigator Award (2008)

CURRENT RESEARCH

My research focuses on the prediction of coronary and cardiovascular disease in high risk patient populations, using population health and molecular imaging, as well as digital health technologies to achieve better preventive outcomes. I am Medical and Scientific Director of the Stanford South Asian Translational Heart Initiative (SSATHI). Our mission is to detect, treat, and prevent the onset of coronary and cardiometabolic diseases in young South Asians. We study this problem at the cellular and physiological levels, and validate our discoveries with partners in India. Within SSATHI, I launched CardioClick, a team-based video visit platform for patient visits that include physician visits, lifestyle intervention, and clinical research study conduction. CardioClick has attracted industry clinical sponsorship to test technologies designed for patient engagement and outcome improvement. This telemedicine platform is now being scaled across cardiovascular medicine and SHC. In addition, I study cell signaling in the heart and have developed molecular imaging probes that track to injured heart tissue or transplanted stem cells, such that we can visualize these injury or survival signals in real-time, non-invasively. In this capacity I am Co-Director of the Falk Cardiovascular MRI Facility. I am applying these imaging strategies in select high-risk patients.

Everyone has a plan until they get hit in the face.
—Mike Tyson

SELECTED PUBLICATIONS

Dose-dependent cardioprotection of moderate (32°C) versus mild (35°C) therapeutic hypothermia in a porcine acute ischemia-reperfusion injury model. Dash R, Mitsutsake Y, Pyun W, Dawoud F, Lyons J, Tachibana A, Matsuura Y, Kolodgie FD, Virmani R, McConnell MV, Illindala U, Ikeno F, Yeung AC. *JACC Cardiovasc Interv.* 2018 Jan 22;11(2):195-205.

Tada Y. and Dash R. T1 Mapping for Infarct Characterization. *T1-Mapping in Myocardial Disease.* July 2018. Edited by Philip Yang. Copyright 2018. Chapter 6, pp 77-86.

Mn-Enhanced Magnetic Resonance Imaging Enables In Vivo Confirmation of Peri-Infarct Restoration Following Stem Cell Therapy in a Porcine Ischemia-Reperfusion Model. Dash, R., Kim, P. J., Matsuura, Y., Ikeno, F., Metzler, S., Huang, N. F., Lyons, J. K., Nguyen, P. K., Ge, X., Foo, C. W., McConnell, M. V., Wu, J. C., Yeung, A. C., Harnish, P., Yang, P. C. *Journal of the American Heart Association*; 2015; 4 (7).

Magnetic Resonance Imaging & Positron Emission Tomography Approaches to Imaging Vascular and Cardiac Inflammation. Amsallem M, Saito T, Tada Y, Dash R, McConnell MV. *Circ J.* 2016 May 25;80(6):1269-77



Mark M. Davis, PhD

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 Professor, Microbiology and Immunology
 Investigator, Howard Hughes Medical Institute
 Director, Stanford Institute for Immunity, Transplantation and Infection (ITI)

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INSTITUTE iti.stanford.edu

EDUCATION/TRAINING

BA Johns Hopkins

PHD Caltech

HONORS & AWARDS

Paul Ehrlich and Ludwig Darmstaedter Prize, Paul Ehrlich Institute, Germany

King Faisal Prize

Behring-Heidelberger Prize, American Association of Immunologists

Novartis Prize for Basic Immunology

ELECTED MEMBER

National Academy of Sciences, USA

Institute of Medicine, National Academy of Sciences

Royal Society of London, UK

SCIENTIFIC ADVISORY BOARDS

Amgen, Chugai Pharmabody, 3T, Janux, Pact Bio, TCR Cure

CURRENT RESEARCH

My laboratory is interested in the molecular basis of T and B lymphocyte recognition, as well understanding the human immune system and its relationship to health and disease. These later efforts have employed systems biology approaches to understand vaccine responses, twin studies to understand the relative influence of environment versus genetics, and T cell repertoire studies to understand self vs non-self capabilities and the origin of memory T cell responses. By identifying markers that could tell us how a particular person's immune system is functioning, we could both understand immune system-related and infectious diseases better and formulate new and more efficacious interventions.

By identifying markers that could tell us how a particular person's immune system is functioning, we could both understand immune system-related and infectious diseases better and formulate new and more efficacious interventions.

SELECTED PUBLICATIONS

Identifying specificity groups in the T cell receptor repertoire. Glanville, J., Huang, H., Nau, A., Hatton, O., Wagar, L.E., Rubelt, F., Ji, X., Han, A., Krams, S.M., Pettus, C., Haas, N., Lindestam-Arlehamn, C.S., Stte, A., Boyd, S.D., Scriba, T.J., Martinez, O.M., and Davis, M.M. *Nature*, 547(7661): 94-98, 2017.

Variation in the human immune system is largely driven by non-heritable influences. Brodin P, Jojic V, Gao T, Bhattacharya S, Angel CJ, Furman D, Shen-Orr S, Dekker CL, Swan GE, Butte AJ, Maecker HT, Davis MM. *Cell*; 2015 Jan 15; 160 (1-2): 37-47.

Transcript-indexed ATAC-seq reveals paired single-cell T cell receptor identity and chromatin accessibility for precision immune profiling. Satpathy, A.T., Saligrama, N., Buenrostro, J.D., Wei, Y., Wu, B., Rubin, A.J., Granja, J.M., Lareau, C.A., Li, R., Qi, Y., Parker, K.R., Mumbach, M.R., Serratelli, W.S., Gennet, D.G., Schep, A.N., Corces, M.R., Kim, Y.H., Khavari, P.A., Greenleaf, W.J., Davis, M.M., and Chang, H.Y. *Nature Med* 24(5): 580-590, 2018.

Rebooting Human Immunology. Davis, M.M. and Brodin, P. *Ann Rev Immunology*. 36: 843-864 2018.



Vinicio A. de Jesus Perez, MD, FAHA, FCCP

Associate Professor, Medicine - Pulmonary and Critical Care Medicine
Co-Director, Stanford Translational Investigator Program (TIP)
Chair, PHA PH Care for All Committee
Chair, ATS Pulmonary Circulation Planning Committee
Staff Physician, Stanford Adult Pulmonary Hypertension Clinic

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EDUCATION/TRAINING

MD University of Puerto Rico

MEDICINE RESIDENCY

Massachusetts General Hospital

PULMONARY DISEASES FELLOWSHIP

University of Colorado
Stanford University

PULMONARY VASCULAR FELLOWSHIP

Stanford University

BOARD CERTIFICATION

Internal Medicine, ABIM
Pulmonary Diseases, ABIM
Critical Care Medicine, ABIM

CLINICAL FOCUS

Pulmonary Hypertension
Scleroderma Related Lung Diseases
Drug Induced Pulmonary Hypertension
Pulmonary Fibrosis

HONORS & AWARDS

Pulmonary Hypertension Association
Award for Outstanding K08
Be Heard Rare Challenge Disease
International Award
FELLOW, American College of Chest
Physicians
FELLOW, American Heart Association
FELLOW, American Thoracic Society
Keystone Symposia Fellowship
American Society of Clinical Invest.
Young Physician Scientist Award
ATS Pulmonary Circulation Assembly
Early Career award)

EDITORIAL BOARD

American Journal of Respiratory
and Critical Care Medicine, Pulmonary
Circulation, Circulation Research, AJP
Lung Cell Molecular Biology, PLoS One

CURRENT RESEARCH

My lab focuses on understanding the genetic, cellular and molecular mechanisms involved in the pathogenesis of pulmonary arterial hypertension (PAH). We are interested in understanding how pulmonary arteries respond to injury and identify novel genetic modifiers whose dysfunction can trigger small vessel loss and vascular remodeling in PAH patients. In particular, we are currently focused on exploring how the Wnt signaling pathways regulate the behavior of pulmonary artery endothelial cells (PAECs), smooth muscle cells (PASMCs) and pericytes in response to injury and whether mutations related to these pathways can affect signaling via other pathways relevant to PAH resulting in development of clinical disease. The overarching goal of our work is to identify potential biomarkers and drug targets that can be used in the development of novel diagnostic and treatment approaches to offer patients afflicted with this devastating disease.

Life is too unpredictable to plan ahead: You should
be prepared to be surprised every step of the way.

SELECTED PUBLICATIONS

Activation of the Wnt/planar cell polarity pathway is required for pericyte recruitment during pulmonary angiogenesis. K Yuan, ME Orcholski, C Panaroni, EM Shuffle, NF Huang, Jiang X, W Tian, VEK Vladar, L Wang, MR Nicolls, JY Wu, VA de Jesus Perez. *Am J Pathol.* 2015, Jan; 185 (1): 69-84.

Features and Outcomes of methamphetamine associated pulmonary arterial hypertension. RT Zamanian, H Hedlin, P Gruenwald, DM Wilson, JI Segal, M Jorden, K Kudelko, J Liu, A His, A Rupp, AJ Sweatt, R Tuder, GJ Berry, M Rabinovitch, RL Doyle, VA de Jesus Perez* and S Kawut*. *Am J Respir Crit Care Med.* 2017 Sep 21. (*Equal contribution).

Health Disparities in Pulmonary Hypertension: A Blueprint for Action. A Talwar, JG Garcia, H Tsai, M Moreno, T Lahm, RT Zamanian, R Machado, SM Kawut, M Selej, S Mathai, L D'Anna, S Sahni, EJ Rodriguez, R Channick, K Fagan, M Gray, J Armstrong, JR Lopez, V McLaughlin and VA de Jesus Perez. *Am J Respir Crit Care Med.* 2017 Oct 15;196(8):e32-e47.

Reduced carboxylesterase 1 is associated with endothelial injury in methamphetamine-induced pulmonary arterial hypertension. ME Orcholski, A Khurshudyan, EA Shamskhov, K Yuan, IY Chen, SD Kodani, C Morisseau, BD Hammock, EM Hong, L Alexandrova, TP Alastalo, G Berry, RT Zamanian, VA de Jesus Perez. *Am J Physiol Lung Cell Mol Physiol.* 2017 Aug 1;313(2):L252-L266.



Anne Dubin, MD

Professor of Pediatrics (Pediatric Cardiology) at the Lucile Salter Packard Children's Hospital
Director, Pediatric Arrhythmia

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EDUCATION/TRAINING

MD University of Rochester School of Medicine and Dentistry (1988)

INTERNSHIP Columbia Presbyterian Medical Center NY (1989)

RESIDENCY Columbia Presbyterian Medical Center NY (1991)

FELLOWSHIP
Children's Hospital of Philadelphia PA (1992)
Yale - New Haven Hospital CT (1995)

BOARD CERTIFICATION:

Pediatric Cardiology, American Board of Pediatric Cardiology (1998)

International Board of Heart Rhythm Examiners Pediatric Electrophysiology (2015)

American Board of Internal Medicine Adult Congenital Heart Disease (2015)

CLINICAL FOCUS

Pediatric Electrophysiology

CURRENT RESEARCH

I am most interested in the diagnosis and treatment of arrhythmia in pediatric heart failure, especially the use of resynchronization therapy in the pediatric and congenital heart population.

It's more than just the technology; it is our caring staff, colleagues, and modern facilities that make the difference for every patient.

SELECTED PUBLICATIONS

What have we learned in the last 20 years? A Comparison of a Modern Era Pediatric and Congenital Catheter Ablation Registry to Prior Pediatric Ablation Registries. Dubin AM, Jorgensen NW, Radbill AE, Bradley DJ, Silva JN, Tsao S, Kanter RJ, Tanel RE, Trivedi B, Young ML, Pflaum A, McCormack J, Seslar SP. *Heart Rhythm* 2018

Bridge to Success: A Better Method of Cryoablation for Atrioventricular Nodal Reentrant Tachycardia in Children. Reddy CD, Ceresnak SR, Motonaga KS, Avasarala K, Feller C, Trela A, Hanisch D, Dubin AM *Heart Rhythm* 2017; 14:1649-54

Pediatrics and Congenital Electrophysiology Society (PACES) Initiative on Device needs in Pediatric Electrophysiology, endorsed by PACES, FDA and Heart Rhythm Society. Dubin AM, Cannon BC, Saarel EV, Triedman JK, Berul CI, Bar-Cohen Y, Shah MJ, Paulsen J, Patel H, Reich J, Carlson MD, Stein K, Gilkerson JO, Kowal RC, Peiris V. *Heart Rhythm* 2018

A Novel Pacing Maneuver to Verify the Post-Pacing Interval minus the Tachycardia Cycle Length While Adjusting for Decremental Conduction: Using "Dual Chamber Entrainment" for Improved Supraventricular Tachycardia Discrimination. Kaiser D, Nasir JM, Liem B, Brodt C, Motonaga KS, Ceresnak SR, Turakhia MP, Dubin AM. *Heart Rhythm* 2018

A Pilot Study Assessing ECG versus ECHO Ventriculoventricular Optimization in Pediatric Resynchronization Patients. Punj, R., Hanisch, D., Motonaga, K. S., Rosenthal, D. N., Ceresnak, S. R., Dubin, A. M. *Journal of Cardiovascular Electrophysiology*; 2016; 27 (2): 210-216.



Alexander Dunn, PhD

Associate Professor, Chemical Engineering

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EDUCATION/TRAINING

PHD Caltech (2003)

HONORS & AWARDS

NIH Director's New Innovator Award

Burroughs Wellcome Career Award at the Scientific Interface

CVI Seed Grant (2013)

Terman Fellowship, Stanford University

James H. Clark Faculty Fellowship

American Heart Association
Postdoctoral Fellowship

Jane Coffin Childs Fellowship

Herbert Newby McCoy Award (Caltech,
outstanding chemistry PhD thesis)

Barry Goldwater Scholarship

GRADUATE ADMISSIONS COMMITTEE
Stanford Biophysics Program

SCIENTIFIC DIRECTOR
Cell Science Imaging Facility Cost
Center for Building 4

FELLOW
Stanford Chemical Biology Institute

MEMBER
Department of Chemical Engineering
undergraduate teaching committee

FACULTY ADVISOR
Stanford AIChE student chapter

STEERING COMMITTEE MEMBER
Stanford Cardiovascular Institute

CURRENT RESEARCH

Observers have noted the central importance of tissue mechanics in health and disease since ancient times. We now know that intrinsically mechanical stimuli such as fluid flow, mechanical stretch, and tissue stiffness play central roles in cardiovascular development, homeostasis, and disease. However, the molecular mechanisms by which cells sense mechanical cues remain poorly understood, due largely to a lack of tools that measure forces inside living cells and tissues. Our laboratory uses genetically encoded molecular sensors to directly visualize mechanical tension in living cells, with the goal of uncovering how mechanical cues regulate stem cell differentiation and self-renewal. In addition, we study how the endothelial cells that line the vascular system sense fluid flow, a fundamental and unsolved question in vascular biology.

The hard and stiff will be broken. The soft and supple will prevail. — Tao Te Ching (trans. Stephen Mitchell)

SELECTED PUBLICATIONS

Vinculin forms a directionally asymmetric catch bond with F-actin. Huang DL, Bax NA, Buckley CD, Weis WI, Dunn AR. *Science*. 2017 Aug 18;357(6352):703-706.

Single Molecule Force Measurements in Living Cells Reveal a Minimally Tensioned Integrin State. Chang AC, Mekhdjian AH, Morimatsu M, Denisin AK, Pruitt BL, Dunn AR. *ACS Nano*. 2016 Dec 27;10(12):10745-10752.

Energetics and forces in living cells. Dunn, A. R., Price, A. *Physics Today*; 2015; 68 (2): 27-32.

Cell adhesion. The minimal cadherin-catenin complex binds to actin filaments under force. Buckley, C. D., Tan, J., Anderson, K. L., Hanein, D., Volkmann, N., Weis, W. I., Nelson, W. J., Dunn, A. R. *Science*; 2014; 346 (6209).

Mechanical control of the sense of touch by β -spectrin. Krieg, M., Dunn, A. R., Goodman, M. B. *Nature Cell Biology*; 2014; 16 (3): 224-233

Molecular tension sensors report forces generated by single integrin molecules in living cells. Morimatsu M, Mekhdjian AH, Adhikari AS, Dunn AR. *Nano Lett.*; 2013; 13(9): 3985-9.

E-cadherin is under constitutive actomyosin-generated tension that is increased at cell-cell contacts upon externally applied stretch. Borghi N, Sorokina M, Shcherbakova OG, Weis WI, Pruitt BL, Nelson WJ, & Dunn AR. *Proc Natl Acad Sci USA*. 2012; 109: 12568-73.



Daniel B. Ennis, PhD

Associate Professor, Department of Radiology, Stanford University
Director, Radiology Research, VA Palo Alto Health Care System

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LAB stanford.edu/cmrgroup.html

EDUCATION/TRAINING

BS UCSD, Bioengineering

PHD Johns Hopkins, Biomedical Engineering

POST-DOC Stanford, Radiology and Cardiothoracic Surgery

HONORS & AWARDS

Society for Cardiovascular Magnetic Resonance, Fellow

Magnetic Resonance in Medicine, Deputy Editor

Imaging Technology Development (ITD) study section, Charter Member

CURRENT RESEARCH

The Cardiac Magnetic Resonance (CMR) Group develops translational cardiac and cardiovascular MRI techniques to study cardiovascular physiology and improve clinical care. Current research projects focus on: 1) characterizing several cardiac MRI biomarkers to detect the cardiomyopathy associated with Duchenne Muscular Dystrophy; and 2) developing MRI methods and a computational modeling framework to estimate changes in passive ventricular stiffness in patients with Heart Failure with Preserved Ejection Fraction (HFpEF). Our group is also very interested in further developing MRI methods that analyze cardiac structure, function, flow, and remodeling with particular emphasis on pulse sequence and gradient waveform design. One central aim is to increase the quantitative accuracy and reduce the image acquisition times for CMR exams.

The good life is one inspired by love and guided by knowledge. —Bertrand Russell

SELECTED PUBLICATIONS

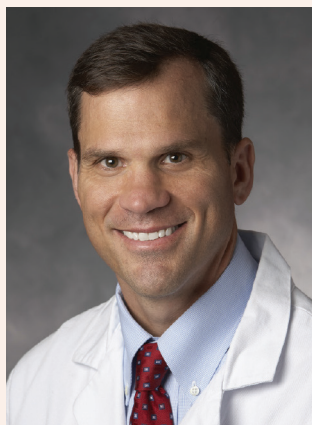
Cardiac MRI biomarkers for Duchenne muscular dystrophy. Magrath P, Maforo N, Renella P, Nelson SF, Halnon N, Ennis DB. *Biomark Med.* 2018 Nov;12(11):1271-1289.

Velocity reconstruction with nonconvex optimization for low-velocity-encoding phase-contrast MRI. Loecher M, Ennis DB. *Magn Reson Med.* 2018 Jul;80(1):42-52.

Convex optimized diffusion encoding (CODE) gradient waveforms for minimum echo time and bulk motion-compensated diffusion-weighted MRI. Aliotta E, Wu HH, Ennis DB. *Magn Reson Med.* 2017 Feb;77(2):717-729.

Effect of free-breathing on left ventricular rotational mechanics in healthy subjects and patients with duchenne muscular dystrophy. Reyhan ML, Wang Z, Kim HJ, Halnon NJ, Finn JP, Ennis DB. *Magn Reson Med.* 2017 Feb;77(2):864-869.

Left ventricular twist and shear in patients with primary mitral regurgitation. Reyhan M, Wang Z, Li M, Kim HJ, Gupta H, Lloyd SG, Dell'Italia LJ, Denney T, Ennis DB. *J Magn Reson Imaging.* 2015 Aug;42(2):400-6.



William Fearon, MD

Professor of Medicine - Cardiovascular Medicine
Director, Interventional Cardiology

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EDUCATION/TRAINING

MD Columbia University, College of Physicians and Surgeons

MEDICINE RESIDENCY & INTERNSHIP
Stanford University

CARDIOLOGY FELLOWSHIP
Stanford University

INTERVENTIONAL CARDIOLOGY FELLOWSHIP
Stanford University

BOARD CERTIFICATION
Cardiovascular Medicine, ABIM
Interventional Cardiology, ABIM

CLINICAL FOCUS

Interventional Cardiology:
Percutaneous Coronary
Intervention and Transcatheter
Aortic Valve Replacement

HONORS & AWARDS

E. William Hancock, MD,
Cardiovascular Medicine Teaching
Award (2004, 2009)

Division of Cardiovascular Medicine
Mentoring Award (2008)

Division of Cardiovascular Medicine
Teaching Award (2004)

American Society for Clinical
Investigation (2015)

FELLOW

American College of Cardiology;
Society of Cardiac Angiography and
Interventions

CURRENT RESEARCH

My research group focuses on the invasive assessment of coronary physiology. In particular, we use coronary wire-based methods to evaluate which coronary artery narrowings are responsible for myocardial ischemia and warrant stenting. We have helped to perform multicenter, international clinical trials examining the role of fractional flow reserve in guiding percutaneous coronary intervention in various patient populations. Through NIH sponsored research, we have also applied these wire-based methods to understand better coronary microvascular function and its role in patient outcomes. In collaboration with other members of the Cardiovascular Institute, we are investigating the effect of PCSK9 inhibition early after cardiac transplantation on coronary physiology and endothelial function.

The saying 'Don't judge a book by its cover' applies to coronary angiography. By invasively assessing coronary physiology, we have learned how misleading the angiogram can be.

SELECTED PUBLICATIONS

Angiotensin-Converting Enzyme Inhibition Early After Heart Transplantation. Fearon WF, Okada K, Kobashigawa JA, Kobayashi Y, Luikart H, Sana S, Daun T, Chmura SA, Sinha S, Cohen G, Honda Y, Pham M, Lewis DB, Bernstein D, Yeung AC, Valentine HA, Khush K. *J Am Coll Cardiol*; 2017;69:2832-2841.

Fractional Flow Reserve and Quality-of-Life Improvement After Percutaneous Coronary Intervention in Patients With Stable Coronary Artery Disease. Nishi T, Piroth Z, De Bruyne B, Jagic N, Möbius-Winkler S, Kobayashi Y, Derimay F, Fournier S, Barbato E, Tonino P, Jüni P, Pijls NHJ, Fearon WF. *Circulation*; 2018;138:1797-1804.

FAME 2 Trial Investigators. Clinical Outcomes and Cost-Effectiveness of Fractional Flow Reserve-Guided Percutaneous Coronary Intervention in Patients With Stable Coronary Artery Disease: Three-Year Follow-Up of the FAME 2 Trial (Fractional Flow Reserve Versus Angiography for Multivessel Evaluation). Fearon WF, Nishi T, De Bruyne B, Boothroyd DB, Barbato E, Tonino P, Jüni P, Pijls NHJ, Hlatky MA. *Circulation*; 2018;137:480-487.

Five-Year Outcomes with PCI Guided by Fractional Flow Reserve. Xaplanteris P, Fournier S, Pijls NHJ, Fearon WF, Barbato E, Tonino PAL, Engström T, Käåb S, Dambrink JH, Rioufol G, Toth GG, Piroth Z, Witt N, Fröbert O, Kala P, Linke A, Jagic N, Mates M, Mavromatis K, Samady H, Irampen A, Oldroyd K, Campo G, Rothenbühler M, Jüni P, De Bruyne B; FAME 2 Investigators. *N Engl J Med*; 2018;379:250-259.



Jeffrey A. Feinstein, MD, MPH

Dunlevie Family Professor of Pulmonary Vascular Disease,
and Professor, by courtesy, of Bioengineering
Director, Vera Moulton Wall Center

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EDUCATION/TRAINING

MD New York Medical College (1991)

MPH George Washington University,
Health Administration (1994)

MS Duke University, Biomedical
Engineering (1987)

INTERNSHIP & RESIDENCY

Children's Hospital National Medical
Center (1992, 1994)

FELLOWSHIP

Children's Hospital Boston (1998)
Children's Hospital National Medical
Center (1997)

BOARD CERTIFICATION

Pediatric Cardiology, ABP (1998)

CLINICAL FOCUS

Pulmonary Hypertension; Pulmonary
Vascular Disease; Pulmonary Vascular
Abnormalities; Congenital Heart
Defects; Biomechanical Engineering/
Bioengineering; Pediatric Cardiology

HONORS & AWARDS

The Dunlevie Family Professorship in
Pulmonary Vascular Disease

Medical Advisory Board, Alagille
Syndrome Alliance (2016–Present)

Medical Director, Pediatric Pulmonary
Hypertension Program, LPCH (1998–
Present)

Director, Vera Moulton Wall Center for
Pulmonary Vascular Disease, Stanford
University (2000–Present)

Director, Pediatric Cardiology Training
Program, Stanford University (2009–
2015)

Associate Chair, Education; Department
of Pediatrics (Fellowships), Stanford
University (2012–2016)

CURRENT RESEARCH

Research interests include (1) computer simulation and modeling of cardiovascular physiology with specific attention paid to congenital heart disease and its treatment, (2) the evaluation and treatment of pulmonary hypertension/pulmonary vascular diseases, and (3) development and testing of medical devices/therapies for the treatment of congenital heart disease and pulmonary vascular diseases.

SELECTED PUBLICATIONS

Pulmonary lung Doppler signals: normative data in a pediatric population compared with adults. Journal of clinical monitoring and computing. Burstein, D. S., Hopper, R. K., McCarthy, E. K., Hall, K., Schatzberger, R., Palti, Y., Feinstein, J. A. *J Clin Monit Comput* (2019).

Evolution of hemodynamic forces in the pulmonary tree with progressively worsening pulmonary arterial hypertension in pediatric patients. Yang, W., Dong, M., Rabinovitch, M., Chan, F. P., Marsden, A. L., Feinstein, J. A. *Biomech Model Mechanobiol*. 2019

Death or resolution: the “natural history” of pulmonary hypertension in bronchopulmonary dysplasia. Journal of perinatology : official journal of the California Perinatal Association Altit, G., Bhombal, S., Hopper, R. K., Tacy, T. A., Feinstein, J. *J Perinatol*. 2019 Jan 7.

Subcutaneous treprostinil in pediatric patients with failing single-ventricle physiology. Handler, S. S., Ogawa, M. T., Hopper, R. K., Sakarovitch, C., Feinstein, J. A. *J Heart Lung Trans* 2018.

Right Ventricular Stroke Work Correlates with Outcomes in Pediatric Pulmonary Arterial Hypertension. Yang, W., Marsden, A. L., Ogawa, M. T., Sakarovitch, C., Hall, K. K., Rabinovitch, M., Feinstein, J. A. *Pulm Circ*. 2018 Jul-Sep.

Relationship Between Pulmonary Vascular Resistance and Right Ventricular Dysfunction Assessed by MRI in Pediatric Pulmonary Arterial Hypertension. Hopper, R. K., Chen, H., Ogawa, M., Feinstein, J. A. *Amer Thoracic Soc*. 2018.



Michael Fischbein, MD, PhD

Associate Professor of Cardiothoracic Surgery (Adult Cardiac Surgery)
 Director of Thoracic Aortic Surgery
 Program Director, Department of Cardiothoracic Surgery

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EDUCATION/TRAINING

MD Boston University (1995)

PHD UCLA (2001)

RESIDENCY UCLA (2003)

FELLOWSHIP Stanford University (2006)

BOARD CERTIFICATION

Thoracic Surgery, American Board of
 Thoracic Surgery,
 General Surgery, American Board of
 Surgery

CLINICAL FOCUS

Cardiothoracic Surgery
 Aortic Diseases
 Thoracic Surgery
 Anomalous Coronary Artery (ACA)
 Aortic Stenosis
 Bicuspid Aortic Valve Disease
 Coarctation of the Aorta
 Coronary Artery Disease

HONORS & AWARDS

Donald Morton Research Award,
 Department of Surgery - UCLA School of
 Medicine (2003)

Ronald K. Tompkins Golden Apple
 Teaching Award, UCLA School of
 Medicine (2003)

Golden Scalpel Award for Teaching
 Excellence, Division of General Surgery -
 UCLA School of Medicine (2003)

MEMBER

American Heart Assoc. Society of
 Thoracic Surgeons, San Francisco
 Surgical Society, Western Thoracic
 Surgical Society Assoc for Academic
 Surgery, American College of Surgeons,
 Society of University Surgeons

CURRENT RESEARCH

Our group is interested the molecular and genetic mechanisms of aortic aneurysm/dissection development, and the molecular mechanisms of aneurysm formation in Marfan Syndrome. Clinical research interests include thoracic aortic diseases (aneurysms, dissections).

SELECTED PUBLICATIONS

miR-29b Participates in Early Aneurysm Development in Marfan Syndrome. Merk D, Chin JT, Dake BA, Maegdefessel L, Miller MO, Kimura N, Tsao PS, Josef C, Berry G, Mohr FW, Spin J, Alvira CM, Robbins RC, Fischbein MP. *miR-29b Participates in Early Aneurysm Development in Marfan Syndrome. Circ Research* 2011; 110 (2); 312-24.

Assessment of Elastin Deficit in a Marfan Mouse Aneurysm Model Using an Elastin-Specific Magnetic Resonance Imaging Contrast Agent. Okamura H, Pisani LJ, Dalal AR, Emrich F, Dake BA, Arakawa M, Onthank DC, Cesati RR, Robinson SP, Milanesi M, Kotek G, Smit H, Connolly AJ, Adachi H, McConnell M, Fischbein MP. *Circ Cardiovasc Imaging* 2014; July 7 (4): 690-6.

Enhanced caspase activity contributes to aortic wall remodeling and early aneurysm development in a murine model of marfan syndrome. Emrich FC, Okamura H, Dalal AR, Penov K, Merk DR, Raaz U, Hennigs JK, Chin JT, Miller MO, Pedroza AJ, Craig JK, Koyano TK, Blankenberg FG, Connolly AJ, Mohr FW, Alvira CM, Rabinovitch M, Fischbein MP. *Arterioscler Thromb Vasc Biol.*; 2015, Jan; 35 (1): 146-54.

Long-term miR-29b suppression reduces aneurysm formation in a Marfan mouse model. Okamura H, Emrich F, Trojan J, Chiu P, Dalal AR, Arakawa M, Sato T, Penov K, Koyano T, Pedroza A, Connolly AJ, Rabinovitch M, Alvira C, Fischbein MP. *Physiol Rep.* 2017 Apr;5(8). pii: e13257.



Peter J. Fitzgerald, MD, PhD, FACC

Professor of Medicine (Cardiovascular Medicine) Emeritus

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EDUCATION/TRAINING

MD Dartmouth Medical School

PHD Dartmouth College

MEDICINE RESIDENCY
UCSF

CARDIOLOGY FELLOWSHIP
UCSF

BOARD CERTIFICATION
Diplomate, ABIM

Interventional Cardiovascular Medicine,
ABIM

CLINICAL FOCUS

Interventional Cardiology

HONORS & AWARDS

FDA Medical Device Advisory Panel

CO-FOUNDER

Latterall Venture Partners;
Tri-Ventures

FELLOW

American College of Cardiology

MEMBER

American Medical Association; American
Federation of Clinical Research;
American Society of Echocardiography

CURRENT RESEARCH

My laboratory includes 17 postdoctoral fellows and graduate engineering students focusing on state-of-the-art technologies in Cardiovascular Medicine. I have led or participated in over 150 clinical trials and published over 450 manuscripts/chapters. In addition, I head the Stanford/Asia MedTech innovation program. I have been principle/founder of eighteen medical device companies in the San Francisco Bay Area; twelve of these start-ups have transitioned to large medical device companies. I serve on several boards of directors and have advised dozens of medical device startups as well as multinational healthcare companies in the design and development of new diagnostic and therapeutic devices in the cardiovascular arena.

Technology in medicine is very important, and is ultimately going to be important for patients.

SELECTED PUBLICATIONS

A Y-shaped bifurcation-dedicated stent for the treatment of de novo coronary bifurcation lesions: an IVUS analysis from the BRANCH trial. Sakata K, Koo BK, Waseda K, Nakatani D, Yock PG, Whitbourn R, Worthley SG, Ormiston J, Webster M, Wilkins GT, Honda Y, Meredith IT, Fitzgerald PJ. *EuroIntervention*. 2014, Aug 30.

Baseline and 9 months IVUS analysis of the bifurcation-dedicated biolimus A9-eluting Axxess stent system: the DIVERGE IVUS substudy. Buysschaert I, Sanidas E, Hasegawa T, Koo BK, Honda Y, Fitzgerald PJ, Verheye S. *Catheter Cardiovasc Interv*.; 2014, Dec 1; 84 (7): 1062-70.



Dominik Fleischmann, MD

Professor, Radiology
Chief, Cardiovascular Imaging
Director of CT, Stanford HealthCare
Medical Director, Stanford 3DQ Lab

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radiology.stanford.edu/patient/clinical_sections/computedtomography
3dradiology.stanford.edu

EDUCATION/TRAINING

MD University of Vienna

MEDICINE RESIDENCY

University of Vienna

RESEARCH RADIOLOGY FELLOWSHIP

Stanford University

BOARD CERTIFICATION

Diagnostic Radiology (EU)

CLINICAL FOCUS

Non-Invasive Cardiovascular Imaging
Clinical Image Processing
Diagnostic Radiology

HONORS & AWARDS

Senior Faculty of the Year Award,
Stanford Radiology (2011, 2012)

CHAIR

Refresher Course Subcommittee
(Vascular), Radiological Society of North
America (RSNA) (2009-201)

FELLOW

Society of Computed Body Tomography
and MR (SCBT/MR)

MEMBER

American Heart Association
North American Society for
Cardiovascular Imaging

ASSOCIATE EDITOR

Radiology (Cardiac Imaging)

DEPUTY EDITOR

Radiology – Cardiothoracic Imaging

EXECUTIVE & STEERING COMMITTEE

MEMBER Stanford Cardiovascular
Institute

CURRENT RESEARCH

My research area broadly covers cardiovascular imaging, ranging from technical optimization of image acquisition for improving temporal and spatial resolution, to the application of novel imaging technologies for detecting, staging and treatment planning of cardiovascular diseases, post-processing and modelling, and individual risk stratification based on data extracted from high-resolution imaging.

I have a strong clinical and research interest in acute aortic diseases, where my lab develops novel clinically applicable tools to measure and monitor patients with aortic aneurysms and dissections. We are the primary site of a multicenter international effort to improve treatment decisions for patients with so-called uncomplicated type B aortic dissection.

Currently we only use a tiny fraction of the wealth of information contained in modern multidimensional imaging data. This is the time to exploit these data.

A picture says more than a thousand words;
now imagine what three-, four- and more
dimensional visualization can do.

SELECTED PUBLICATIONS

Coronary artery calcium: A technical argument for a new scoring method. Willemink MJ, van der Werf NR, Nieman K, Greuter MJW, Kweek LM, Fleischmann D. *Journal of Cardiovascular Computed Tomography* 2018.

Photon-counting CT: Technical Principles and Clinical Prospects. Willemink MJ, Persson M, Pourmorteza A, Pelc NJ, Fleischmann D. *Radiology* 2018

Aortic Growth and the Development of False lumen thrombosis within the first year predict late adverse events in patients with initially uncomplicated acute Stanford Type B aortic dissection. Higashigaito K, Sailer AM, Van Kuijk SM, Willemink MJ, Hahn L, Chiu P, Dake MD, Miller DC, Fischbein MP, Fleischmann D. *J Thorac Cardiovasc Surg* 2018

Aortic dissection maps: comprehensive visualization of aortic dissections for risk assesment. Mistelbauer G, Schmidt J, Sailer AM, Baeumler K, Fleischmann D. In: Bruckner S, Preim B, Vilanova A, Hauser H, Hennemuth A, Lundervold A, editors. *Eurographics Workshop on Visual Computing for Biology and Medicine*. Bergen, Norway: The Eurographics Association, 2016:143-152.



Victor Froelicher, MD

Professor Emeritus, Medicine - Cardiovascular Medicine

Professor (by courtesy), Orthopedics

Director, Stanford Sports Cardiology Clinic

VAPAHSC Cardiologist Consultant

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EDUCATION/TRAINING

MD University of Pittsburg

MEDICINE RESIDENCY & INTERNSHIP

Wilford Hall USAFMC Medical Center

CARIOLOGY FELLOWSHIP

University of Alabama

BOARD CERTIFICATION

Internal Medicine, ABIM

Cardiology, ABIM

CLINICAL FOCUS

Ambulatory and Resting

Elctrocardiography, Sports Cardiology

HONORS & AWARDS

FORMER CHIEF AND ASSISTANT CHIEF OF CARDIOLOGY (1983-1992)

Long Beach VAMC and UC Irvine

MILITARY SERVICE

Lt Col USAFMC (1963-1977)

FORMER ASSISTANT CHIEF OF

CARDIOLOGY Wilford Hall USAFMC

FORMER DIRECTOR Cardiac

Catheterization Lab and Exercise Testing

School of Aerospace Medicine

FELLOW

American College of Cardiology (ACC);

American Heart Association; American

College of Sports Medicine

SESSION CHAIR

ACC Scientific Session 2013; Sudden

Cardiac Death In Athletes Symposium

2012

CURRENT RESEARCH

My research and clinical interests include cardiovascular screening of athletes of all ages, non-invasive electrocardiography (rest and ambulatory), atrial fibrillation, and automated arrhythmia analysis.

SELECTED PUBLICATIONS

Clinical implications of technological advances in screening for atrial fibrillation. Singh N, Chun S, Hadley D, Froelicher V. *Progress in cardiovascular diseases*. 2018 Jan.

Heart Rate Variability: An Old Metric with New Meaning in the Era of using mHealth Technologies for Health and Exercise Training Guidance. Part One: Physiology and Methods. Singh N, Moneghetti KJ, Christle JW, Hadley D, Plews D, Froelicher V. *Arrhythmia & electrophysiology review*. 2018 Aug;7(3):193.

QT Corrections for Long QT Risk Assessment: Implications for the Preparticipation Examination.

Hadley D, Hsu D, Pickham D, Drezner JA, Froelicher VF. *Clinical Journal of Sport Medicine*. 2017 Oct 5.

Limited Relationship of Voltage Criteria for Electrocardiogram Left Ventricular Hypertrophy to Cardiovascular Mortality. Le H, Elbadawi A, Froelicher VF. *The American Journal of Medicine*. 2017 Aug 10.



Sanjiv Sam Gambhir, MD, PhD

Virginia and DK Ludwig Professor for Clinical Investigation in Cancer Research
Chair, Department of Radiology
Professor (by courtesy), Bioengineering and Materials Science and Engineering
Director, Canary Center for Cancer Early Detection at Stanford
Director, Molecular Imaging Program at Stanford (MIPS)

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DEPARTMENT radiology.stanford.edu

PROGRAM mips.stanford.edu

EDUCATION/TRAINING

MD UCLA

PHD UCLA

MEDICINE RESIDENCY & INTERNSHIP

UCLA

FELLOWSHIP

UCLA

BOARD CERTIFICATION

Nuclear Medicine, ABNM

CLINICAL FOCUS

Nuclear Medicine

Radiology

Positron Emission Tomography (PET)
Imaging

HONORS & AWARDS

J. Allyn Taylor International Prize in
Medicine

Georg Charles de Hevesy Nuclear
Pioneer Award, Society of Nuclear
Medicine (SNM)

Radiology Society of Northern America
(RSNA) Outstanding Researcher of the
Year Award

Paul C. Abersold Award, Society of
Nuclear Medicine

Parmley Prize, American College of
Cardiology Foundations

Tesla Medal, United Kingdom Royal
College of Radiologists

Hounsfield Medal, Imperial College of
London

ELECTED MEMBER

National Academy of Medicine
National Academy of Inventors
American Association for the
Advancement of Science

CURRENT RESEARCH

My laboratory is developing imaging assays to monitor fundamental cellular/molecular events in living subjects including patients. Technologies such as micro positron emission tomography (microPET), bioluminescence optical imaging, fluorescence optical imaging, micro computerized axial tomography (microCAT), ultrasound, photoacoustics, and Raman imaging are all being actively investigated in small animal models. Our goals are to marry fundamental advances in molecular/cell biology with those in biomedical imaging to advance the field of molecular imaging. We have a particular interest in cancer biology and early cancer detection. Research in early cancer detection and pharmacological therapy assessment is also being performed. Assays to interrogate cells for mRNA levels, cell surface antigens, intracellular proteins and protein-protein interactions are under active development. We are also extending many of these approaches for human clinical applications using optical and PET-CT technologies.

SELECTED PUBLICATIONS

Multimodality Molecular Imaging of Cardiac Cell Transplantation: Part I. Reporter Gene Design, Characterization, and Optical in Vivo Imaging of Bone Marrow Stromal Cells after Myocardial Infarction. N. Parashurama, B.C. Ahn, K. Ito, R. Paulmurugan, J.K. Willmann, J. Chung, F. Ikeno, J.C. Swanson, D.R. Merk, J.K. Lyons, D. Yerushalmi, T. Teramoto, H. Kosuge, C.N. Dao, P. Ray, M. Patel, Y.F. Chang, M. Mahmoudi, J.E. Cohen, A.B. Goldstone, F. Habte, S. Bhaumik, S. Yaghoubi, R.C. Robbins, R. Dash, P.C. Yang, T.J. Brinton, P.G. Yock, M.V. McConnell, S.S. Gambhir. *Radiology*, 280(3): 815-25, 2016.

Multimodality Molecular Imaging of Cardiac Cell Transplantation: Part II. In Vivo Imaging of Bone Marrow Stromal Cells in Swine with PET/CT and MR Imaging. N. Parashurama, B.C. Ahn, K. Ito, R. Paulmurugan, J.K. Willmann, J. Chung, F. Ikeno, J.C. Swanson, D.R. Merk, J.K. Lyons, D. Yerushalmi, T. Teramoto, H. Kosuge, C.N. Dao, P. Ray, M. Patel, Y.F. Chang, M. Mahmoudi, J.E. Cohen, A.B. Goldstone, F. Habte, S. Bhaumik, S. Yaghoubi, R.C. Robbins, R. Dash, P.C. Yang, T.J. Brinton, P.G. Yock, M.V. McConnell, S.S. Gambhir. *Radiology*, 280(3): 826-36, 2016.

Reporter Gene Imaging of Targeted T Cell Immunotherapy in Recurrent Glioma. K.V. Keu, T.H. Witney, S. Yaghoubi, J. Rosenberg, A. Kurien, R. Magnusson, J. Williams, F. Habte, J.R. Wagner, S. Forman, C. Brown, M. Allen-Auerbach, J. Czernin, W. Tang, M.C. Jensen, B. Badie, S.S. Gambhir. *Science Translational Medicine*, 9(373): eaag2196, 2017.



Christopher Gardner, PhD

Rehnborg Farquhar Professor

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WEB nutrition.stanford.edu

EDUCATION/TRAINING

PHD University of California, Berkeley

HONORS & AWARDS

Outstanding Faculty Advisor, Program in Human Biology (2011-2012)

Teaching Award, Stanford Prevention Research Center (2011)

Teaching Award, Stanford Prevention Research Center (2005)

CURRENT RESEARCH

I have been involved in more than a dozen human intervention trials involving more than 2,000 participants. These have examined the potential health benefits of garlic, soy, antioxidants, fish oil, ginkgo biloba, vegetarian diets, and weight loss diets. In the past few years my long-term research interests have shifted to include a second line of inquiry that falls more under the umbrella of food systems research. This shift came from the realization and appreciation that focusing on "health" as a motivator can drastically limit the potential impact for change. This led me to seek out colleagues across all seven of Stanford's schools, including those in the fields of business, law, education, earth sciences, and medicine, as well as many disciplines from the school of humanities and sciences. My long-term vision is to create a world-class Stanford Food Systems Initiative and build on the idea that Stanford is uniquely positioned geographically, culturally, and academically, to address national and global crises in obesity and diabetes that are directly related to our broken food systems. My current nutrition and food research involves institutional food settings such as universities, worksites, hospitals, schools, and retirement communities. I serve on the Scientific Advisory board of the Culinary Institute of America and have many new colleagues that are chefs who are striving to elevate the unapologetic deliciousness of food, while at the same time including human and environmental health. My long-term goal is to contribute to and accelerate positive changes in the food environment and social norms.

The river delights to lift us free, if only we dare let go. Our true work is this voyage, this adventure.

– Richard Bach

SELECTED PUBLICATIONS

Low-Carbohydrate Diet on 12-Month Weight Loss in Overweight Adults and the Association with Genotype Pattern or Insulin Secretion: A Randomized Clinical Trial. Gardner CD, Trepanowski JF, Del Gobbo LC, Hauser ME, Rigdon J, Ioannidis JPA, Desai M, King AC, Effect of Low-Fat vs. *JAMA* 2018;319(7):667-679.

Food and beverage environment and procurement policies for healthier work environments. Gardner CD, Whitsel LP, Thorndike AN, Marrow MW, Otten JJ, Foster GD, Carson JA, Johnson RK. *Nutr Rev.* 2014;72:390-410.

Non nutritive sweeteners: current use and health perspectives. A scientific statement from the American Heart Association. Gardner CD, Wylie-Rosett J, Gidding SS, Steffen L, Johnson R, Reading D, Lichtenstein A. *Circulation* 2012;126:509-19.

Incorporating prototyping and iteration into intervention development: A case study of a dining hall-based intervention. McClain AD, Hekler EB, Gardner CD. *J Amer College Health* 2013;61(2):122-31.



Francois Haddad, MD

Clinical Associate Professor, Medicine (Cardiovascular)
Director, Stanford CVI Biomarker and Phenotypic Core Laboratory

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EDUCATION/TRAINING

MD University of Montreal

PHD(c) University of Montreal

RESIDENCY Montreal University

CARDIOVASCULAR IMAGING FELLOWSHIP

Montreal Heart Institute

HEART FAILURE/TRANSPLANT & PULMONARY VASCULAR DISEASE FELLOWSHIP Stanford University

BOARD CERTIFICATION

Cardiology, Royal College of Physicians
Internal Medicine, Royal College of Physicians

CLINICAL FOCUS

Cardiology

Right Heart Failure

Precision Medicine and Biomarker focused research

Cardio-immunology

Heart Transplantation

HONORS & AWARDS

American Heart Association 3CPR Council

Fellow American Heart Association

Expert Panelist, American Thoracic Association

Task Force member, WHO Pulmonary Hypertension Committee (2013 - 2018)

Right Heart Expert Panel, American Thoracic Society (2015 - 2018)

CURRENT RESEARCH

My research focuses on precision cardiovascular health. Our laboratory focuses on (1) identifying the most useful imaging and circulating biomarkers to guide management of cardiovascular health and disease; (2) on elucidating the mechanisms of heart failure with preserved ejection fraction and metabolic cardiomyopathy; (3) on developing novel therapeutics for right heart failure and (4) on cardio-immunology. Our laboratory focuses on applying precision imaging, exercise testing and biomarker to facilitate translational studies in heart failure, pulmonary hypertension, diabetes mellitus and stem cell therapy.

Our mission is to contribute to precision cardiovascular health through comprehensive physiological phenotyping and a focused approach to biomarker discovery. We are developing new imaging and biomarker platforms as well as new computational approaches to biomarker discovery.

SELECTED PUBLICATIONS

Autoantibody profiling on a plasmonic nano-gold chip for the early detection of hypertensive heart disease. Li X, Kuznetsova T, Cauwenberghs N, Wheeler M, Maecker H, Wu JC, Haddad F, Dai H. *Proc Natl Acad Sci USA*. 2017 Jul 3;114(27):7089-7094.

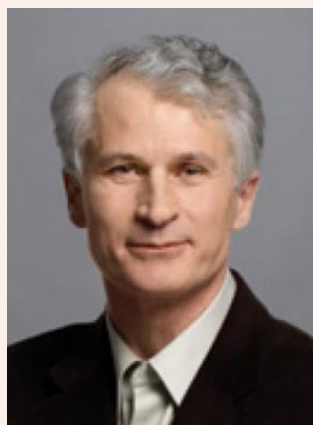
Noninvasive Imaging in the Assessment of the Cardiopulmonary Vascular Unit. Noordegraaf, A. V., Haddad, F., Bogaard, H. J., Hassoun, P. M. *Circulation*; 2015; 131 (10): 899-913.

Biventricular VAD versus LVAD for right heart failure. Boulate D, Marques MA, Ha R, Banerjee D, Haddad F. *Ann Cardiothorac Surg*; 2014; Nov; 3 (6): 585-8.

Right ventricular reserve in a piglet model of chronic pulmonary hypertension. Guihaire J, Haddad F, Noly PE, Boulate D, Decante B, Darteville P, Humbert M, Verhoye JP, Mercier O, Fadel E. *Eur Respir J*; 2014, Dec 10.

Intracoronary Transplantation of CD34 Cells is Associated with Improved Myocardial Perfusion in Patients with Non-ischemic Dilated Cardiomyopathy. Lezaic L, Socan A, Poglajen G, Peitl PK, Sever M, Cukjati M, Cernelc P, Wu JC, Haddad F, Vrtovec B. *J Card Fail*; 2014, Nov 18.

Pulmonary hypertension in patients with advanced heart failure is associated with increased levels of interleukin-6. Dolenc J, Šebešćten M, Vrtovec B, Koželj M, Haddad F. *Biomarkers*; 2014, Aug; 19 (5): 385-90.



Frank Hanley MD

Lawrence Crowley, MD Endowed Professor in Child Health
Cardiothoracic Surgery

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EDUCATION/TRAINING

MD Tufts University

INTERNSHIP UCSF Medical Center

RESIDENCY UCSF Medical Center

FELLOWSHIP UCSF Medical Center

BOARD CERTIFICATION

Thoracic Surgery, ABTS

CLINICAL FOCUS

Cardiac Surgery

Cardiothoracic Surgery, Pediatric

Thoracic Surgery

HONORS & AWARDS

Outstanding Graduating Student in Surgery (Martin J Loeb Award), Tufts Medical School (1978)

Alpha Omega Alpha medical society, University of California, San Francisco (1986)

Outstanding Resident Teaching Award, University of California, San Francisco (1986)

Outstanding Surgical Chief Resident Award, University of California, San Francisco (1986)

Excellence in Teaching Award in the Department of Surgery, University of California, San Francisco (1992-94)

Lawrence Crowley, MD, Endowed Professorship in Child Health, Stanford (2004)

CURRENT RESEARCH

Dr. Hanley's research and clinical work focuses on the development of interventional techniques for fetal and neonatal treatment of congenital heart disease, pulmonary, vascular physiology, and the neurologic impact of open-heart surgery. He developed and pioneered the unifocalization procedure, in which a single procedure is used to repair a complex and life-threatening congenital heart defect rather than several staged open-heart surgeries as performed by other surgeons. Currently, Lucile Packard Children's Hospital is a worldwide referral site for patients requiring these procedures. Hanley is also actively involved in exploring new approaches for the surgical repair of pediatric heart disease and is developing evidence-based guidelines for clinical care.

SELECTED PUBLICATIONS

Postoperative Outcomes of Children With Tetralogy of Fallot, Pulmonary Atresia, and Major Aortopulmonary Collaterals Undergoing Reconstruction of Occluded Pulmonary Artery Branches Asija, R., Koth, A. M., Velasquez, N., Chan, F. P., Perry, S. B., Hanley, F. L., McElhinney, D. *Annals of Thoracic Surgery*. 2016; 101 (6): 2329-2334.

Pulmonary Valve Repair for Patients With Acquired Pulmonary Valve Insufficiency. Said, S. M., Mainwaring, R. D., Ma, M., Tacy, T. A., Hanley, F. L. *Annals of Thoracic Surgery*. 2016; 101 (6): 2294-2301.

Surgical Repair of 115 Patients With Anomalous Aortic Origin of a Coronary Artery From a Single Institution. Mainwaring, R. D., Murphy, D. J., Rogers, I. S., Chan, F. P., Petrossian, E., Palmon, M., Hanley, F. L. *World Journal for Pediatric & Congenital Heart Surgery*. 2016; 7 (3): 353-359

Exploring the Role of Polycythemia in Patients With Cyanosis After Palliative Congenital Heart Surgery. Siehr, S. L., Shi, S., Hao, S., Hu, Z., Jin, B., Hanley, F., Reddy, V. M., McElhinney, D. B., Ling, X. B., Shin, A. Y. *Pediatric Critical Care Medicine*. 2016; 17 (3): 216-222

Mitral Stenosis and Aortic Atresia-A Risk Factor for Mortality After the Modified Norwood Operation in Hypoplastic Left Heart Syndrome. Siehr, S. L., Maeda, K., Connolly, A. A., Tacy, T. A., Reddy, V. M., Hanley, F. L., Perry, S. B., Wright, G. E. *Annals of Thoracic Surgery*. 2016; 101 (1): 162-168.

Critical Role of Coaptive Strain in Aortic Valve Leaflet Homeostasis: Use of a Novel Flow Culture Bioreactor to Explore Heart Valve Mechanobiology. Maeda, K., Ma, X., Hanley, F. L., Riemer, R. K. *Journal of the American Heart Association*. 2016; 5 (8).



Robert A. Harrington, MD

Arthur L. Bloomfield Professor of Medicine

Chair, Department of Medicine, Stanford University School of Medicine

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EDUCATION/TRAINING

MD Tufts University

MEDICINE RESIDENCY

University of Massachusetts

INTERVENTIONAL

CARDIOLOGY FELLOWSHIP

Duke University

BOARD CERTIFICATION

ABIM Internal Medicine, ABIM

Cardiovascular Disease, ABIM

Interventional Cardiology

CLINICAL FOCUS

Cardiovascular Disease

HONORS & AWARDS

Elected member: Institute of Medicine/
National Academy of Medicine

Elected member: Association of
University Cardiologists

Elected member: Association of
American Physicians

Master, American College of Cardiology

2017 Clinical Research Prize, American
Heart Association

President-elect 2018-19, American Heart
Association

President 2019-2020, American Heart
Association

CURRENT RESEARCH

My research focuses on redefining the care of patients with acute ischemic heart disease while building local, national and international collaborations for the efficient conduct of innovative clinical research and trying to better understand and improve upon the methodology of clinical trials.

Society needs academic centers to step up and figure out how we are going to deliver health care while also advancing science and educating the next generation of clinical leaders.

SELECTED PUBLICATIONS

Alirocumab and Cardiovascular Outcomes after Acute Coronary Syndrome. Schwartz GG, Steg PG, Szarek M, Bhatt DL, Bittner VA, Diaz R, Edelberg JM, Goodman SG, Hanotin C, Harrington RA, Jukema JW, Lecorps G, Mahaffey KW, Moryusef A, Pordy R, Quintero K, Roe MT, Sasiela WJ, Tamby JF, Tricoci P, White HD, Zeiher AM; ODYSSEY OUTCOMES Committees and Investigators. *N Engl J Med.* 2018 Nov 29;379(22):2097-2107.

Alirocumab Reduces Total Nonfatal Cardiovascular and Fatal Events in the ODYSSEY OUTCOMES Trial. Szarek M1, White HD2, Schwartz GG3, Alings M4, Bhatt DL5, Bittner VA6, Chiang CE7, Diaz R8, Edelberg JM9, Goodman SG10, Hanotin C11, Harrington RA12, Jukema JW13, Kimura T14, Kiss RG15, Lecorps G11, Mahaffey KW12, Moryusef A9, Pordy R16, Roe MT17, Tricoci P18, Xavier D19, Zeiher AM20, Steg PG21; ODYSSEY OUTCOMES Committees and Investigators. *J Am Coll Cardiol.* 2018 Oct 27.

Planning and Conducting the ISCHEMIA Trial. Maron DJ, Harrington RA, Hochman JS. *Circulation.* 2018 Oct 2;138(14):1384-1386.

Evaluating Health Technology Through Pragmatic Trials: Novel Approaches to Generate High-Quality Evidence. Peterson ED, Harrington RA. *JAMA.* 2018 Jul 10;320(2):137-138.

Mobile Health Advances in Physical Activity, Fitness, and Atrial Fibrillation: Moving Hearts. McConnell MV, Turakhia MP, Harrington RA, King AC, Ashley EA. *J Am Coll Cardiol.* 2018 Jun 12;71(23):2691-2701.

Canakinumab for Atherosclerotic Disease. Harrington RA. *N Engl J Med.* 2018 Jan 11;378(2):199-200.

What This Computer Needs Is a Physician: Humanism and Artificial Intelligence. Verghese A, Shah NH, Harrington RA. *JAMA.* 2018 Jan 2;319(1):19-20.



Paul A. Heidenreich, MD, MS

Professor, Medicine - Cardiovascular Medicine
 Professor (by courtesy), Health Research and Policy
 Vice-Chair for Quality, Department of Medicine
 Director of Echocardiography, VA Palo Alto Health Care System

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EDUCATION/TRAINING

MD University of Chicago

MS Health Services Research, Stanford University

INTERNAL MEDICINE RESIDENCY
UCSF

CARDIOVASCULAR IMAGING FELLOWSHIP UCSF

CLINICAL CARDIOLOGY FELLOWSHIP
UCSF

BOARD CERTIFICATION
 Cardiovascular Disease, ABIM
 Internal Medicine, ABIM
 Transthoracic plus Transesophageal
 Certification in Adult
 Echocardiography, NBE

CLINICAL FOCUS

Cardiac Imaging

HONORS & AWARDS

Simon Dack Award for Outstanding
 Scholarship, American College of
 Cardiology Foundation

Anna and Harry Borun Visiting Professor,
 UCLA (2011)

ELITE REVIEWER
 Journal of the American College of
 Cardiology (ACC)

FELLOW
 ACC; American Heart Association

MEMBER
 American College of Physicians;
 American Society of Echocardiography

CURRENT RESEARCH

My current research interests include: 1) the cost-effectiveness of new cardiovascular technologies (for example, tests to screen asymptomatic patients for left ventricular systolic dysfunction); 2) interventions to improve the quality of care of patients with heart disease (for example, clinical reminders and home monitoring); 3) outcomes research using existing clinical and administrative datasets; and 4) use of echocardiography to predict prognosis. I am the Director of Echocardiography, VA Palo Alto Health Care System and a Research Associate of Primary Care and Outcomes Research Center.

Both heart failure and atrial fibrillation impose an important economic and health burden on western societies that is only going to worsen as their populations age.

SELECTED PUBLICATIONS

2018 AHA/ACC/AACVPR/AAPA/ABC/ACPM/ADA/AGS/APhA/ASPC/NLA/PCNA Guideline on the Management of Blood Cholesterol: A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines. Grundy SM, Stone NJ, Bailey AL, Beam C, Birtcher KK, Blumenthal RS, Braun LT, de Ferranti S, Faiella-Tommasino J, Forman DE, Goldberg R, Heidenreich PA, Hlatky MA, Jones DW, Lloyd-Jones D, Lopez-Pajares N, Ndumele CE, Orringer CE, Peralta CA, Saseen JJ, Smith SC Jr, Sperling L, Virani SS, Yeboah J. *J Am Coll Cardiol*. 2018 Nov 8.

Association Between Offering Limited Left Ventricular Ejection Fraction Echocardiograms and Overall Use of Echocardiography. Sandhu AT, Parizo J, Moradi-Ragheb N, Heidenreich PA. *JAMA Intern Med*. 2018 Sep 1;178(9):1270-1272.

US Department of Justice Investigations of Implantable Cardioverter-Defibrillators and Quality Improvement in Health Care. Heidenreich PA. *JAMA*. 2018 Jul 3;320(1):40-42.

Cost-Effectiveness of Sacubitril-Valsartan in Patients Who Have Heart Failure With Reduced Ejection Fraction. Sandhu AT, Ollendorf DA, Chapman RH, Pearson SD, Heidenreich PA. *Ann Intern Med*. 2017 Apr 18;166(8):607-608.



Sarah Heilshorn, PhD

Lee Otterson Faculty Scholar
Associate Professor, Materials Science and Engineering
Associate Professor (by courtesy), Chemical Engineering
Associate Professor (by courtesy), Bioengineering

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EDUCATION/TRAINING

MS California Institute of Technology

PHD California Institute of Technology

RESEARCH FELLOWSHIP UC Berkeley

HONORS & AWARDS

NIH Director's New Innovator Award

National Science Foundation Career Award

UK-US Stem Cell Collaboration Development Award

Young Talent Award, State Key Laboratory of Molecular Engineering Polymers, China

ASSOCIATE EDITOR

Science Advances

ELECTED POSITIONS

Board of Directors, Materials Research Society

Fellow, Royal Society of Chemistry

Fellow, American Institute for Medical and Biological Engineering

CURRENT RESEARCH

I combine my diverse training in engineering, chemistry, and biology to design new materials that mimic those found in our own bodies for applications in tissue engineering and regenerative medicine. Current topics of investigation include the design of injectable materials to improve stem cell transplantation, protein engineered materials for regenerative medicine scaffolds, and peptide-based self-assembly materials for enhanced drug delivery.

I have advised PhD students from six different academic programs at Stanford: chemistry, chemical engineering, bio engineering, materials science, mechanical engineering, and MD/PhD.

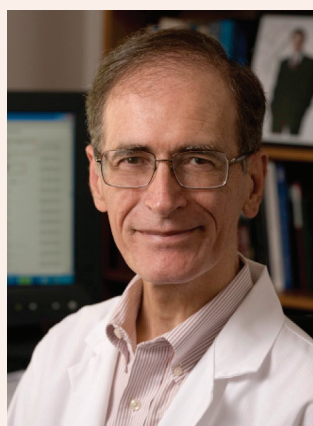
SELECTED PUBLICATIONS

Engineered stem cell mimics to enhance stroke recovery. George PM, Oh B., Dewi RE, Hua T., Cai L., Levinson A., Liang X., Krajina BA, Bliss TM, Heilshorn SC, Steinberg GK. *Biomaterials*, 2018, 178:63-72.

Bioengineering strategies to accelerate stem cell therapeutics. Madl CM, Heilshorn SC, Blau H. *Nature*, 2018, 557:335-342.

Protein-engineered hydrogels enhance the survival of induced pluripotent stem cell-derived endothelial cells for treatment of peripheral arterial disease. Foster A., Dewi R., Cai L., Hou L., Strassberg Z., Alcazar C., Heilshorn SC., Huang N. *Biomaterials Science*, 2018, 6:614-622.

Maintenance of neural progenitor cell stemness in 3D hydrogels requires matrix remodelling. Madl CM, LeSavage BL, Dewi R., Dinh C., Stowers R., Khariton M., Lampe K., Nguyen D., Chaudhuri O., Enejder A., Heilshorn SC. *Nature Materials*, 2017, 16:1233-1242.



Mark Hlatky, MD

Professor, Health Research and Policy
Professor, Medicine - Cardiovascular Medicine
Director, Health Services Research Masters Degree Program

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PROFILE med.stanford.edu/profiles/mark-hlatky

EDUCATION/TRAINING

MD University of Pennsylvania

MEDICINE RESIDENCY

University of Arizona

CARDIOLOGY FELLOWSHIP

Duke University

ROBERT WOOD JOHNSON CLINICAL SCHOLAR UCSF

BOARD CERTIFICATION

Internal Medicine, ABIM
Cardiovascular Disease, ABIM

CLINICAL FOCUS

General Cardiology

HONORS & AWARDS

DISTINGUISHED SCIENTIST AWARD

American College of Cardiology (ACC)
American Heart Association (AHA)

LIFETIME ACHIEVEMENT AWARD

AHA Quality of Care and Outcomes
Research Council

FELLOW

American College of Cardiology;
American Heart Association

MEMBER

ACC/AHA Task Force on Clinical Practice
Guidelines;
AHA Clinical Cardiology Council
AHA Quality of Care and Outcomes
Research Council

SCIENTIFIC ADVISOR

Office of Clinical Affairs, Blue Cross Blue
Shield Association

FORMER CHAIR

Dept. of Health Research and Policy

CURRENT RESEARCH

My major interests are in cardiovascular health services research, outcomes research, evidence-based medicine, and cost-effectiveness analysis. I introduced data collection about economic and quality of life endpoints in several randomized trials, principally trials of therapies for cardiovascular disease (coronary angioplasty, stents, and bypass surgery; diabetes management). I am the Director of Stanford's Health Policy Masters Degree Program.

I am interested in determining what “works” in medical care, whether it provides enough value to be worth the money we spend on it, and how to foster the adoption of effective and efficient practices.

SELECTED PUBLICATIONS

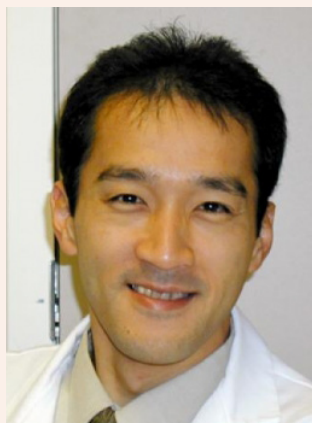
PCSK9 inhibitors: Economics and policy. Hlatky, M.A., Kazi, D.S.; *J Am Coll Cardiol* 2017; 70:2677-2687.

Functional testing or coronary computed tomography angiography in patients with stable coronary artery disease. Jørgensen ME, Andersson C, Nørgaard BL, Abdulla J, Shreibati JB, Torp-Pedersen C, Gislason GH, Shaw RE, Hlatky MA. *J Am Coll Cardiol* 2017; 69:1761-1770.

Economic Outcomes of Treatment Strategies for Type 2 Diabetes Mellitus and Coronary Artery Disease in the Bypass Angioplasty Revascularization Investigation 2 Diabetes Trial. Hlatky, M. A., Boothroyd, D. B., Melsop, K. A., Kennedy, L., Rihal, C., Rogers, W. J., Venkitachalam, L., Brooks, M. M.; *Circulation*; 2009; 120 (25): 2550-U69

Criteria for evaluation of novel markers of cardiovascular risk: a scientific statement from the American Heart Association. Hlatky, M. A., Greenland, P., Arnett, D. K., Ballantyne, C. M., Criqui, M. H., Elkind, M.S., Go, A. S., Harrell, F. E., Hong, Y., Howard, B. V., Howard, V. J., Hsue, P. Y., Kramer, C. M., McConnell, J. P., Normand, S. T., O'Donnell, C. J., Smith, S. C., Wilson, P. W.; *Circulation*; 2009; 119 (17): 2408-2416.

Coronary artery bypass surgery compared with percutaneous coronary interventions for multivessel disease: A collaborative analysis of individual patient data from ten randomised trials. Hlatky, M. A., Boothroyd, D. B., Bravata, D. M., Boersma, E., Booth, J., Brooks, M. M., Carrie, D., Clayton, T. C., Danchin, N., Flather, M., Hamm, C. W., Hueb, W. A., Kaehler, J., Kelsey, S. F., King, S. B., Kosinski, A. S., Lopes, N., McDonald, K. M., Rodriguez, A., Serruys, P., Sigwart, U., Stables, R. H., Owens, D. K., Pocock, S. J.; *Lancet*; 2009; 373 (9670): 1190-1197.



Yasuhiro Honda, MD

Clinical Associate Professor, Medicine - Cardiovascular Medicine
Director, Stanford Cardiovascular Core Analysis Laboratory (CCAL)

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WEB med.stanford.edu/ccvt

CURRENT RESEARCH

My laboratory is recognized worldwide as a leading centralized resource of image analysis in the conduct of research studies and clinical trials in the field of cardiovascular medicine. Specifically, we have served as a core laboratory for over 145 national or international multi-center trials of new medical devices or pharmacological treatments, utilizing advanced cardiovascular imaging techniques, such as intravascular ultrasound (IVUS), catheter-based optical coherence tomography (OCT) / frequency domain imaging (OFDI), and intravascular near-infrared spectroscopy (NIRS). The data provided from my laboratory have contributed not only to the FDA's approval process of new treatment technologies, but also academically to our understanding of cardiovascular disease by generating over 420 scientific articles published in peer-reviewed journals.

Advances in diagnostic technologies will enable us to better understand pathophysiology and will pave the way for new treatment strategies for our patients.

SELECTED PUBLICATIONS

Bioresorbable Scaffold for Treatment of Coronary Artery Lesions: Intravascular Ultrasound Results From the ABSORB Japan Trial. Okada K, Honda Y, Kitahara H, Otagiri K, Tanaka S, Hollak MB, Yock PG, Popma JJ, Kusano H, Cheong WF, Sudhir K, Fitzgerald PJ, Kimura T and Investigators AJ. *JACC Cardiovasc Interv.* 2018;11:648-661.

Assessment of bioresorbable scaffold with a novel high-definition 60 MHz IVUS imaging system: Comparison with 40-MHz IVUS referenced to optical coherence tomography. Okada K, Kitahara H, Mitsutake Y, Tanaka S, Kimura T, Yock PG, Fitzgerald PJ, Ikeno F and Honda Y. *Catheter Cardiovasc Interv.* 2018;91:874-883.

Impact of attenuated-signal plaque observed by intravascular ultrasound on vessel response after drug-eluting stent implantation. Kitahara H, Waseda K, Sakamoto K, Yamada R, Huang CC, Nakatani D, Sakata K, Kawarada O, Yock PG, Matsuyama Y, Yokoi H, Nakamura M, Muramatsu T, Nanto S, Fitzgerald PJ and Honda Y. *Atherosclerosis.* 2017;259:68-74.

Impact of stent size selection on acute and long-term outcomes after drug-eluting stent implantation in de novo coronary lesions. Kitahara H, Okada K, Kimura T, Yock PG, Lansky AJ, Popma JJ, Yeung AC, Fitzgerald PJ and Honda Y. *Circ Cardiovasc Interv.* 2017;10:e004795.

Functional versus anatomic assessment of myocardial bridging by intravascular ultrasound: impact of arterial compression on proximal atherosclerotic plaque. Yamada R, Tremmel JA, Tanaka S, Lin S, Kobayashi Y, Hollak MB, Yock PG, Fitzgerald PJ, Schnittger I and Honda Y. *J Am Heart Assoc.* 2016;5:e001735.

EDUCATION/TRAINING

MD Kyoto University

MEDICINE RESIDENCY

Kobe General Hospital

CARDIOLOGY FELLOWSHIP

Kobe General Hospital

RESEARCH FELLOWSHIP

Stanford University

CLINICAL FOCUS

Advanced Cardiovascular Imaging
Interventional Cardiology
Intravascular Diagnostics

HONORS & AWARDS

INTERNATIONAL COMMITTEE & TASK FORCE

International Working Group for Intravascular Optical Coherence Tomography Standardization and Validation

STEERING COMMITTEE MEMBER

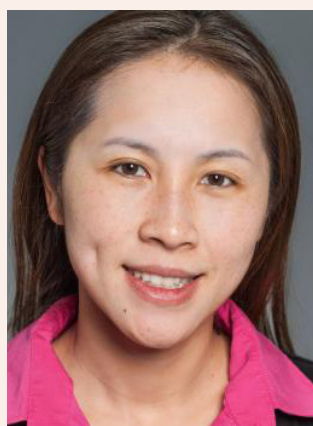
Stanford Trans-Pacific Cardiovascular Research Scholarship Program

FELLOW

American College of Cardiology;
American Heart Association

EDITORIAL BOARD

Cardiovascular Intervention and Therapeutics



Ngan F. Huang, PhD

Assistant Professor, Cardiothoracic Surgery - Adult Cardiac Surgery
Biomedical Engineer, VA Palo Alto Health Care System

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LAB huanglab.stanford.edu

EDUCATION/TRAINING

PHD UC Berkeley and UCSF

BS Massachusetts Institute of Technology

HONORS & AWARDS

Society for Vascular Medicine Jay D. Coffman Young Investigator Award First Place

American Heart Association, Council on Peripheral Vascular Disease Robert W Hobson II MD Early Career Investigator Award

Rising Star Award, Cellular and Molecular Bioengineering Annual Conference

Young Innovator Award, Biomedical Engineering Society

Young Innovator Award, Tissue Engineering and Regenerative Medicine-Americas

American Heart Association, Council on Peripheral Vascular Disease, Jay D. Coffman Young Investigator Award, 2nd Place

Fellow of the American Heart Association (FAHA)

STEERING COMMITTEE MEMBER

Stanford Cardiovascular Institute

MEMBER

Bio-X; Child Health Research Institute
CHEM-H (Stanford Chemistry, Engineering & Medicine for Human Health)

CURRENT RESEARCH

My research laboratory aims to quantify the chemical and biophysical interactions between cells and extracellular matrix (ECM) proteins that regulate cell fate specification into cardiovascular lineages. Using high-throughput ECM-microarrays, tunable hydrogels, and spatially patterned nanofibrillar scaffolds, we are studying how the ECM influences lineage commitment processes such as differentiation, transdifferentiation, and nuclear reprogramming. The fundamental insights of cell-ECM interactions are applied towards translational applications with respect to improving the survival and regenerative capacity of transplanted cells, as well as for engineering vascularized cardiovascular tissues. We are also collaborating with industry partners to develop biomaterials-based approaches for treatment of critical limb ischemia and volumetric muscle loss and in small and large animal models.

I believe that a fully functional tissue-engineered heart can be realized in my lifetime.

SELECTED PUBLICATIONS

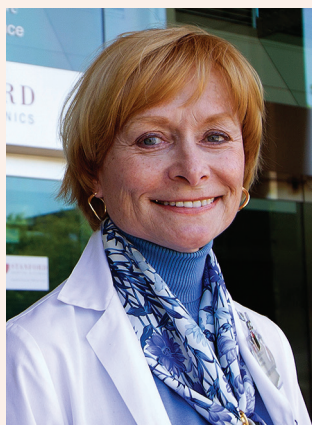
Protein-engineered hydrogels enhance the survival of induced pluripotent stem cell-derived endothelial cells for treatment of peripheral arterial disease. Foster AA, Dewi RE, Cai L, Hou L, Strassberg Z, Alcazar CA, Heilshorn SC, Huang NF. *Biomater Sci*. 6:614-622, 2018

Aligned Nanofibrillar Scaffolds for Controlled Delivery of Modified mRNA. Zaitseva T, Alcazar C, Zamani M, Hou L, Sawamura S, Yakubov E, Hopkins M, Woo YJ, Paukshto M, Huang NF. *Tissue Eng Part A*. 2018 May 2.

Near-Infrared IIb Fluorescence Imaging of Vascular Regeneration with Dynamic Tissue Perfusion Measurement and High Spatial Resolution. Ma Z, Zhang M, Yue J, Alcazar C, Zhong Y, Doyle TC, Dai H, Huang NF. *Adv Funct Mater* 28, 1803417, 2018.

A small molecule derived from carboxyethylpyrrole protein adducts promotes angiogenesis in a mouse model of peripheral arterial disease. Hou L, Yang G, Tang S, Alcazar C, Joshi P, Strassberg Z, Kim M, Kawamura M, Woo YJ, Shrager J, Ding S, Huang NF. *JAHA* 7(18):e009234, 2018.

Rehabilitative Exercise and Spatially Patterned Nanofibrillar Scaffolds Enhance Vascularization and Innervation Following Volumetric Muscle Loss. Nakayama KH, Alcazar C, Yang G, Quarta M, Paine P, Doan L, Davis A, Rando TA, Huang NF. *npj Regen Med*, 3:16, 2018.



Sharon Hunt, MD

Professor Emeritus, Medicine - Cardiovascular Medicine
Medical Director, Post-Heart Transplant Programs

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PROFILE med.stanford.edu/profiles/sharon-hunt

EDUCATION/TRAINING

MD Stanford University

MEDICINE RESIDENCY & INTERNSHIP

Stanford University

CARDIOLOGY FELLOWSHIP

Stanford University

BOARD CERTIFICATION

Advanced Heart Failure Transplant

Cardiology, ABIM

Core Cardiology, ABIM

Internal Medicine, ABIM

CLINICAL FOCUS

Clinical Heart Transplant

HONORS & AWARDS

LIFETIME ACHIEVEMENT AWARD

International Society for Heart and Lung Transplantation (ISHLT; 2012)

American Society of Transplantation
Senior Achievement Award in Clinical Transplantation

Laennec Master Clinician Award,
American Heart Association

David A Ryland Clinical Teaching Award,
Stanford University

FORMER CHAIR (1999-2006)

ACC/AHA Committee to rewrite heart failure guidelines

FORMER CHAIR (2008-12)

ABIM Test Committee on Advanced Heart Failure and Transplant Cardiology

FORMER CO-CHAIR (2011-12)

ISHLT Guidelines for post transplant patient management

CURRENT RESEARCH

Dr. Hunt is a pioneering figure in the field of cardiology and has received numerous awards, including the Lifetime Achievement Award from the International Society for Heart and Lung Transplantation. Her research and clinical work focus on advancing long-term postoperative care for heart transplant recipients. She enjoys both taking care of patients and the opportunity to mentor cardiology fellows at Stanford.

The holy grail of immune tolerance remains beyond our reach at this time, but has the potential to completely alter the heart transplant landscape.

SELECTED PUBLICATIONS

Cardiac allograft vasculopathy: It really has changed over time. Hunt, SA. *JACC: Heart Failure*. 2017;5:902-3.

Major advantages and critical challenge for proposed United States heart allocation system. Stevenson LW, Kormos RL, Young JB, Kirklin JK, Hunt SA. *J Heart Lung Transplant*. 2016; 35:547-549.

Heart transplant recipient selection issues: limited assets, infinite possibilities. Hunt SA. *J Heart Lung Transplant* 31:675-6, 2012.

Clinical and functional correlates of early microvascular dysfunction after heart transplantation. Haddad F, Khazanie P, Deuse T, Weisshaar D, Zhou J, Nam CW, Vu TA, Gomari FA, Skhiri M, Simos A, Schnittger I, Vrtovc B, Hunt SA, Fearon WF. *Circ Heart Fail* 5:759-768, 2012.



Erik Ingelsson, MD, PhD

Professor, Medicine - Cardiovascular Medicine
 Professor (by Courtesy), Health Research and Policy - Epidemiology
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 LAB <http://med.stanford.edu/ingelssonlab.html>

EDUCATION/TRAINING

MD Uppsala University

PHD Uppsala University

HONORS & AWARDS

Young Investigator Award, EuroPrevent
 2008, European Association of
 Cardiovascular Prevention and
 Rehabilitation

Trudy Bush Fellowship for
 Cardiovascular Research in Women's
 Health, American Heart Association

Ingvar Carlsson Award, Swedish
 Foundation for Strategic Research

Fellow of the American Heart
 Association (FAHA)

ERC Starting Grant Award, European
 Research Council

Wallenberg Academy Fellow, Knut and
 Alice Wallenberg Foundation

Göran Gustafsson Prize in Medicine,
 Göran Gustafsson Foundation

Member of the Royal Society of Arts and
 Sciences, Sweden

CURRENT RESEARCH

Work in Dr. Ingelsson's lab focuses on genetics of cardiovascular disease, with a special focus on metabolic disturbances, such as obesity and insulin resistance. The methods comprise human genetics and molecular epidemiology, including -omics studies of how cardiovascular disease and related conditions vary with DNA variation, RNA expression, and circulating biomarkers, such as proteins and metabolites; as well as functional studies of candidate genes using gene editing in cell and animal models. His research is translational, trying to bridge population studies with molecular biology to reach new important insights into the pathophysiology of cardiovascular diseases, identification of new biomarkers for improved risk prediction, and discovery of novel targets for drug development.

SELECTED PUBLICATIONS

Body composition and atrial fibrillation: A Mendelian randomization study. Tikkanen E, Gustafsson S, Knowles JW, Perez M, Ingelsson E. *Eur Heart J*. 2019. doi: 10.1093/eurheartj/ehz003

Large-scale phenome-wide association study of PCSK9 variants demonstrates protection against ischemic stroke. Rao AS, Lindholm D, Rivas MA, Knowles JW, Montgomery SB, Ingelsson E. *Circ Genom Precis Med*. 2018 Jul;11(7):e002162.

Glucose challenge metabolomics implicates medium-chain acylcarnitines in insulin resistance. Nowak C, Hetty S, Salihovic S, Castillejo-Lopez C, Ganna A, Cook NL, Broeckling CD, Prenni JE, Shen X, Giedraitis V, Årnlöv J, Lind L, Berne C, Sundström J, Fall T, Ingelsson E. *Sci Rep*. 2018 Jun 6;8(1):8691.

Birthweight, type 2 diabetes mellitus, and cardiovascular disease: Addressing the Barker Hypothesis with Mendelian randomization. Zanetti D, Tikkanen E, Gustafsson S, Priest JR, Burgess S, Ingelsson E. *Circ Genom Precis Med*. 2018;11(6):e002054.

Associations of fitness, physical activity, strength, and genetic risk with cardiovascular disease: Longitudinal analysis in the UK biobank study. Tikkanen E, Gustafsson S, Ingelsson E. *Circulation*. 2018;137(24):2583-2591.

Five-year mortality predictors: A prospective study of ~500,000 UK Biobank participants. Ganna A, Ingelsson E. *Lancet* 2015;386(9993):533-540.

Genome-Wide Meta-Analysis Identifies 11 New Loci for Anthropometric Traits and Provides Insights into Genetic Architecture. Berndt SI, Gustafsson S, Mägi R, Ganna A, [>300 authors], Speliotes EK, North KE, Loos RJ, Ingelsson E. *Nat Genet*. 2013; 45(5):501-12.



John P. A. Ioannidis, MD, DSc

C.F. Rehnberg Professor in Disease Prevention
 Professor, Medicine - Stanford Prevention Research Center
 and Health Research and Policy
 Professor (by courtesy), Statistics
 Director, Stanford Prevention Research Center
 Co-Director, Meta-Research Innovation Center at Stanford (METRICS)

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SPRC prevention.stanford.edu

EDUCATION/TRAINING

MD University of Athens

DSc University of Athens

INTERNAL MEDICINE RESIDENCY

Harvard University

INFECTIOUS DISEASE FELLOWSHIP

Tufts University

BOARD CERTIFICATION

Internal Medicine (Europe)

Infectious Disease (Europe)

HONORS & AWARDS

European Award for Excellence in Clinical Science

Chanchlani Award for Global Health

Medal for Distinguished Service, Teachers College, Columbia University

Honorary PhD, Erasmus University Rotterdam

Honorary PhD (health sciences), University of Athens

ELECTED MEMBER

European Academy of Sciences and Arts
 Association of American Physicians (also elected Councilor)

European Academy of Cancer Sciences
 American Epidemiological Society

FORMER PRESIDENT

Society for Research Synthesis Methodology

AFFILIATED FACULTY

Woods Institute for the Environment, Bio-X, Stanford Cancer Institute

EDITOR-IN-CHIEF

European Journal of Clinical Investigation

EDITORIAL BOARD MEMBER

26 major international journals

CURRENT RESEARCH

I have worked in the fields of evidence-based medicine, clinical and molecular epidemiology, human genome epidemiology, statistical methods and mathematical modeling, predictive and personalized medicine and health, and the sociology of science. I have a strong interest in large-scale evidence (in particular randomized trials and meta-analyses) and empirical evaluation of bias in biomedical research. I am interested in understanding how to improve research practices and in the interdisciplinary enhancement of existing research methods for study design and analysis in biomedicine and beyond.

I am privileged to have learned and to continue to learn from interactions with students and scientists from all over the world and to be constantly reminded that I know next to nothing.

SELECTED PUBLICATIONS

Meta-assessment of bias in science. Fanelli, D., Costas, R., Ioannidis, J. P. *Proc Natl Acad Sci*; 2017;114 (14): 3714-3719.

What does research reproducibility mean? Goodman, S. N., Fanelli, D., Ioannidis, J. P. *Sci Transl Med* 2016; 8 (341).

Evidence-based medicine has been hijacked: a report to David Sackett. Ioannidis, J.P. *J Clin Epidemiol* 2016; 73: 82-86.

Evolution of Reporting P Values in the Biomedical Literature, 1990-2015. Chavalarias, D., Wallach, J. D., Li, A. H., Ioannidis, J. P. *J Am Med Assoc*. 2016; 315 (11): 1141-1148.

Reproducible Research Practices and Transparency across the Biomedical Literature. Iqbal, S. A., Wallach, J. D., Khoury, M. J., Schully, S. D., Ioannidis, J. P. *PLoS Biology* 2016;14(1).



Michael Kapiloff, MD, PhD

Associate Professor (Research) of Ophthalmology and, by courtesy, of Medicine (Cardiovascular Medicine)

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EDUCATION/TRAINING

PHD University of California, San Diego

MD University of California, San Diego

RESIDENCY

University of Utah and Primary Children's Medical Centers

RESEARCH FELLOWSHIP

Oregon Health and Science University

HONORS & AWARDS

FELLOW

American Heart Association (2008)
American Physiological Society, Cardiovascular Section (2014)

MEMBER

American Society for Clinical Investigation (2011)

Micah Batchelor Award For Excellence In Children's Health Research, University of Miami (2013)

CURRENT RESEARCH

Dr. Kapiloff is currently involved in full-time basic science and translational research. His laboratory studies the basic molecular mechanisms underlying the response of the retinal ganglion cell and cardiac myocyte to disease. The longstanding interest of his laboratory is the role in intracellular signal transduction of multimolecular complexes organized by scaffold proteins. Recently, his lab has been involved in the translation of these concepts into new therapies, including the development of new AAV gene therapy biologics for the prevention and treatment of heart failure and for neuroprotection in the eye.

As we acquire a more profound understanding of the molecular underpinnings of the function of our hearts, new therapies will emerge that will provide new hope for diseases that we only assume will take so many of our loved ones away from us.

SELECTED PUBLICATIONS

The Protein Kinase A Anchoring Protein mAKAP Coordinates Two Integrated cAMP Effector Pathways. Dodge-Kafka, K.L., Soughayer, J., Pare, G.C., Michel, J.J.C., Langeberg, L.K., Kapiloff, M.S., and Scott, J.D. *Nature*, 437: 574-578, 2005.

Anchored p90 ribosomal S6 kinase 3 is required for cardiac myocyte hypertrophy. Li, J., Kritzer, M.D., Michel, J.J., Le, A., Thakur, H., Gayanilo, M., Passariello, C.L., Negro, A., Danial, J.B., Oskouei, B., Sanders, M., Hare, J.M., Hanauer, A., Dodge-Kafka, K.L., and Kapiloff, M.S. *Circulation Research*, 112: 128-139, 2013.

The Scaffold Protein Muscle A-Kinase Anchoring Protein Beta Orchestrates Cardiac Myocyte Hypertrophic Signaling Required for the Development of Heart Failure. Kritzer, M.D., Li, J., Passariello, C.L., Gayanilo, M., Thakur, H., Dayan, J., Dodge-Kafka, K.L., and Kapiloff, M.S. *Circulation: Heart Failure*, 7 (4):663-672, 2014.



Ioannis Karakikes, PhD

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EDUCATION/TRAINING

PHD University of Essex, UK

POSTDOCTORAL TRAINING

Imperial College, London, UK
Ichan School of Medicine, NY

HONORS & AWARDS

Best Manuscript Award, *Circulation Research* 2018

K99/R00 Pathway to Independence Award, NIH/NHLBI (2012)

CURRENT RESEARCH

The Karakikes Lab aims to uncover fundamental new insights into the molecular mechanisms and functional consequences of pathogenic mutations associated with familial cardiovascular diseases.

The overarching goal of our studies is to improve our understanding of the pathogenesis of familial cardiomyopathies, such as Hypertrophic Cardiomyopathy (HCM) and Dilated Cardiomyopathy (DCM). We utilize isogenic human induced pluripotent stem cells (iPSCs) as a platform for disease modeling to gain insights on how rare mutations affect the cardiomyocyte biology. By establishing a better understanding of the biology of the disease, our studies represent a first definitive step in elucidating the genotype-phenotype associations in HCM and DCM toward applying a precision medicine approach to the treatment of genetic cardiomyopathies.

SELECTED PUBLICATIONS

A Mutation in MYBPC3 Causes Hypertrophic Cardiomyopathy via Chronic Activation of Nonsense-Mediated Decay. Seeger T, Shrestha R, Chen C, Lam CK, Lau E, McKeithan WL, Matthew Greenhaw, Lee J, , Soah Lee, Mark Mercola, Fan Yang, Karakikes I, Wu JC. *Circulation*. 2019

A Comprehensive TALEN-Based Knockout Library for Generating Human Induced Pluripotent Stem Cell-Based Models for Cardiovascular Diseases. Karakikes I, Termglinchan V, Cepeda D, Lee J, Diecke S, Hendel A, Itzhaki I, Ameen M, Shrestha R, Wu H, Ma N, Shao N, Seeger T, Woo N, Wilson KD, Matsa M, Porteus M, V Sebastiano V, Wu JC. *Circulation Research*. 2017 12;120(10):1561-1571

Correction of human phospholamban R14del mutation associated with cardiomyopathy using targeted nucleases and combination therapy. Karakikes, I., Stillitano, F., Nonnenmacher, M., Tzimas, C., Sanoudou, D., Termglinchan, V., Kong, C., Rushing, S., Hansen, J., Ceholski, D., Kolokathis, F., Kremastinos, D., Katoulis, A., Ren, L., Cohen, N., Gho, J. M., Tsiapras, D., Vink, A., Wu, J. C., Asselbergs, F. W., Li, R. A., Hulot, J., Kranias, E. G., Hajjar, R. J. *Nature Communications*. 2015; 6.

Human Induced Pluripotent Stem Cell-Derived Cardiomyocytes Insights into Molecular, Cellular, and Functional Phenotypes. Karakikes, I., Ameen, M., Termglinchan, V., Wu, J. C.; *Circulation Research*. 2015; 117 (1): 80-88.



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EDUCATION/TRAINING

MD Harvard University, University of California, San Francisco

RESIDENCY / CARDIOLOGY FELLOWSHIPS

University of California, San Francisco

BOARD CERTIFICATION

Advanced Heart Failure and Transplant Cardiology, American Board of Internal Medicine Cardiovascular Disease, American Board of Internal Medicine

HONORS & AWARDS

R01 Research Project Grant, National Institutes of Health (2014)

Clinical Research Program Award

CURRENT RESEARCH

As Director of Heart Transplant Research in the Division of Cardiovascular Medicine, my research focuses on the evaluation and selection of donors for heart transplantation; the pathogenesis of post-transplant complications, including acute rejection and cardiac allograft vasculopathy; and non-invasive diagnosis of post-transplant complications. I serve as Associate Director of the International Society for Heart and Lung Transplantation (ISHLT) Thoracic Transplant Registry and as the heart transplant lead for the ISHLT 2019 annual scientific sessions. I am on the editorial boards of the Journal of Heart and Lung Transplantation and Circulation Heart Failure. I am also the Program Director of the Advanced Heart Failure and Transplant Cardiology fellowship at Stanford.

SELECTED PUBLICATIONS

Angiotensin-Converting Enzyme Inhibition Early After Heart Transplantation. Fearon WF, Okada K, Kobashigawa J, Kobayashi Y, Luikart H, Sana S, Daun T, Chmura SA, Sinha S, Cohen G, Honda Y, Pham M, Lewis DB, Bernstein D, Yeung AC, Valantine HA, Khush K. *Journal of the American College of Cardiology*, 2017 June 13; 69(23):2832-2841.

Late manifestation of alloantibody-associated injury and clinical pulmonary antibody-mediated rejection: Evidence from cell-free DNA analysis. Agbor-Enoh S, Jackson AM, Tunc I, Berry GJ, Cochrane A, Grimm D, Davis A, Shah P, Brown AW, Wang Y, Timofte I, Shah P, Gorham S, Wylie J, Goodwin N, Jang MK, Marishta A, Bhatti K, Fideli U, Yang Y, Luikart H, Cao Z, Pirooznia M, Zhu J, Marboe C, Iacono A, Nathan SD, Orens J, Valantine HA, Khush K. *Journal of Heart and Lung Transplantation* 2018 Jan 31.

Accepting hepatitis C virus-infected donor hearts for transplantation: Multistep consent, unrealized opportunity, and the Stanford experience. Moayed Y, Gulamhusein AF, Ross HJ, Teuteberg JJ, Khush KK. *Clin Transplant*. 2018 Jun 5: e13308.

Transplant phenomapping: A move toward personalized immunosuppression. *J Heart Lung Transplant*. Miller RJH, Khush KK. 2018 Aug; 37(8) 943-44.

Increasing complexing of thoracic transplantation and the rise of multiorgan transplantation around the world: insights from the International Society for Heart and Lung Transplantation Registry. Stehlik J, Chambers DC, Zuckermann A, Mehra MR, Khush KK. *J Heart Lung Transplant*. 2018; Oct 37(10) 1145-54.

The International Thoracic Organ Transplant Registry of the International Society for Heart and Lung Transplantation: Thirty-fifth Adult Heart Transplantation Report-2018; Focus Theme: Multiorgan Transplantation. Khush KK, Cherikh WS, Chambers DC, Goldfarb S, Hayes D Jr, Kucheryavaya AY, Levvey BJ, Meiser B, Rossano JW, Stehlik J. *Journal of Heart and Lung Transplantation*, 2018; 37(10):1155-1168.



Joshua W. Knowles, MD, PhD

Assistant Professor, Medicine - Cardiovascular Medicine

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EDUCATION/TRAINING

MD UNC-Chapel Hill

PHD UNC-Chapel Hill

MEDICINE RESIDENCY & INTERNSHIP

Stanford University

CARDIOLOGY FELLOWSHIP

Stanford University

BOARD CERTIFICATION

Internal Medicine, ABIM

Cardiovascular Disease, ABIM

CLINICAL FOCUS

Genetic forms of Heart Disease

Familial Hypercholesterolemia

Lipidology

HONORS & AWARDS

CHIEF Research Advisor

The Familial Hypercholesterolemia (FH) Foundation

American Heart Association National Fellow to Faculty Transition Award

Future Leaders in CV Medicine Fellowship Award

FELLOW

American College of Cardiology; American Heart Association

DIPLOMATE

American Board of Clinical Lipidology

STEERING COMMITTEE

Stanford Cardiovascular Institute

CURRENT RESEARCH

The fundamental theme of my work is the application of genetics to improve human health. I view this as a continuum from Discovery -> to the development of Model Systems -> to clinical Translation -> to larger Public Health efforts. Much of my work focuses on discovery of genetic variants underlying cardiovascular disease especially lipid disorders and insulin resistance. We are translating these findings to the clinic in a randomized trial where we are asking if we can improve an individual's risk by giving them information about their inherited risk of heart disease. We are also creating human induced pluripotent stem cell (iPSC) lines to model the genetic networks that produce disease. Finally, as the Chief Research Advisor for a patient-led, non-profit (The FH Foundation), we are attempting to raise the profile of familial hypercholesterolemia (FH), an inherited disease that causes extremely elevated LDL cholesterol levels and risk of coronary disease. We have partnered with patients and organizations like the CDC, ACC, and AHA to increase public health awareness of FH and have launched a national patient registry called "CASCADE FH".

Stanford is contributing at all levels to using the tools of human genetics to improve human health.

SELECTED PUBLICATIONS

Clinical Genetic Testing for Familial Hypercholesterolemia: JACC Scientific Expert Panel. Sturm AC, Knowles JW, Gidding SS, Ahmad ZS, Ahmed CD, Ballantyne CM, Baum SJ, Bourbon M, Carrié A, Cuchel M, de Ferranti SD, Defesche JC, Freiburger T, Hershberger RE, Hovingh GK, Karayan L, Kastelein JJP, Kindt I, Lane SR, Leigh SE, Linton MF, Mata P, Neal WA, Nordestgaard BG, Santos RD, Harada-Shiba M, Sijbrands EJ, Stitzel NO, Yamashita S, Wilemon KA, Ledbetter DH, Rader DJ; Convened by the Familial Hypercholesterolemia Foundation. *J Am Coll Cardiol*. 2018 Aug 7;72(6):662-680.

Cardiovascular disease: The rise of the genetic risk score. Knowles JW, Ashley EA. *PLoS Med*. 2018 Mar 30;15(3):e1002546.

Impact of a Genetic Risk Score for Coronary Artery Disease on Reducing Cardiovascular Risk: A Pilot Randomized Controlled Study. Knowles JW, Zarafshar S, Pavlovic A, Goldstein BA, Tsai S, Li J, McConnell MV, Absher D, Ashley EA, Kiernan M, Ioannidis JPA, Assimes TL. *Front Cardiovasc Med*. 2017 Aug 14;4:53.

Induced Pluripotent Stem Cell-Derived Endothelial Cells in Insulin Resistance and Metabolic Syndrome. Carcamo-Orive I, Huang NF, Quertermous T, Knowles JW. *Arterioscler Thromb Vasc Biol*. 2017 Nov;37(11):2038-2042.

Leveraging Human Genetics to Understand the Relation of LDL Cholesterol with Type 2 Diabetes. Ingelsson E, Knowles JW. *Clin Chem*. 2017 Jul;63(7):1187-1189.



Brian Kobilka, MD

Helene Irwin Fagan Chair in Cardiology
Professor, Molecular and Cellular Physiology
Professor, Medicine - Cardiovascular Medicine
Professor (by courtesy), Chemical and Systems Biology

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EDUCATION/TRAINING

MD Yale University

INTERNAL MEDICINE RESIDENCY

Washington University

RESEARCH FELLOWSHIP

Duke University

BOARD CERTIFICATION

Internal Medicine, ABIM

HONORS & AWARDS

Nobel Prize in Chemistry (2012)

Earl and Thressa Stadtman
Distinguished Scientist Award, ASBMB

Louis and Artur Lucian Award, McGill
University

ELECTED HONORARY MEMBER

Royal Irish Academy

ELECTED MEMBER

National Academy of Sciences

GUEST PROFESSOR

Tsinghua University, Beijing, China

ADJUNCT PROFESSOR

Monash University, Melbourne, Australia

DOCTEUR HONORIS CAUSA

Free University, Brussels, Belgium

John Daly Memorial Lecture, NIH

MEMBER

American Chemical Society; American Society for Pharmacology and Experimental Therapeutics; American Society for Biochemistry and Molecular Biology; American Society of Clinical Investigation; British Pharmacological Society

CURRENT RESEARCH

The goal of my lab is to characterize the structure and mechanism of activation of G protein coupled receptors (GPCRs). GPCRs are the largest group of cellular receptors for hormones and neurotransmitters in the body. They play central roles in the network of cellular communication that orchestrates the physiological processes essential for life. Disruption of one or more components of this complex communication network can lead to a broad spectrum of diseases ranging from cardiovascular and metabolic disorders, to neuropsychiatric and neurodegenerative disorders. GPCRs are therefore important targets for drug discovery. We apply biochemical and biophysical tools to investigate the molecular mechanism of GPCR signaling in cells, and the structural basis for regulation of GPCR function by drugs. We are also working to discover approaches for the more efficient and economical development of safer and more effective therapeutics targeting these receptors.

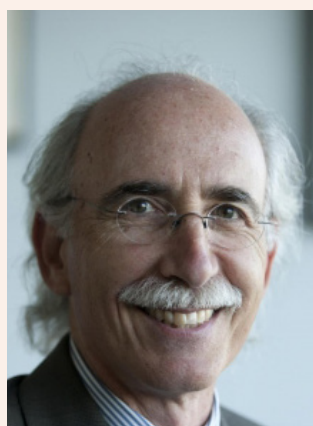
It has been a great privilege to be part of the Stanford community, which provides a unique environment for interdisciplinary collaborations, and attracts the most talented and innovative students and fellows.

SELECTED PUBLICATIONS

Crystal structure of the beta 2-adrenergic receptor-Gs protein complex. Rasmussen, S. G., Devree, B. T., Zou, Y., Kruse, A. C., Chung, K. Y., Kobilka, T. S., Thian, F. S., Chae, P. S., Pardon, E., Calinski, D., Mathiesen, J. M., Shah, S. T., Lyons, J. A., Caffrey, M., Gellman, S. H., Steyaert, J., Skiniotis, G., Weis, W. I., Sunahara, R. K. & Kobilka, B. K. *Nature*, 477, 549-555 (2011).

Structural insights into the dynamic process of beta2-adrenergic receptor signaling. Manglik, A., Kim, T. H., Masureel, M., Altenbach, C., Yang, Z., Hilger, D., Lerch, M. T., Kobilka, T. S., Thian, F. S., Hubbell, W. L., Prosser, R. S., and Kobilka, B. K. *Cell* 161(5), 1101-1111 (2015).

Single-molecule analysis of ligand efficacy in beta2AR-G-protein activation. Gregorio, G.G., Masureel, M., Hilger, D., Terry, D.S., Juetter, M., Zhao, H., Zhou, Z., Perez-Aguilar, J.M., Hauge, M., Mathiasen, S., Javitch, J.A., Weinstein, H., Kobilka, B.K.* and Blanchard, S.C.* *Nature* 547: 68-73 (2017).



Fredric Kraemer, MD

Stanford University Professor in Endocrinology

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EDUCATION/TRAINING

MD New York University School of Medicine

INTERNSHIP Kings County Hospital

RESIDENCY Kings County Hospital

FELLOWSHIP

Stanford University School of Medicine

BOARD CERTIFICATION

Endocrinology, Diabetes, and Metabolism (ABIM)

HONORS & AWARDS

Stanford University Professorship in Endocrinology, Stanford University (2002)

SmithKline Beecham Junior Faculty Award In Diabetes, SmithKline Beecham (1998)

Hume Faculty Scholar, Stanford University (1984-1988)

Mellon Foundation Fellow, Stanford University (1983-1984)

Special Emphasis Research Career Award, NIH (1982-1987)

CURRENT RESEARCH

Our research interests are in the general area of cellular lipid and lipoprotein metabolism. The work is aimed primarily at understanding the mechanisms regulating cholesterol and triglyceride accumulation in cells. We utilize a variety of techniques from cell biology, biochemistry, and molecular biology. Current research projects focus on the trafficking of cholesterol for steroid hormone synthesis, uptake and mobilization of fatty acids by cells and interplay between adipose cell and bone metabolism.

SELECTED PUBLICATIONS

SNARE-mediated cholesterol movement to mitochondria supports steroidogenesis in rodent cells. Lin Y., Hou X., Hanssen R., Khor V.K., Cortez Y., Roseman A.N., Azhar S., Kraemer F.B. *Mol. Endocrinol.* 30:234-247, 2016.

Hormone-sensitive lipase knockout mice maintain high bone density during aging. Shen W.-J., Liu L.-F., Patel S., Kraemer F.B. *FASEB J* 25:2722-2730, 2011.

Resistance to high fat diet-induced obesity with altered expression of adipose specific genes in hormone-sensitive lipase deficient mice. Harada K., Shen W.-J., Patel S., Natu V., Wang J., Osuga J.-i., Ishibashi S., Kraemer F.B. *Am. J. Physiol. Endocrinol. Metab.* 285:E1182-1195, 2003.



Mark A. Krasnow, MD, PhD

Endowed Chair, The Paul and Mildred Berg Professorship in Biochemistry
Investigator, Howard Hughes Medical Institute
Executive Director, Wall Center for Pulmonary Vascular Diseases

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EDUCATION/TRAINING

MD University of Chicago

PHD University of Chicago

HELEN HAY WHITNEY FELLOW
Stanford University

CLINICAL FOCUS

Lung Development and Stem Cells
Neural Control of Breathing
Lung Diseases
Genetic Model Organisms for Medicine

HONORS & AWARDS

Lucille P. Markey Scholar Award

NSF Presidential Young Investigator Award

Kaiser Family Foundation Award for Preclinical Teaching

ELECTED FELLOW

American Academy of Arts and Sciences; American Association for the Advancement of Science

FOUNDING EDITORIAL BOARD

Public Library of Science Journals

Scientific Advisory Board

Centre ValBio, Madagascar; Pediatric Research Center, Hannover Medical School; Vesalius Research Center

FORMER CHAIR

Department of Biochemistry, Stanford University

FORMER PRESIDENT

North American Drosophila Board of Directors

CURRENT RESEARCH

My laboratory uses genetic, genomic, and biochemical approaches to map the development of the lung and identify stem and progenitor cells and the molecular pathways that control them. We are also mapping the neural circuit and the genetic and molecular basis of breathing. We are interested in understanding the normal processes and how they go awry in devastating human diseases such as lung cancer, pulmonary fibrosis, pulmonary hypertension and Sudden Infant Death Syndrome. I am an Investigator at the Howard Hughes Medical Institute and the Executive Director of the Vera Moulton Wall Center for Pulmonary Vascular Disease.

The tube is a fundamental unit of organ design. Understanding how tubes form and are maintained could unlock the secrets of many pulmonary and cardiovascular diseases and suggest new ways of treating them.

SELECTED PUBLICATIONS

Breathing control center neurons that promote arousal in mice. Yackle K, Schwarz LA, Kam K, Sorokin JM, Huguenard JR, Feldman JL, Luo L, Krasnow MA. *Science*. 2017 Mar 31;355(6332):1411-1415.

Oxygen regulation of breathing through an olfactory receptor activated by lactate. Chang, A. J., Ortega, F. E., Riegler, J., Adison, D. V., Krasnow, M. A.; *Nature*; 2015; 527 (7577): 240.

Formation of a Neurosensory Organ by Epithelial Cell Slithering. Kuo, C. S., Krasnow, M. A.; *Cell*; 2015; 163 (2): 394-405.

Subcellular Trafficking of FGF Controls Tracheal Invasion of Drosophila Flight Muscle. Peterson SJ, Krasnow MA. *Cell*. 2015 Jan 15; 160 (1-2): 313-23.

Reconstructing lineage hierarchies of the distal lung epithelium using single-cell RNA-seq. Treutlein B, Brownfield DG, Wu AR, Neff NF, Mantalas GL, Espinoza FH, Desai TJ, Krasnow MA, Quake SR.; *Nature*; 2014 May 15; 509 (7500): 371-5.

Alveolar progenitor and stem cells in lung development, renewal and cancer. Desai TJ, Brownfield DG, Krasnow MA; *Nature*; 2014; Mar 13; 507 (7491): 190-4.



Calvin Kuo, MD, PhD

Maureen Lyles D'Ambrogio Professor, Medicine - Hematology
Professor, by courtesy, of Chemical and Systems Biology
Co-Lead, Cancer Biology Program, Stanford Cancer Institute
Vice Chair, Department of Medicine

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EDUCATION/TRAINING

MD Stanford University

PHD Stanford University

INTERNAL MEDICINE RESIDENCY

Brigham and Women's Hospital

Medical Oncology FELLOWSHIP

Dana-Farber/Partners

BOARD CERTIFICATION

Medical Oncology, ABIM

CLINICAL FOCUS

Hematology

HONORS & AWARDS

NIH Transformative R01 Award

Burroughs Wellcome Foundation
New Investigator in Pharmacological
Sciences

Kimmel Foundation Scholar in
Translational Science

American Heart Association Innovative
Science Award

SAMANTHA JANOWER RESEARCH CHAIR
Brain Tumor Society

PRESIDENT-ELECT

American Heart Association Silicon
Valley Chapter

ELECTED MEMBER

American Society for Clinical
Investigation

American Association of Physicians

CURRENT RESEARCH

A major focus of my laboratory is the definition of molecular mechanisms of central nervous system angiogenesis and blood-brain barrier regulation, using knockout mouse and adenoviral approaches. In particular, we have generated conditional floxed alleles for the orphan G-protein coupled receptor GPR124 expressed in brain endothelial cells, revealing embryonic lethality from highly specific developmental CNS angiogenesis phenotypes, and allowing testing of essential requirements of this receptor during adulthood and diseases such as stroke or brain tumors. We are interested in developing novel pharmacologic modulators of blood-brain barrier permeability. We also study the endothelial-expressed miR-126/Egfl7 locus using floxed mouse alleles. Additional parts of the lab work in stem cell biology and 3D organoid culture of diverse human organs. This has led to a strong interest in lung stem cell biology and regenerative medicine.

If we knew what we were doing it wouldn't be called
research, would it? — Albert Einstein

SELECTED PUBLICATIONS

Essential regulation of CNS angiogenesis by the orphan G protein-coupled receptor GPR124. Kuhnert F, Mancuso MR, Wang H, Young WL, Heilshorn S and Kuo CJ. *Science*. Nov 12;330(6006):985-9. (2010).

Oligodendrocyte precursors migrate along vasculature in the developing nervous system. Tsai HH, Munji R, Davalos D, Tien AC, Kuo CJ, Chan JR, Daneman D, Fancy SPJ. *Science* (2016) Jan 22;351(6271):379-84.

Gpr124 is essential for blood-brain barrier integrity in central nervous system disease. Chang J, Mancuso MR, Maier C, Liang X, Yuki K, Yang L, Kwong JW, Wang J, Rao V, Vallon M, Kosinski C, Zhang JJ, Mah AT, Xu L, Li L, Gholamin S, Reyes TF, Li R, Kuhnert F, Corney DC, Cheshier SH, Shortliffe LD, Wu X, Snyder M, Chan P, Giffard RG, Chang HY, Andreasson K, Kuo CJ. *Nature Medicine* (2017) Mar 13.

Oncogenic transformation of diverse gastrointestinal tissues in primary organoid culture. Li X, Nadauld L, Ootani A, Corney DC, Pai RK, Gevaert O, Cantrell MA, Rack PG, Neal JT, Chan CW, Yeung T, Gong X, Yuan J, Wilhelmy J, Robine S, Attardi LD, Plevritis SK, Hung KE, Chen CZ, Ji HP, Kuo CJ. *Nature Medicine*. (2014) Jul;20(7):769-77.

Surrogate Wnt agonists that phenocopy canonical Wnt and beta-catenin signalling. Janda CY, Dang LT, You C, Chang J, de Lau W, Zhong ZA, Yan KS, Marecic O, Siepe D, Li X, Moody JD, Williams BO, Clevers H, Piehler J, Baker D, Kuo CJ, Garcia KC. *Nature* (2017) May 11;545(7653):234-237.



Anson Lee, MD

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EDUCATION/TRAINING

MD Washington University School of Medicine

INTERNSHIP Washington University School of Medicine

RESIDENCY Washington University School of Medicine

FELLOWSHIP Washington University School of Medicine

BOARD CERTIFICATION
Thoracic and Cardiovascular Surgery (ABTS)

CLINICAL FOCUS

Arrhythmia Surgery

Atrial Fibrillation

Adult Cardiac Surgery

Heart and lung transplantation

HONORS & AWARDS

Thoracic Surgical Foundation STSA Research Award

Bio-X Interdisciplinary Initiatives Program Seed Grant

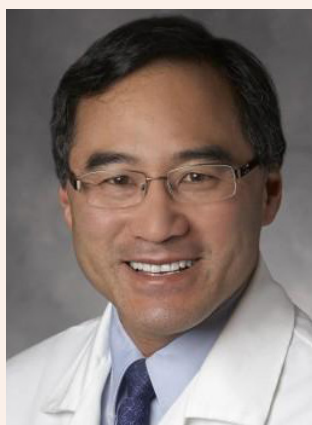
CURRENT RESEARCH

My lab is working to advance the understanding of the mechanisms of cardiac arrhythmias and to apply that understanding to develop potential therapies to treat atrial fibrillation and other disorders of cardiac rhythm. We have investigations at the genomic level, whole organ tissue level, and clinical studies in humans. We are developing new high resolution mapping tools to characterize atrial fibrillation, and are using cell culture to examine arrhythmias at the cellular level. Utilizing the knowledge from these investigations, we are also developing minimally invasive surgical techniques to treat arrhythmia.

We have to do better. If our success rates with coronary artery disease were as bad as our results with atrial fibrillation, we would all be out of business.

SELECTED PUBLICATIONS

Maze permutations during minimally invasive mitral valve surgery. Lee AM. *Ann Cardiothorac Surg.* 2015 Sep;4(5):463-8.



David Lee, MD

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EDUCATION/TRAINING

MD University of Minnesota

RESIDENCY Stanford University

FELLOWSHIP Stanford University

BOARD CERTIFICATION

Interventional Cardiology (ABIM)

CLINICAL FOCUS

Cardiology

Interventional Cardiology

HONORS & AWARDS

President, Western States Affiliate,
American Heart Association

CURRENT RESEARCH

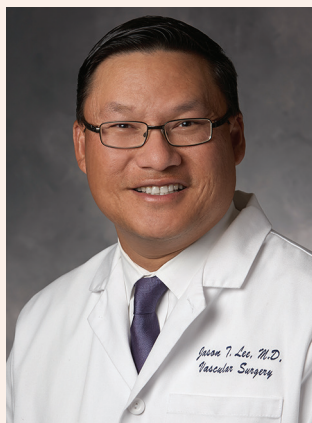
My current research is largely focused on developing new technology for interventional cardiology. I helped develop catheter-based renal denervation as a treatment for hypertension, and my current studies have focused on RDN as primary therapy alone or in combination with medications. My other projects include a novel set of devices for mitral valve interventions and a large-bore vascular closure device.

SELECTED PUBLICATIONS

Catheter-based renal denervation in patients with uncontrolled hypertension in the absence of antihypertensive medications (SPYRAL HTN-OFF MED): a randomised, sham-controlled, proof-of-concept trial. Townsend RR, Mahfoud F, Kandzari DE, Kario K, Pocock S, Weber MA, Ewen S, Tsioufis K, Tousoulis D, Sharp ASP, Watkinson AF, Schmieder RE, Schmid A, Choi JW, East C, Walton A, Hopper I, Cohen DL, Wilensky R, Lee DP, Ma A, Devireddy CM, Lea JP, Lurz PC, Fengler K, Davies J, Chapman N, Cohen SA, DeBruin V, Fahy M, Jones DE, Rothman M, Böhm M; SPYRAL HTN-OFF MED trial investigators*. *Lancet* 2017; 390:2160-2170.

Prasugrel plus aspirin beyond 12 months is associated with improved outcomes after TAXUS Liberté paclitaxel-eluting coronary stent placement. Garratt KN, Weaver WD, Jenkins RG, Pow TK, Mauri L, Kereiakes DJ, Winters KJ, Christen T, Allocco DJ, Lee DP. *Circulation* 2015;131(1):62-73.

Twelve or 30 months of dual antiplatelet therapy after drug-eluting stents. Mauri L, Kereiakes DJ, Yeh RW, Driscoll-Shempp P, Cutlip DE, Steg PG, Normand SL, Braunwald E, Wiviott SD, Cohen DJ, Holmes DR Jr, Krucoff MW, Hermiller J, Dauerman HL, Simon DI, Kandzari DE, Garratt KN, Lee DP, Pow TK, Ver Lee P, Rinaldi MJ, Massaro JM; DAPT Study Investigators. *N Engl J Med.* 2014;371:2155-66.



Jason T. Lee, MD

Professor, Surgery
Director, Endovascular Surgery
Program Director, Vascular Surgery Residency/Fellowship

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EDUCATION/TRAINING

MD UCSD

General Surgery Residency

Harbor-UCLA Medical Center

Vascular Surgery Fellowship

Stanford University

BOARD CERTIFICATION

Vascular Surgery, ABS

CLINICAL FOCUS

Complex Endovascular Aneurysm Repair
Fenestrated/Parallel/Branched Aortic
Repair

Thoracic Dissection/Thoracoabdominal
Aneurysm Therapy

Surgical Simulation and Education

Vascular Disorders in Athletes

Thoracic Outlet Syndrome

HONORS & AWARDS

Society for Vascular Surgery

Distinguished Fellow

Department of Surgery Inaugural Seed
Grant (2018)

Coulter Foundation Translational Grant
(2018)

Henry J. Kaiser Family Foundation
Teaching Award Society for Vascular
Surgery E.J. Wyllie Traveling

Fellowship Stanford Program in
Biodesign, Mentorship Award

SECRETARY-TREASURER

Association for Program Directors in
Vascular Surgery (APDVS) (2016-current)

SECRETARY

Peripheral Vascular Surgery Society
(2016-current)

CURRENT RESEARCH

My clinical research interests focus on developing and refining endovascular techniques to treat complex aortic pathology related to aneurysms and dissections, particularly as Stanford's local principal investigator for numerous endograft trials, and having also accumulated one of the largest series of fenestrated and snorkel/chimney procedures for juxtarenal aortic aneurysms in the country. As a surgical educator and former Robert Wood Johnson Faculty Physician Scholar, my lab has demonstrated that endovascular simulation for students and trainees translates to increased learner interest, more efficient surgical training, and improved operative performance. We are currently collaborating with multiple institutions designing national standards for technical skills assessment. I am the Director of Endovascular Surgery and Program Director of our top-notch Vascular Surgery Residency/Fellowship.

Don't bet against technology - continued device innovation and technical improvements will provide patients with much less invasive ways to cure their vascular diseases.

SELECTED PUBLICATIONS

Prospective, multicenter study of endovascular repair of aortoiliac and iliac aneurysms using the Gore IBE. Schneider DB, Matsumura J, Lee JT, Peterson B, Chaer R, Oderich G. *J Vasc Surg* 2017 Sep;66(3):775-785.

Collected world experience about the performance of the snorkel/chimney endovascular technique in the treatment of complex aortic pathologies: The PERICLES registry. Lee JT, Donas KP, Lachat M, Torsello G, Veith FJ. *Ann Surg* 2015;262:546-53.

Changes in geometry and cardiac deformation of the thoracic aorta after TEVAR. Hirotsu K, Suh GY, Lee JT, Dake MD, Fleischman D, Cheng CP. *Ann Vasc Surg* 2018;46:83-89.

Polar orientation of renal grafts within the proximal seal zone affects risk of early Type 1a endoleak following chimney EVAR. Tran K, Ullery BW, Itoga N, Lee JT. *J Vasc Surg* 2018;67:1034-41.

Infrarenal EVAR with large device (34-36mm) diameters are associated with higher risk of proximal fixation failure. McFarland G, Tran K, Downey W, Chandra V, Mell MW, Harris EJ, Dalman RL, Lee JT. In press, *J Vasc Surg*, 2018.



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Chief, Vascular Medicine
Director, Vascular Research

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EDUCATION/TRAINING

MD University of Chicago

INTERNAL MEDICINE RESIDENCY
UCSF

CARDIOLOGY FELLOWSHIP
Stanford University

VASCULAR MEDICINE FELLOWSHIP
Stanford University

BOARD CERTIFICATION
Internal Medicine, ABIM

Cardiovascular Disease, ABIM
Vascular Medicine, ABVM

CLINICAL FOCUS

Vascular Medicine

HONORS & AWARDS

PRESIDENT
American Heart Association, Silicon Valley Board

Jeremiah Stamler Distinguished Young Investigator Research Award, Northwestern Cardiovascular Young Investigators' Forum (2013)

Jay D. Coffman Young Investigator Award, Society for Vascular Medicine

CHAIR
ATVB Early Career Committee

STEERING COMMITTEE
Stanford Cardiovascular Institute

TRUSTEE
Society for Vascular Medicine

CURRENT RESEARCH

As much as half of an individual's lifetime risk for cardiovascular disease is genetic in nature. My laboratory is focused on defining and understanding the heritable factors which account for this risk. Specifically, we employ agnostic, genome-wide approaches to prioritize candidates for molecular investigation. Currently, our main focus is on a process known as "efferocytosis" (Greek: to carry the dead to the grave) and developing novel translational therapies which can stimulate phagocytic removal of apoptotic debris from the necrotic core of the atherosclerotic plaque.

A man is as old as his arteries. —Thomas Sydenham, 17th Century

SELECTED PUBLICATIONS

CD47-blocking antibodies restore phagocytosis and prevent atherosclerosis. Kojima, Y., Volkmer, J., McKenna, K., Civelek, M., Lusic, A. J., Miller, C. L., DiRenzo, D., Nanda, V., Ye, J., Connolly, A. J., Schadt, E. E., Quertermous, T., Betancur, P., Maegdefessel, L., Matic, L. P., Hedin, U., Weissman, I. L., Leeper, N. J. *Nature*. 2016; 536 (7614): 86-90.

The Role of Efferocytosis in Atherosclerosis. Kojima, Y., Weissman, I. L., Leeper, N. J. *Circulation*. 2017; 135 (5): 476-489.

Canagliflozin and Cardiovascular and Renal Events in Type 2 Diabetes. Neal, B., Perkovic, V., Mahaffey, K. W., de Zeeuw, D., Fulcher, G., Erond, N., Shaw, W., Law, G., Desai, M., Matthews, D. R. *The New England Journal of Medicine*. 2017; 377 (7): 644-57.

Pro-efferocytic therapy promotes TGFβ signaling and prevents aneurysm formation. Kojima, Y., Werner, N., Ye, J., Nanda, V., Tsao, N., Wang, Y., Flores, A.M., Miller C., Weissman, I.L., Xu, B., Dalman, R.L., Eken, S.M., Pelisek, J., Li, Y., Maegdefessel, L., Leeper, N.J. *Circulation*. In Press, 2018.



Lawrence Leung, MD

Maureen Lyles D'Ambrogio Professor of Medicine, Hematology
Senior Associate Dean for Veterans Affairs
Chief of Staff, VA Palo Alto Health Care System

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EDUCATION/TRAINING

MD Columbia University

MEDICINE RESIDENCY

Cornell University Medical Center

HEMATOLOGY-ONCOLOGY FELLOWSHIP

Cornell University Medical Center

BOARD CERTIFICATION

Hematology, ABIM

Internal Medicine, ABIM

Oncology, ABIM

CLINICAL FOCUS

Bleeding and Thrombotic Disease

HONORS & AWARDS

EDITOR-IN-CHIEF

UpToDate - Hematology

American Board of Internal Medicine (ABIM), Hematology subspecialty board (2003-2010)

ELECTED MEMBER

American Society for Clinical Investigation; Association of American Physicians

FORMER CHIEF

Division of Hematology, Stanford University (1995-2004)

FORMER CHIEF

Medical Service, VA Palo Alto Health Care System (2004-2011)

FORMER DIRECTOR

Vascular Biology and Medicine, Gilead Sciences (1992-1994)

CURRENT RESEARCH

My laboratory studies how thrombin, the key enzyme in the coagulation cascade, interacts with its various substrates to regulate hemostasis, inflammation, and innate immunity. Thrombin interacts with the endothelial cell cofactor thrombomodulin to activate protein C and procarboxypeptidase B (pCPB). Activated CPB inactivates a number of proinflammatory mediators and regulates the proinflammatory activities of thrombin in a homeostatic fashion. I am Chief of Staff, VA Palo Alto Health Care System.

Our long-term goal is to define the molecular links important in the crosstalk between hemostasis, thrombosis, inflammation and innate immunity, thereby developing clinically useful diagnostic and therapeutic reagents.

Our long-term goal is to define the molecular links important in the crosstalk between hemostasis, thrombosis, inflammation and innate immunity, thereby developing clinically useful diagnostic and therapeutic reagents.

SELECTED PUBLICATIONS

Carboxypeptidase B2 deficiency reveals opposite effects of complement C3a and C5a in a murine polymicrobial sepsis model. Shao Z, Nishimura T, Leung LLK, Morser J. J. *Thromb. Haemost.* 2015, 13:1090-1102.

Chemerin activation in human obesity. Chang SS, Eisenberg D, Zhao L, Adams C, Leib R, Morser J, Leung L.; *Obesity*; 2016; Jul; 24 (7): 1522-9.

Prochemerin cleavage by factor XIa links coagulation and inflammation. Ge X, Yamaguchi Y, Zhao L, Bury L, Greasele P, Berube C, Leung LL, Morser J. *Blood* 2018, 131:353-364. (Commentary: Meijers JCM. *Blood* 131:275-276).

Carboxypeptidase B2 and N play different roles in regulation of activated complements C3a and C5a in mice. Morser J, Shao Z, Nishimura T, Zhou Q, Zhao L, Higgins J, Leung LLK. *CJ. Thromb. Haemost.* 2018, 16:991-1002. (Commentary: Foley JH, Conway EM. *JTH* 16:987-990).

Decoding the genomics of abdominal aortic aneurysm. Li J, Pan C, Zhang S, Spin J, Deng A, Leung LLK, Dalman RL, Tsao PS, Snyder M. *Cell* 2018, 174:1361-1372.



Craig Levin, PhD

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EDUCATION/TRAINING

PHD Yale University

HONORS & AWARDS

Japanese Society for the Promotion of Science (JSPS) Invitation Fellowship (2015)

Academy of Radiology Research (ARR) Distinguished Investigator Recognition Award (2012)

Elected to the American Institute for Medical and Biological Engineering's (AIMBE) College of Fellows (2012)

CURRENT RESEARCH

Our research interests are to explore and create new instrumentation and signal processing algorithm concepts for *in vivo* imaging of molecular signatures of disease in living subjects. These novel cameras efficiently image emissions from molecular contrast agents to probe disease biology in tissues residing deep within the body using measurements made from outside the body. The technology goals are to advance the sensitivity and spatial, spectral, and/or temporal resolutions, to create new camera geometries for special biomedical applications, to understand the entire imaging process comprising the subject tissues, radiation transport, and imaging system, and to provide the best available image quality and quantitative accuracy. The ultimate goal is to introduce these new imaging tools into studies of molecular mechanisms and treatments of disease in living subjects.

It is better to light a candle than to curse the darkness —attributed to William L. Watkinson

SELECTED PUBLICATIONS

Low Eddy Current RF Shielding Enclosure Designs for 3T MR Applications. B.J. Lee, R.D. Watkins, C.M. Chang, C.S. Levin. *Magnetic Resonance in Medicine*. June 2017.

Studies of a Next Generation Silicon-Photomultiplier-Based Time-of-Flight PET/CT System. D.F.C. Hsu, E. Ilan, W.T. Peterson, J. Uribe, M. Lubberink, C.S. Levin. *Journal of Nuclear Medicine*, 58(9), pp. 1511-1518, Sept 2017

An Expectation Maximization Method for Joint Estimation of Emission Activity Distribution and Photon Attenuation Map in PET. Mihlin, Alexander; Levin, Craig S. *IEEE Transactions on Medical Imaging*, 36(1), pp. 214-224, JAN 2017.

Simultaneous PET/MR imaging with a radio frequency-penetrable PET insert. Grant, AM, Lee, BJ, Chang, CM, Levin, C.S. *Medical Physics*, Vol. 44, Issue 1, Pages 112-120, Jan 2017.

A promising new mechanism of ionizing radiation detection for positron emission tomography: modulation of optical properties. Tao, L; Daghighian, HM; Levin, CS. *Physics in Medicine and Biology*, 61(21), pp. 7600-7622, Nov 2016.



Ronglih Liao, PhD

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EDUCATION/TRAINING

PHD University of Alabama at Birmingham

POSTDOCTORAL TRAINING

Harvard Medical School/Beth Israel Hospital

CURRENT RESEARCH

Our laboratory has played an international leading role in the study of amyloid light chain (AL) cardiomyopathy, a rare and fatal form of cardiovascular disease. We have described the underlying pathophysiologic basis for amyloid cardiomyopathy and found that the circulating amyloidogenic light chain proteins that characterize this disease directly result in a specific cardiotoxic response. Consequently, our research work has redefined AL cardiomyopathy and has raised new treatment approaches. In line with our goal of revealing novel therapeutic strategies for patients with cardiovascular disease, our efforts have also focused on characterizing and harnessing endogenous cardiac regenerative mechanisms. Our group initially demonstrated the therapeutic potential of exogenous primitive muscle cells delivered to the injured heart. This work was among the earliest milestones in the field and served as the basis for an international trial of cell-based therapy. We aim to reveal the molecular mechanisms regulating the endogenous regenerative capacity of the heart and to harness such repair mechanisms for the treatment of cardiovascular disease.

SELECTED PUBLICATIONS

MicroRNA-34a Plays a Key Role in Cardiac Repair and Regeneration Following Myocardial Infarction. Yang Y, Cheng HW, Qiu Y, Dupee D, Noonan M, Lin YD, Fisch S, Unno K, Sereti KI, Liao R. *Circ Res*. 2015;117 (5):450-9.

Lysosomal dysfunction and impaired autophagy underlie the pathogenesis of amyloidogenic light chain-mediated cardiotoxicity. Guan J, Mishra S, Qiu Y, Shi J, Trudeau K, Las G, Liesa M, Shirihai OS, Connors LH, Seldin DC, Falk RH, MacRae CA, Liao R. *EMBO Mol Med*. 2014 (11):1493-507.

Assessment of right ventricular structure and function in mouse model of pulmonary artery constriction by transthoracic echocardiography. Cheng HW, Fisch S, Cheng S, Bauer M, Ngoy S, Qiu Y, Guan J, Mishra S, Mbah C, Liao R. *J Vis Exp*. 2014 Feb 3;(84):e51041.

Geographic Disparities in Reported US Amyloidosis Mortality From 1979 to 2015: Potential Underdetection of Cardiac Amyloidosis. Alexander KM, Orav J, Singh A, Jacob SA, Menon A, Padera RF, Kijewski MF, Liao R, Di Carli MF, Laubach JP, Falk RH, Dorbala S. *JAMA Cardiol*. 2018 Sep 1;3(9):865-870.

Mortality from Heart Failure and Dementia in the United States: CDC WONDER 1999-2016. Vuong JT, Jacob SA, Alexander KM, Singh A, Liao R, Desai AS, Dorbala S. *J. Cardiac Failure* 2019 Nov;25(2) 125-129.



Michael Longaker, MD

Deane P. and Louise Mitchell Professor in the School of Medicine and Professor (by courtesy) of Bioengineering and Materials Science and Engineering

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EDUCATION/TRAINING

MD Harvard Medical School

GENERAL SURGERY INTERNSHIP UCSF Medical Center

GENERAL SURGERY RESIDENCY UCSF Medical Center

PLASTIC & RECONSTRUCTIVE SURGERY RESIDENCY NYU Medical Center

CRANIOFACIAL SURGERY FELLOWSHIP UCLA Medical Center

BOARD CERTIFICATION

General Surgery (ABS), Plastic Surgery (ABPS)

CLINICAL FOCUS

Plastic Surgery

HONORS & AWARDS

American Society for Clinical Investigation (2004)

National Academy Of Medicine (2007)

Association Of American Physicians (2008)

I.s Ravdin Lecture In Basic Medical Sciences, American College Of Surgeons (2009)

France-Karl Award, American Surgical Association (2011)

Sheen Award, Bank Of America/ American College Of Surgeons (2012)

66Th. Volume Of The Surgical Forum Is Dedicated To Michael T. Longaker, Md, Mba, Facs (2015)

PSF Career Research Award, Plastic Surgery Foundation (2016)

CURRENT RESEARCH

Michael Longaker's extensive research experience includes the cellular and molecular biology of extracellular matrix with specific applications to the differences between fetal and post-natal wound healing, the biology of keloids and hypertrophic scars, the cellular and molecular events in craniofacial development and stem cell biology. In addition, his research investigates craniofacial development and skeletal stem cell biology. He has a unique understanding of wound healing, fetal wound healing research, developmental biology, tissue engineering, and stem cell biology.

The harder I work, the luckier I get.
—Thomas Jefferson

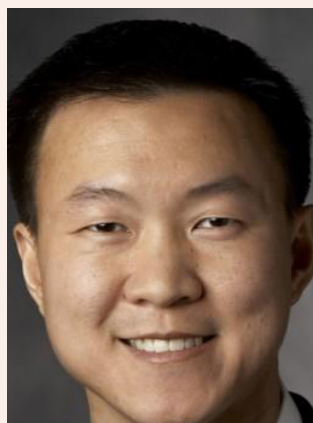
SELECTED PUBLICATIONS

Identification and specification of the mouse skeletal stem cell. Chan CK, Seo EY, Chen JY, Lo D, McArdle A, Sinha R, Tevlin R, Seita J, Vincent-Thompkins J, Wearda T, Lu WJ, Senartha-Yapa K, Chung MT, Marecic O, Tran M, Yan KS, Upton R, Walmsley GG, Lee AS, Sahoo D, Kuo C. Weissman L, Longaker MT. *Cell* 2015; 160: 285-298.

Identification and targeted inhibition of a fibroblast lineage responsible for skin scarring and cancer stroma. Yuval Rinkevich, Graham G. Walmsley, Michael S. Hu, Zeshaan N. Maan, Aaron M. Newman, Micha Drukker, Michael Januszyk, Geoffrey C. Gurtner, Peter H. Lorenz, Irving L. Weissman, Michael T. Longaker. *Science*. 2015;348(6232):aaa2151.

Chemical rescue of cleft palate and midline defects in conditional GSK-3beta mice. Liu KJ, Arron JR, Stankunas K, Crabtree GR, Longaker MT. *Nature*. 2007;446(7131):79-82.

Pharmacological rescue of diabetic skeletal stem cell niches. Tevlin R, Seo EY, Marecic O, McArdle A, T Xinming, Zimdahl B, Malkovskly A, Sinha R, Gulati G, Li X, Wearda T, Morganti R, Lopez M, Ransom RC, Duldulao CR, Rodrigues M, Nguyen A, Januszyk M, Maan Z, Paik K, Yapa KS, Rajadas J, Wan DC, Gurtner GC, Snyder M, Beachy PA, Yang F, Goodman SB, Weissman IL, Chan CK, Longaker MT. *Science Translational Medicine*. 2017; 9(372).



George Lui, MD

Clinical Associate Professor, Medicine (Cardiovascular Medicine)
and Pediatrics (Cardiology)
Medical Director, Adult Congenital Heart Program

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EDUCATION/TRAINING

MD Yale University School of Medicine

RESIDENCY Harvard Combined Internal Medicine and Pediatrics Residency

FELLOWSHIP Columbia University Medical Center

BOARD CERTIFICATION

Internal Medicine (ABIM); Cardiovascular Disease (ABIM); Adult Congenital Heart Disease (ABIM); Adult Comprehensive Echocardiography (NBE)

CLINICAL FOCUS

Adult Congenital Heart Disease
Cardiovascular Disease
Echocardiography

HONORS & AWARDS

E. William Hancock Teaching Award in Division of Cardiovascular Medicine, Stanford University (2015)

Outstanding Research Award in Pediatric Cardiology, American Heart Association (2009)

Norma Bailey Berniker Prize, Yale University (2002)

CURRENT RESEARCH

My research interests include the longterm outcome and prevalence of adolescents and adults with congenital heart disease. I am currently working with the Centers for Disease Control and Prevention on the Surveillance of Congenital Heart Defects Across the Lifespan. The goal of this project is to build on existing infrastructure for population-based CHDs surveillance to (i) link additional years of surveillance data for both adolescents and adults identified having a CHD, (ii) identify factors associated with optimal healthcare and improved outcomes, (iii) evaluate factors that impede appropriate transition from pediatric to adult care, (iv) expand surveillance activities to include the lifespan, and (v) develop pilot projects to translate public health best practices into action.

There are more than a million U.S. adults living with congenital heart disease. I hope that we can enhance the quality of care and longevity for these individuals through our clinical expertise, education, and research.

SELECTED PUBLICATIONS

Diagnosis and Management of Noncardiac Complications in Adults with Congenital Heart Disease: A Scientific Statement from the American Heart Association. Lui GK, Saidi A, Bhatt AB, Burchill LJ, Deen JF, Earing MG, Gewitz M, Ginns J, Kay JD, Kim YY, Kovacs AH, Krieger EV, Wu FM, Yoo SJ; American Heart Association Adult Congenital Heart Disease Committee of the Council on Clinical Cardiology and Council on Cardiovascular Disease in the Young; Council on Cardiovascular Radiology and Intervention; and Council on Quality of Care and Outcomes Research. *Circulation* 2017; Oct 9.

Proximity to pediatric cardiac surgical care among adolescents with congenital heart defects in eleven New York counties. Sommerhalter K, Insaf T, Akkaya-Hocagil T, McGarry C, Farr S, Downing K, Lui GK, Zaidi A, Van Zutphen A. *Birth Defects Research (Part A)* 2017; 109: 1494-1503.

Risk Estimates for Atherosclerotic Cardiovascular Disease in Adults with Congenital Heart Disease. Lui GK, Rogers IS, Ding VY, Hedlin HK, MacMillen K, Maron D, Sillman C, Romfh A, Dade TC, Haeffele C, Grady SR, Murphy DJ, McElhinney D, Fernandes SM. *Am J Card* 2017; 119: 112-118.

Management of Cardiovascular Risk Factors in Adults with Congenital Heart Disease. Lui GK, Fernandes S, McElhinney DB. *Journal of the American Heart Association* 2014; 3.



Merritt Maduke, PhD

Associate Professor of Molecular and Cellular Physiology

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EDUCATION/TRAINING

PHD University of California, San Diego

HONORS & AWARDS

Faculty Scholar, Esther Ehrman Lazard (2003-2005)

Scientist Development Award, American Heart Association (2004-2007)

Cranefield Award, Society of General Physiologists (2008)

Spark Scholar, Stanford University (2010)

Stanford Leadership Development Program (2016-2017)

CURRENT RESEARCH

Ion transport across the hydrophobic barrier of the cell membrane is a primary challenge faced by all cells. Such transport sets up and exploits ion gradients, thus providing the basic energy and signaling events that are the foundation of life. My laboratory studies the molecular mechanisms of ion channels and transporters, the proteins that catalyze this transport. We use a combination of biophysical methods to investigate membrane-protein structure and dynamics together with electrophysiological analyses to directly measure function. We also collaborate with the Du Bois laboratory (Chemistry) to develop small-molecule tools for studying physiological functions of channels and transporters. Finally, we apply expertise in ion channels towards understanding the mechanism by which ultrasound modulates neural activity. These projects have many potential therapeutic applications in cardiovascular health and disease.

Nothing will work if you don't. —Maya Angelou.

SELECTED PUBLICATIONS

The CLC-0 chloride channel is a “broken” Cl⁻/H⁺ antiporter. Lisal, J. and Maduke, M. *Nature Struct. Mol. Biol.* 15, 805-810, 2008.

A designed inhibitor of a CLC antiporter blocks function through a unique binding mode. Howery, A.E., Elvington, S.M., Abraham, D.J., Choi, K.H., Dworschak-Simpson, S., Phillips, S., Ryan, C.M., Sanford, R.L., Almqvist, J., Tran, K., Chew, T.A., Zachariae, U., Andersen, O.S., Whitelegge, J.P., Matulef, K., Du Bois, J. & Maduke, M. *Chem. Biol.*, 19(11), 1460-1470., 2012.

Revealing an outward-facing open conformational state in a CLC Cl⁻/H⁺ exchange transporter. Khantwal, C.M., Abraham, S.J., Han, W., Jiang, T., Chavan, T.S., Cheng, R.C., Elvington, S.M., Liu, C.W., Mathews, I.I., Stein, R.A., Mchaourab, H.S., Tajkhorshid, E., and Maduke, M. *Elife* Jan 22;5.

Activation of Piezo1 but not Nav1.2 Channels by Ultrasound at 43 MHz. Prieto, M.L., Firouzi, K., Khuri-Yakub, B.T., Maduke, M. *Ultrasound in Medicine and Biology*, accepted, Available at BioRxiv 136994, 2017.

¹³C NMR detects conformational change in the 100-kD membrane transporter CLC-ec1. Abraham, S.J., Cheng, R.C., Chew, T.A., Khantwal, C.M., Liu, C.W., Gong, S., Nakamoto, R.K., and Maduke, M. *J Biomol NMR*, 61(3-4), 209-26, 2015.



Kenneth W. Mahaffey, MD

Professor, Medicine – Cardiovascular Medicine
Vice Chair of Clinical Research, Medicine

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EDUCATION/TRAINING

MD University of Washington

MEDICINE RESIDENCY

University of Arizona Health Sciences

CHIEF RESIDENT

University of Arizona Health Sciences

CARDIOLOGY FELLOWSHIP

Duke University

BOARD CERTIFICATION

Cardiovascular Medicine, ABIM

CLINICAL FOCUS

Adult Cardiology

HONORS & AWARDS

CHAIR

MI and Death Definitions Working Group, Standardized Data Collection of Cardiovascular Trials Initiative (FDA)

CONSULTANT

Endocrinologic and Metabolic Drugs Advisory Committee

ADVISORY BOARD MEMBER

Brazilian Clinical Research Institute

CONTRIBUTOR

European Society of Cardiology, Task Force of Guidelines for the Management of Acute Myocardial Infarction in Patients with Persistent ST-segment Elevation

FELLOW

American College of Cardiology;
American Heart Association

FORMER ASSOCIATE DIRECTOR

Duke Clinical Research Institute (DCRI)

CURRENT RESEARCH

My primary research focus is the design and conduct of multicenter clinical trials and analyses of important clinical cardiac issues using large patient databases. My research focuses on novel anticoagulation agents for the treatment of acute coronary syndromes and atrial fibrillation, the study of agents targeted to protect the myocardium during reperfusion therapy for acute myocardial infarction, and the evaluation of cardiovascular safety of diabetic therapies. I am also interested in the methodology of clinical trials. Current research activities include standardization of the definition of myocardial infarction used in clinical trials, the adjudication of suspected clinical endpoint events, and evaluation of evidence-based operations in the conduct of large multinational clinical trials. I am the Vice Chair of Clinical Research in the department of Medicine.

We need to bring the key stakeholders together—academia, industry, regulatory agencies and other important bodies—to do research more efficiently.

SELECTED PUBLICATIONS

Computerized Q wave dimensions in athletes and hypertrophic cardiomyopathy patients. Bent RE, Wheeler MT, Hadley D, Froelicher V, Ashley E, Perez MV. *J Electrocardiol*. 2015 Feb 14.

P-wave characteristics on routine preoperative electrocardiogram improve prediction of new-onset postoperative atrial fibrillation in cardiac surgery. Wong JK, Lobato RL, Pinesett A, Maxwell BG, Mora-Mangano CT, Perez MV. *J Cardiothorac Vasc Anesth*. 2014 Dec;28(6):1497-504.



David J. Maron, MD

Clinical Professor, Medicine - Cardiovascular Medicine
Director, Preventive Cardiology

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EDUCATION/TRAINING

MD University of Southern California

MEDICINE RESIDENCY UCLA

**CARDIOVASCULAR DISEASE
EPIDEMIOLOGY FELLOWSHIP**
Stanford University

**ROBERT WOOD JOHNSON CLINICAL
SCHOLAR** Stanford University

CARDIOLOGY FELLOWSHIP
Stanford University

BOARD CERTIFICATION
Internal Medicine, ABIM
Cardiovascular Disease, ABIM
Clinical Lipidology, ABCL

CLINICAL FOCUS

Primary and Secondary Prevention of
Coronary Artery Disease
Lipid Disorders

HONORS & AWARDS

Alpha Omega Alpha
Vanderbilt Emergency Department
Patient Advocate Award
Vanderbilt Five Star Award for patient
satisfaction (2010, 2013)

FORMER DIRECTOR
(VANDERBILT UNIVERSITY)
Dayani Center for Health and Wellness;
Emergency Cardiology; Vanderbilt Chest
Pain Unit

CURRENT RESEARCH

My research is devoted to the application of evidence-based medicine for the prevention and treatment of coronary artery disease. As a follow-up to my work on the COURAGE trial, I am Co-Chair of the ISCHEMIA trial, a large international NIH/NHLBI-funded trial that compares the effectiveness of conservative versus invasive management of patients with stable coronary disease and at least moderate ischemia on stress testing. I am working on Project Baseline to find new signals that indicate the onset or progression of coronary artery disease.

SELECTED PUBLICATIONS

Healthy Behavior, Risk Factor Control, and Survival in the COURAGE Trial. Maron DJ, Mancini GBJ, Hartigan PM, Spertus JA, Sedlis SP, Kostuk WJ, Berman DS, Teo KK, Weintraub WS, Boden WE. *J Am Coll Cardiol* 2018;72:2297-2305.

Planning and Conducting the ISCHEMIA Trial: Setting the Record Straight. Maron DJ, Harrington RA, Hochman JS. *Circulation* 2018;138:1384-1386.

International Study of Comparative Health Effectiveness with Medical and Invasive Approaches (ISCHEMIA) Trial: Rationale and Design. ISCHEMIA Trial Research Group. Maron DJ, Hochman JS, O'Brien SM, Reynolds HR, Boden WE, Stone GW, Bangalore S, Spertus JA, MD, Mark DB, Alexander KP, Shaw L, Berger JS, Ferguson Jr. TB, Williams DO, Harrington RA, Rosenberg Y. *Am Heart J* 2018;201:124-135.

ISCHEMIA-CKD Research Group. International Study of Comparative Health Effectiveness with Medical and Invasive Approaches-Chronic Kidney Disease (ISCHEMIA-CKD): Rationale and design. Bangalore S, Maron DJ, Fleg JL, O'Brien SM, Herzog CA, Stone GW, Mark DB, Spertus JA, Alexander KP, Sidhu MS, Chertow GM, Boden WE, Hochman JS; *Am Heart J* 2018;205:42-52.

Appropriate use criteria for coronary revascularization in patients with stable ischemic heart disease: a report of the American College of Cardiology Appropriate Use Criteria Task Force, American Association for Thoracic Surgery, American Heart Association, American Society of Echocardiography, American Society of Nuclear Cardiology, Society for Cardiovascular Angiography and Interventions, Society of Cardiovascular Computed Tomography, and the Society of Thoracic Surgeons. Patel MR, Calhoun JH, Dehmer GJ, Grantham JA, Maddox TM, Maron DJ, Smith PK. *ACC/AATS/AHA/ASE/ASNC/SCAI/SCCT/STS 2017 J Am Coll Cardiol* 2017;69:2212-2241.



Alison Marsden, PhD

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CURRENT RESEARCH

Alison Marsden is an associate professor and Wall Center scholar in the departments of Pediatrics, Bioengineering, and, by courtesy, Mechanical Engineering at Stanford University. From 2007-2015 she was a faculty member in the Mechanical and Aerospace Engineering Department at the University of California San Diego. She graduated with a bachelor's degree in Mechanical Engineering from Princeton University in 1998, and a PhD in Mechanical Engineering from Stanford in 2005. She was a postdoctoral fellow at Stanford University in Bioengineering and Pediatric Cardiology from 2005-07. She was the recipient of a Burroughs Wellcome Fund Career Award at the Scientific Interface (2007), an NSF CAREER award (2011), received the UCSD graduate student association faculty mentor award (2014) and MAE department teaching award (2015). She is a fellow of two major scientific societies, the American Institute for Medical and Biological Engineering and the Society for Industrial and Applied Mathematics. She has published over 90 peer reviewed journal papers, and has received funding from the NSF, NIH, and several private foundations. She serves on the editorial boards of *PLOS Computational Biology*, the *Journal of Biomechanical Engineering and Cardiovascular Engineering and Technology*, and on the advisory board for the Burroughs Wellcome Fund. Her work focuses on the development of numerical methods for cardiovascular blood flow simulation, medical device design, optimization to large-scale fluid mechanics simulations, and application of engineering tools to impact patient care in cardiovascular surgery and congenital heart disease.

Failure is closer to success than inaction
—Earl Bakken.

SELECTED PUBLICATIONS

Right Ventricular Stroke Work Correlates with Outcomes in Pediatric Pulmonary Arterial Hypertension. Yang, W., Marsden, A.L., Ogawa, M.T., Sakarovitch, C., Phillips, K. K., Rabinovitch, M., Feinstein, J.A. *Pulmonary Circulation*, Vol. 8(3) (June 2018).

A unified continuum and variational multiscale formulation for fluids, solids, and fluid-structure interaction. Liu, J., Marsden, A.L. *Computer Methods for Applied Mechanics and Engineering*, Vol. 337 (1), pp. 549-597 (August 2018).

Optimization of the Assisted Bidirectional Glenn Procedure for First Stage Single Ventricle Repair. Verma, A., Esmaily, M., Shang, J.K., Figliola, R.S., Feinstein, J.A., Hsia, T.-Y., Marsden, A.L. *World Journal for Pediatric and Congenital Heart Surgery*, Vol. 9(2), pp. 157-170, (March 2018).

Uncertainty quantification of simulated biomechanical stimuli in coronary artery bypass grafts. Tran, J.S., Schiavazzi, D.E., Kahn, A.M., Marsden, A.L. Accepted, *Computer Methods in Applied Mechanics and Engineering*.

Gradual loading ameliorates maladaptation in computational simulations of vein graft growth and remodeling. Ramachandra, A. B., Humphrey, J. D., Marsden, A. L. *Journal of the Royal Society Interface*, Vol. 14 (130), May 2017.

EDUCATION/TRAINING

PHD Stanford University

HONORS & AWARDS

Career Award at the Scientific Interface, Burroughs Wellcome Fund

Career Award, National Science Foundation

Teacher of the Year Award, MAE Department, UCSD

Vera Moulton Wall Center Faculty Scholar

FELLOW

Fellow, American Institute of Medical and Biological Engineering

Fellow, Society for Industrial and Applied Mathematics

ADVISORY BOARDS

Burroughs Wellcome Fund Career Awards at the Scientific Interface



Nicholas Melosh, PhD

Associate Professor of Material Science and Engineering and of Photon Science

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EDUCATION/TRAINING

PHD University of California, Santa Barbara

CURRENT RESEARCH

The focus of my research is engineering cell access and dynamic bio-electronic interfaces. I am very interested in how to design new structures that will seamlessly integrate with biological systems to address problems in molecular delivery, iPSC development, cell sampling, and electrical recording. This involves both fundamental work such as to deeply understand how lipid membranes interact with inorganic surfaces, electrokinetic phenomena in biologically relevant solutions, and applying this knowledge into new device designs. Examples of this include “nanostraw” drug delivery platforms for direct delivery or extraction of material through the cell wall using a biomimetic gap-junction made using nanoscale semiconductor processing techniques. We also engineer materials and structures for electrical interfaces and highly parallel stimulation and recording. For instance, we have created inorganic electrodes that mimic the hydrophobic banding of natural transmembrane proteins, allowing them to ‘fuse’ into the cell wall, providing a tight electrical junction for solid-state patch clamping. In addition to significant efforts at engineering surfaces at the molecular level, we also work on ‘bridge’ projects that span between engineering and biological/clinical needs.

One of the most exciting developments over the past ten years is the merging of engineered devices and biological problems to make clinical impacts.

SELECTED PUBLICATIONS

Non-Destructive Nanostraw Intracellular Sampling for Longitudinal Cell Monitoring. Cao Y, Hjort M, Chen H, Birey F, Leal-Ortiz S, Han C, Santiago J, Paşca S, Wu J, & Melosh NA. 2017 *Proc Natl Acad Sci USA*, Vol. 114, pp. 1866-1874.

Nanotechnology and neurophysiology. Angle MR, Cui B, & Melosh NA (2015). *Current Opinion in Neurobiology*. 2015 Jun;32:132-40.

Quantification of Nanowire Penetration into Living Cells. M. Xu, A. Aalipour, S. Leal-Ortiz, A. H. Mekhdjian, X. Xie, A. R. Dunn, C. C. Garner, N. A. Melosh. 2014 *Nature Communications*:1-8.

Fusion of Biomimetic ‘Stealth’ Probes into Lipid Bilayer Cores. B. D. Almquist, N. A. Melosh. 2010 *Proc Natl Acad Sci USA*, Vol. 107, pp. 5815-5820.



Doff McElhinney, MD

Professor of Cardiothoracic Surgery (Pediatric Cardiac Surgery) and of Pediatrics (Cardiology)

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EDUCATION/TRAINING

MD University of California, San Francisco, School of Medicine

RESIDENCY Children's Hospital of Philadelphia

FELLOWSHIP Boston Children's Hospital

BOARD CERTIFICATION

American Board of Pediatrics

American Board of Pediatrics, Pediatric Cardiology

Adult Congenital Heart Disease, American Board of Internal Medicine

HONORS & AWARDS

EDITORIAL BOARD

Associate Editor, Catheterization and Cardiovascular Interventions

GUEST EDITOR

Circulation

EXECUTIVE COMMITTEE

Lucile Packard Children's Heart Center

CURRENT RESEARCH

My interests are in outcomes research, transcatheter device therapy for congenital heart disease, and collaborative translational investigation related to the pathophysiology, evaluation, and management of pediatric and adult congenital heart disease. I am Director of the Lucile Packard Children's Hospital Stanford Heart Center, Program for Clinical and Translational Research.

SELECTED PUBLICATIONS

Relative risk factors for cardiac erosion following transcatheter closure of atrial septal defects: a case-control study. McElhinney DB, Quartermain MD, Kenny D, Alboliras E, Amin Z. *Circulation* 2016;133:1738-46.

Transcatheter pulmonary valve replacement reduces tricuspid regurgitation in patients with right ventricular volume/pressure overload. Jones TK, Rome JJ, Armstrong AK, Berger F, Hellenbrand WE, Cabalka AK, Benson LN, Balzer DT, Cheatham JP, Eicken A, McElhinney DB. *J Am Coll Cardiol* 2016;68:1525-35.

Programmatic approach to management of tetralogy of Fallot with major aortopulmonary collateral arteries: a 15-year experience with 458 patients. Bauser-Heaton H, Borquez A, Han B, Ladd M, Asija R, Downey L, Koth A, Algaze CA, Wise-Faberowski L, Perry SB, Shin A, Peng LF, Hanley FL, McElhinney DB. *Circ Cardiovasc Interv.* 2017 Apr;10(4). PMID: 28356265.

Relationships among conduit type, pre-stenting, and outcomes in patients undergoing transcatheter pulmonary valve replacement in the prospective North American and European Melody valve trials. Cabalka AK, Hellenbrand WE, Eicken A, Kreutzer J, Gray RG, Bergersen L, Berger F, Armstrong AK, Cheatham JP, Zahn EM, McElhinney DB. *JACC Cardiovasc Interv* 2017;10:1746-59.

Transcatheter pulmonary valve replacement using the melody valve for treatment of dysfunctional surgical bioprostheses: A multicenter study. Cabalka AK, Asnes JD, Balzer DT, Cheatham JP, Gillespie MJ, Jones TK, Justino H, Kim DW, Lung TH, Turner DR, McElhinney DB. *J Thorac Cardiovasc Surg* 2018;155:1712-24.

Intentional fracture of bioprosthetic valve frames in patients undergoing valve-in-valve transcatheter pulmonary valve replacement. Shahanavaz S, Asnes JD, Grohmann J, Qureshi AM, Rome JJ, Tanase D, Crystal MA, Latson LA, Morray BH, Hellenbrand W, Balzer DT, Gewillig M, Love JC, Berdjis F, Gillespie MJ, McElhinney DB. *Circ Cardiovasc Interv.* 2018;11:e006453. doi: 10.1161/CIRCINTERVENTIONS.118.006453.

Endocarditis after transcatheter pulmonary valve replacement. McElhinney DB, Sondergaard L, Armstrong AK, Bergersen L, Padera RF, Balzer DT, Lung TH, Berger F, Zahn EM, Gray RG, Hellenbrand WE, Kreutzer J, Eicken A, Jones TK, Ewert P. *J Am Coll Cardiol* 2018;72:2717-28.



Mark Mercola, PhD

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EDUCATION/TRAINING

PHD UCLA

BA UCLA

HONORS & AWARDS

American Cancer Society Postdoctoral Fellowship (1986)

Richard A. Smith Prize for Scientific Excellence, Dana-Farber Cancer Institute (1989)

Basil O'Connor Award, March of Dimes Birth Defects Foundation (1991)

Established Investigator Award, American Heart Association (1997)

National Institutes of Health MERIT Award (2007)

CURRENT RESEARCH

Our goal is to discover new therapeutic targets and therapeutics for heart failure, and to remove the adverse cardiac effects of oncology drugs. Over the past two decades, our studies laid the groundwork for the efficient production of heart cells from pluripotent stem cells, and for automated, high throughput screening of genes, proteins and small molecules for the ability to ameliorate disease symptoms. Our current pipeline starts with cardiomyopathy and arrhythmia models generated using patient and genome edited iPSCs and uses them in screens to find new therapeutic targets and develop novel therapeutic strategies. The most advanced projects are now in preclinical, large animal testing.

There is so much we can do now to understand the human condition that would have been unimaginable only a few years ago—in many ways we live in the best of times.

SELECTED PUBLICATIONS

An Automated Platform for Assessment of Congenital and Drug-Induced Arrhythmia with hiPSC-Derived Cardiomyocytes. McKeithan WL, Savchenko A, Yu MS, Cerignoli F, Bruyneel AAN, Price JH, Colas AR, Miller EW, Cashman JR, Mercola M. *Front Physiol.* 2017 Oct 11;8:766.

Id genes are essential for early heart formation. Cunningham TJ, Yu MS, McKeithan WL, Spiering S, Carrette F, Huang CT, Bushway PJ, Tierney M, Albin S, Giacca M, Mano M, Puri PL, Sacco A, Ruiz-Lozano P, Riou JF, Umbhauer M, Duester G, Mercola M, Colas AR. *Genes Dev.* 2017 Jul 1;31(13):1325-1338.

High-throughput screening of tyrosine kinase inhibitor cardiotoxicity with human induced pluripotent stem cells. Sharma A, Burrige PW, McKeithan WL, Serrano R, Shukla P, Sayed N, Churko JM, Kitani T, Wu H, Holmström A, Matsa E, Zhang Y, Kumar A, Fan AC, Del Álamo JC, Wu SM, Moslehi JJ, Mercola M, Wu JC. *Sci Transl Med.* 2017 Feb 15;9(377).

Will iPSC-cardiomyocytes revolutionize the discovery of drugs for heart disease? Bruyneel AA, McKeithan WL, Feyen DA, Mercola M. *Curr Opin Pharmacol.* 2018 Oct;42:55-61.

A Novel Inhibitor Targets Both Wnt Signaling and ATM/p53 in Colorectal Cancer. Cheng J, Dwyer M, Okolotowicz KJ, Mercola M, Cashman JR. *Cancer Res.* 2018 Sep 1;78(17):5072-5083.

miRNAs that Induce Human Cardiomyocyte Proliferation Converge on the Hippo Pathway. Diez-Cuñado M, Wei K, Bushway PJ, Maurya MR, Perera R, Subramaniam S, Ruiz-Lozano P, Mercola M. *Cell Rep.* 2018 May 15;23(7):2168-2174.



D. Craig Miller, MD

Thelma and Henry Doelger Professor in Cardiovascular Surgery
Department of Cardiothoracic Surgery

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EDUCATION/TRAINING

MD Stanford University School of Medicine CA

BA Stanford University, Basic Medical Sciences (1969)
Dartmouth College, Chemistry/Mathematics (1968)

RESIDENCY Stanford University School of Medicine CA (1975, 1977)

BOARD CERTIFICATION

Thoracic Surgery, American Board of Thoracic Surgery (1979) Recertified, 1988, 1998, 2008, 2017.

HONORS & AWARDS

President, American Association for Thoracic Surgery, 2007-2008

President, Western Thoracic Surgical Association, 1994-1995

Eugene Braunwald Mentorship Award, American Heart Association, 2009

Distinguished Scientist of the American Heart Association, 2003

Antoine Marfan Award, National Marfan's Foundation, 2001

Wilfred Bigelow Award, Canadian Cardiovascular Society, 2000

Distinguished Achievement Award, American Heart Assoc. Cardiovascular Surgery & Anesthesia Council, 2008

William W. L. Glenn lecturer, American Heart Association, 2002

David J. Dugan Distinguished Service Award (Western Thoracic Surgical Association) 2016

CURRENT RESEARCH

Cardiac and heart valve disease with experimental laboratory large animal projects focused on the investigation of left ventricular and cardiac mechanics, bioenergetics, and LV and mitral valve physiology and pathophysiology. Current thrust is aimed at understanding the mitral valve and subvalvular mitral apparatus and transmural LV wall strains, thickening, and myolaminar fiber-sheet mechanics.

Clinical research interests include thoracic aortic diseases (aortic dissection, aneurysm) and cardiac valvular disease, including surgical treatment, endovascular thoracic aortic stent-graft repair, mitral valve repair, and valve-sparing aortic root replacement.

Those who cannot remember the past are
condemned to repeat it.

—George Santayana (1863-1952)

SELECTED PUBLICATIONS

Rationale and results of the Stanford modification of the David V reimplantation technique for valve-sparing aortic root replacement. Miller, D. C. *Journal of Thoracic and Cardiovascular Surgery* 2015; 149 (1): 112-114

Stroke After Surgical Versus Transfemoral Transcatheter Aortic Valve Replacement in the PARTNER Trial. Kapadia, S. R., Huded, C. P., Kodali, S. K., Svensson, L. G., Tuzcu, E. M., Baron, S. J., Cohen, D. J., Miller, D. C., Thourani, V. H., Herrmann, H. C., Mack, M. J., Szerlip, M., Makkar, R. R., Webb, J. G., Smith, C. R., Rajeswaran, J., Blackstone, E. H., Leon, M. B., PARTNER Trial Investigators *Journal of the American College of Cardiology* 2018; 72 (20): 2415-26

Transcatheter or Surgical Aortic-Valve Replacement in Intermediate-Risk Patients. Leon, M. B., Smith, C. R., Mack, M. J., [5 authors], Miller, D. C., Herrmann, H. C., Doshi, D., Cohen, D. J., Pichard, A. D., [15 authors] P., Hahn, R. T., Jaber, W. A., Anderson, W. N., Alu, M. C., Webb, J. G. *New England Journal of Medicine* 2016; 374 (17): 1609-1620

5-year outcomes of transcatheter aortic valve replacement or surgical aortic valve replacement for high surgical risk patients with aortic stenosis (PARTNER 1): a randomised controlled trial. Mack, M. J., Leon, M. B., Smith, C. R., Miller, D. C., Moses, J. W., Tuzcu, E. M., Webb, J. G., Douglas, P. S., Anderson, W. N., Blackstone, E. H., Kodali, S. K., Makkar, R. R., Fontana, G. P., Kapadia, S., Bavaria, J., Hahn, R. T., Thourani, V. H., Babaliaros, V., Pichard, A., Herrmann, H. C., Brown, D. L., Williams, M., Akin, J., Davidson, M. J., Svensson, L. G. *Lancet* 2015; 385 (9986): 2477-2484



Daria Mochly-Rosen, PhD

George D. Smith Professor of Translational Medicine
Professor, Chemical and Systems Biology
Co-director, SPARK - Stanford's Translational Research Program
President and Founder, SPARK GLOBAL

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EDUCATION/TRAINING

PHD Weizmann Institute of Science

HONORS & AWARDS

NIH Merit award

Janice Pfeffer Distinguished Lecturer

FOUNDER AND DIRECTOR

SPARK Translational Research Program

FOUNDING MEMBER International Society for Heart Research (ISHR)

ADVISORY BOARD

Stanford University Office of Technology Licensing

LEADERSHIP Senior Associate Dean for Research, Stanford University (2006-13); Child Health Initiative, Stanford University; Council of Councils, NIH; Council on Basic Cardiovascular Sciences, American Heart Association (AHA); Peer Review Advisory Committee to the Director of the NIH

PRECEPTOR

Sarnoff Cardiovascular Research Foundation Fellowship Program

PRESIDENTIAL LECTURE

International Symposium on Cerebral Blood Flow, Metabolism and Function

FORMER ELECTED MEMBER

Council of the ISHR

MEMBER American Society for Biochem and Molec Biology; Council on Stroke, AHA; Heart Failure Society of America; ISHR; Society for Neuroscience; UCSF-Stanford CERSI External Advisory Board, VIB Institutional Advisory Board, Belgium, CA Life Sciences Assoc Board

CURRENT RESEARCH

Our basic research focuses on elucidating molecular events that contribute to heart diseases, generating tools to interfere with these pathologies and the translation of them into drug leads. We have used both rationally designed peptides and small molecules to regulate key signaling events and metabolism in the myocardium. Our research has led to several clinical trials using drugs that were developed in our laboratory at Stanford. My passion for translational research led me to create and co-direct SPARK that helps scores of inventors at Stanford move their early research discoveries to clinical trials and/or to licensing for drug development. I am the Founder and Co-director of SPARK - Stanford's Translational Research Program.

I believe that it is our social responsibility to ensure that basic and clinical discoveries are translated into products that benefit patients. By providing the knowhow and the tools, together with industry experts we are making it happen.

SELECTED PUBLICATIONS

SAM β A, a selective antagonist of mitofusin 1- β IIPKC association, improves heart failure outcome in rats. Ferreira JC, Campos CS, Qvit N, Qi X, Bozi BHM, Bechara LRG, LimaVM, Queliconi QB, Disatnik M-H, Dourado PMM, Kowaltowski AJ, Mochly-Rosen D. *Nature Commun*, Dec 2018

Drp1/Fis1-mediated mitochondrial fragmentation leads to lysosomal dysfunction in cardiac models of Huntington's disease. Joshi AU, Ebert AE, Haileselassie B, Mochly-Rosen D. *J Mol Cell Cardiol*. 2018 Dec 11. pii: S0022-2828(18)30795-8. doi: 10.1016/j.yjmcc.2018.12.004.

Engineered substrate-specific delta PKC antagonists to enhance cardiac therapeutics. Qvit N, Kornfeld OS, Mochly-Rosen D. *Angew Chem Int*. 2016; 55: 15672-15679.

Mitochondrial reactive oxygen species at the heart of the matter: new therapeutic approaches for cardiovascular diseases. Kornfeld OS, Hwang S, Disatnik MH, Chen CH, Qvit N, Mochly-Rosen D. *Circ Res*. 2015; 116:1783-99.

Selective Phosphorylation inhibitor of delta protein kinase C-pyruvate dehydrogenase kinase protein-protein interactions: application for myocardial injury, in vivo. Qvit N, Disatnik MH, Sho E, Mochly-Rosen D. *J Am Chem Soc*. 2016; 138:7626-35.

Protein kinase C, an elusive therapeutic target? Mochly-Rosen D, Das K, Grimes KV. *Nature Rev Drug Discovery*. 2012; 11:937-57.



Jonathan Myers, PhD

Clinical Professor, Medicine - Cardiovascular Medicine

Research Coordinator, Exercise Physiology Lab, VA Palo Alto Health Care System

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CURRENT RESEARCH

Our research group focuses on clinical applications of exercise testing and training in patients with cardiovascular disease. We coordinate several national and international data bases designed to address cardiopulmonary exercise test, clinical, and lifestyle factors and their association with health outcomes. We provide collaborators with the means to use exercise as a medium to study mechanisms of disease and improve outcomes. Current projects include the effects of training on peripheral vascular disease, renal failure, gene expression, coronary disease, and mild cognitive impairment.

If we could give every individual the right amount of nourishment and exercise, not too little and not too much, we would have found the safest way to health. —Hippocrates

SELECTED PUBLICATIONS

Association between cardiorespiratory fitness and health care costs: The Veterans Exercise Testing Study. Myers J, Doom R, King R, Fonda H, Abella J, Froelicher V, Chan K, Kokkinos P. *Mayo Clinic Proceedings*. 2017 Nov 28.

A reference equation for normal standards for VO2 max: Analysis from the Fitness Registry and the Importance of Exercise Database (FRIEND Registry). Progress in Cardiovascular Diseases. Myers J, Kaminsky L, Lima R, Christle J, Ashley E, Arena R. *Prog Cardiovasc Dis*. 2017 Jun-Jul;60(1):21-29.

Cardiorespiratory fitness and reclassification of risk for incidence of heart failure: The Veterans Exercise Testing Study. Myers J, Kokkinos P, Chan K, Dandekar E, Yilmaz B, Nagare A, Faselis C, Soofi M. *Circ Heart Fail*. 2017 Jun;10(6).

Cardiorespiratory fitness and incidence of major adverse cardiovascular events in US veterans: A cohort study. Kokkinos PF, Faselis C, Myers J, Narayan P, Sui X, Zhang J, Lavie CJ, Moore H, Karasik P, Fletcher R. *Mayo Clin Proc*. 2017; 92 (1): 39-48.

Prognosis: Does exercise training reduce adverse events in heart failure? Myers J, Brawner CA, Haykowsky MJF, Taylor RS. *Heart Failure Clinics*. 2015; 11:59-72.

Physical activity and cardiorespiratory fitness as major markers of cardiovascular risk: Their independent and interwoven importance to health status. Myers J, McAuley P, Lavie C, Despres JP, Arena R, Kokkinos P. *Progress in Cardiovascular Diseases*. 2015; 57:306-314.

Improved reclassification of mortality risk by assessment of physical activity in patients referred for exercise testing. Myers J, Nead KT, Chang P, Abella J, Kokkinos P, Leeper NJ. *Am J Med*. 2015; 128:396-402.

EDUCATION/TRAINING

PHD University of Southern California

MS San Diego State University

BA UC Santa Barbara

HONORS & AWARDS

Michael L. Pollock Established Investigator Award, American Association of Cardiovascular and Pulmonary Rehabilitation (2007)

Steven N. Blair Award for Excellence in Physical Activity Research, American Heart Association, 2017

Research Career Scientist Award, Veterans Administration Rehabilitation Research and Development Service (2004, 2009, 2016)

ADVISORY BOARD

American Heart Association Council on Epidemiology & Prevention; Fitness registry and the importance of exercise national database (FRIEND Registry); European Society of Preventive Medicine

FELLOW

American Association of Cardiovascular and Pulmonary Rehabilitation; American College of Cardiology; American College of Sports Medicine; American Heart Association

MEMBER

AHA Council on Epidemiology and Prevention; AHA Council on Nutrition, Physical Activity and Metabolism



Sanjiv Narayan, MD, MSc

Professor of Medicine (Cardiovascular Medicine)

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EDUCATION/TRAINING

MBChB U. of Birmingham, England (1987)

MRCP Royal College of Physicians of London, England (1990)

MSc U. of Birmingham, England (1990)

MD U. of Birmingham, England (1994)

FRCP Royal College of Physicians of London, England (2005)

CURRENT RESEARCH

I direct a bedside-to-bench-to-bedside translational program using bioengineering to understand and treat complex heart rhythm disorders. My laboratory reported for the first time that chaotic and disorganized patterns of human AF are typically sustained by small rotational or focal sources, where direct ablation (Focal Impulse and Rotor Modulation, FIRM) may yield successful outcomes, as now validated in multiple laboratories. The finding of localized drivers for cardiac fibrillation was unexpected, and has been extended to ventricular arrhythmias. Our exceptional interdisciplinary team uses a variety of analytic techniques, computational models and supervised and unsupervised machine learning to redefine clinical arrhythmia syndromes. A major focus of the laboratory is to share our raw data, code and other results using novel online and mobile platforms to accelerate collaboration and discussion.

Our laboratory principle is bedside-to-bench-to-bedside research integrating bioengineering and computational methods with sound physiological understanding.

SELECTED PUBLICATIONS

Imaging Optical Reflectance In Rodent Barrel And Forelimb Sensory Cortex. Narayan SM, Santori EM, Blood AJ, Burton JS, Toga AW. *Neuroimage* 1994b; 1: 181-190.

Atrial Fibrillation. Narayan SM, Cain ME, Smith, JM. *Lancet* 1997; 350: 943-950.

Demonstration of the Proarrhythmic Preconditioning of Single Premature Extrastimuli by Use of the Magnitude, Phase and Distribution of Repolarization Alternans. Narayan SM, Lindsay BD, Smith JM. *Circulation* 1999; 100: 1887-1893.

Repolarization and Activation Restitution Near Human Pulmonary Veins and Atrial Fibrillation Initiation. A Mechanism for the initiation of Atrial Fibrillation by Premature Beats. Narayan SM, Kazi D, Krummen DE, Rappel W-J. *J Am Coll Cardiol* 2008; 52(15): 1222-1230.

Repolarization Alternans Indicates Vulnerability to Human Atrial Fibrillation. Narayan SM, Franz MR, Clopton P, Pruvot E, Krummen DE. *Circulation* 2011; 123: 2922-2930.

Treatment of Atrial Fibrillation by the Ablation of Localized Sources: The CONventional Ablation For Atrial Fibrillation With and Without Focal Impulse and Rotor Modulation (CONFIRM) Trial. Narayan SM, Krummen DE, Shivkumar K, Clopton PS, Rappel WJ, Miller JM. *J Am Coll Cardiol* 2012; 60(7):628-36. Subject of an editorial.



Patricia K. Nguyen, MD

Assistant Professor, Medicine - Cardiovascular Medicine

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EDUCATION/TRAINING

MD Johns Hopkins Medical School

MEDICINE RESIDENCY

Columbia University

CARDIOLOGY FELLOWSHIP

Stanford University

BOARD CERTIFICATION

Internal Medicine, ABIM

Cardiovascular Medicine, ABIM

CLINICAL FOCUS

Cardiovascular Imaging

HONORS & AWARDS

American Heart Association Research Award, Western States Affiliates

American College of Cardiology Foundation/GE Healthcare Award

American College of Cardiology Foundation/Merck Fellow

FELLOW

American College of Cardiology

MEMBER

American Heart Association

CURRENT RESEARCH

My research applies imaging technology to translate promising basic science findings into clinical application and to better understand the pathophysiology of coronary artery disease in men and women.

[Humans] love to wonder, and that is the seed of science... — Ralph Waldo Emerson

SELECTED PUBLICATIONS

Brief report: external beam radiation therapy for the treatment of human pluripotent stem cell-derived teratomas. Lee AS, Tang C, Hong WX, Park S, Bazalova M, Nelson G, Sanchez-Freire, Bakerman I, Zhang W, Neofytou E, Connolly A, Chan CK, Graves EE, Weissman IL, Nguyen PK*, and Wu JC*. *Stem Cells*. 2017 Aug;35(8):1994-2000.

Prolonged survival of transplanted stem cells after ischemic injury via the slow release of pro-survival peptide analogs crosslinked to an injectable collagen matrix. Lee AS, Inayathullah M, Lijkwan M, Zhao X, Sun W, Park S, Hong W, Parekh MB, Malkovskiy A, Lau E, Qin X, Pothineni VR, Sanchez-Freire V, Zhang WY, Kooreman N, Ebert AD, Chan C, Nguyen PK*, Rajadas J*, Wu JC*. *Nature Biomedical Engineering*. 2018 Jan;2(2):104-113.



Mark R. Nicolls, MD

Professor, Medicine - Pulmonary and Critical Care and
Immunology and Rheumatology
Chief, Division of Pulmonary and Critical Care Medicine
Director, Lung Immunology
Endowed Chair: The Stanford Professor of Pulmonary and Critical Care Medicine

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EDUCATION/TRAINING

MD Stanford University

MEDICINE RESIDENCY & INTERNSHIP

Stanford University

PULMONARY AND CRITICAL CARE

MEDICINE FELLOWSHIP

University of Colorado

BOARD CERTIFICATION

Pulmonary Disease, ABIM

CLINICAL FOCUS

Heart/Lung Transplantation

Lung Transplantation

Pulmonary Hypertension

Lymphedema

HONORS & AWARDS

ELECTED MEMBER

American Society for Clinical
Investigation (ASCI)

DIRECTOR

Stanford Lung Immunology Program
Stanford University Remodeled Airways
Tissue Bank
Stanford Center for Advanced Lung
Disease (CALD)

CO-FOUNDER

Northern California Scleroderma
Research Consortium

EXECUTIVE STEERING COMMITTEE

Vera Moulton Wall Center for Pulmonary
Vascular Disease

CHAIRMAN OF THE BOARD

Palo Alto Veterans Institute for Research

EDITORIAL BOARD

European Respiratory Journal

CURRENT RESEARCH

I specialize in the treatment of lung transplant patients. I have practiced pulmonary and critical care medicine for more than 18 years. We focus on how the immune system contributes to vascular injury leading to a variety of diseases and pathology with a special focus on lung transplantation, pulmonary hypertension, and lymphedema.

SELECTED PUBLICATIONS

Leukotriene B-4 antagonism ameliorates experimental lymphedema. Tian, W., Rockson, S. G., Jiang, X., Kim, J., Begaye, A., Shuffle, E. M., Tu, A. B., Cribb, M., Nepiyushchikh, Z., Feroze, A. H., Zamanian, R. T., Dhillon, G. S., Voelkel, N. F., Peters-Golden, M., Kitajewski, J., Dixon, J. B., Nicolls, M. R. *Science Translational Medicine* 2017; 9 (389)

Models of Lung Transplant Research: a consensus statement from the National Heart, Lung, and Blood Institute workshop. Lama VN, Belperio JA, Christie JD, El-Chemaly S, Fishbein MC, Gelman AE, Hancock WW, Keshavjee S, Kreise D, Laubach VE, Looney MR, McDyer JF, Mohanakumar T, Shilling RA, Panoskaltis-Mortari A, Wilkes DS, Eu JP, Nicolls MR. *JCI Insight*. 2017 May 4;2(9).

Microhemorrhage-associated tissue iron enhances the risk for Aspergillus fumigatus invasion in murine tracheal transplantation. Hsu JL, Manouvakova OV, Clemons KV, Inayathullah M, Tu AB, Sobel RA, Tian W, Nazik H, Pothineni VR, Pasupneti S, Jiang X, Dhillon GS, Bedi H, Rajadas J, Haas H, Aurelian L, Stevens DA, Nicolls MR. *Science Translational Medicine*, 2018

A dominant role for regulatory T cells in protecting females against pulmonary hypertension. Tamosiuniene R, Manouvakova O, Mesange P, Saito T, Qian J, Sanayal M, Lin YC, Nguyen L, Luria A, Tu A, Sante J, Rabinovitch M, Fitzgerald DJ, Graham BB, Habtezion A, Voelkel NF, Aurelian L, Nicolls MR. *Circ. Res*. 2018 Mar 15;117.312058.

Pilot studies demonstrate the potential benefits of anti-inflammatory therapy in human lymphedema. Rockson SG, Tian W, Jiang X, Kuznetsova T, Haddad F, Zampell J, Mehrara B, Roche L, Kim J, Nicolls MR. *JCI Insight*. 2018 Oct 18;3 (20).

Endothelial HIF-2α is required for the maintenance of airway microvasculature. Jiang X, Tian W, Tu AB, Pasupneti S, Shuffle E, Dahms P, Zhang P, Cai H, Dinh TT, Liu B, Cain C, Giaccia AJ, Butcher EC, Simon MC, Semenza GL, Nicolls MR. *Circulation*. 2019; 139 (in press).



Koen Nieman, MD, PhD

Associate Professor of Medicine (Cardiovascular Medicine)
and Radiology (CV Imaging)

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EDUCATION/TRAINING

MD Radboud University, Nijmegen NL

PHD Erasmus University, Rotterdam NL

INTERNSHIP Radboud University

RESIDENCY

Erasmus University Medical Center

FELLOWSHIP Massachusetts General
Hospital Department of Radiology

HONORS & AWARDS

BOARDS

Vice-president Society of Cardiovascular
Computed Tomography
Associate editor JACC cardiovascular
imaging

CURRENT RESEARCH

Dr. Nieman is a cardiologist and associate professor in the departments of cardiovascular medicine and radiology. He investigates advanced cardiac imaging techniques, and current research interest include stress myocardial perfusion CT, CT-based fractional flow reserve, machine-learning approaches to disease differentiation, imaging-guided decision making and the clinical value of cardiac CT in ischemic heart disease.

Dr. Nieman was born in the Netherlands, obtained his medical degree at the Radboud University in Nijmegen (1998), and completed his cardiology training at the Erasmus University Medical Center in Rotterdam (2008). His research in cardiac CT at the Erasmus University resulted in a PhD degree in 2003. In 2004 he performed an imaging fellowship at the Massachusetts General Hospital (Harvard Medical School) in Boston, MA. Dr Nieman became faculty at Erasmus (cardiology/radiology) in 2008 and was scientific director of cardiac CT and MRI and clinical director of the intensive cardiac care unit until he joined Stanford in 2016.

SELECTED PUBLICATIONS

Real-world clinical utility and impact on clinical decision-making of coronary computed tomography angiography-derived fractional flow reserve: lessons from the ADVANCE Registry. Fairbairn TA, Nieman K, Akasaka T, Nørgaard BL, Berman DS, Raff G, Hurwitz-Koweek LM, Pontone G, Kawasaki T, Sand NP, Jensen JM, Amano T, Poon M, Øvrehus K, Sonck J, Rabbat M, Mullen S, De Bruyne B, Rogers C, Matsuo H, Bax JJ, Leipsic J, Patel MR. *Eur Heart J*. 2018 Nov 1;39(41):3701-3711.

18F-fluorodeoxyglucose positron emission/computed tomography and computed tomography angiography in prosthetic heart valve endocarditis: from guidelines to clinical practice. Swart LE, Scholtens AM, Tanis W, Nieman K, Bogers AJJC, Verzijlbergen FJ, Krestin GP, Roos-Hesselink JW, Budde RPJ. *Eur Heart J*. 2018 Nov 1;39(41):3739-3749.

Comprehensive Cardiac CT With Myocardial Perfusion Imaging Versus Functional Testing in Suspected Coronary Artery Disease: The Multicenter, Randomized CRESCENT-II Trial. Lubbers M, Coenen A, Kofflard M, Bruning T, Kietselaer B, Galema T, Kock M, Niezen A, Das M, van Gent M, van den Bos EJ, van Woerkens L, Musters P, Kooij S, Nous F, Budde R, Hunink M, Nieman K. *JACC Cardiovasc Imaging*. 2018 Nov;11(11):1625-1636.

Iodixanol versus Iopromide at Coronary CT Angiography: Lumen Opacification and Effect on Heart Rhythm-the Randomized IsoCOR Trial. Lubbers MM, Kock M, Niezen A, Galema T, Kofflard M, Bruning T, Kooij HS, van Valen H, Dijkshoorn M, Booij R, Padmos A, Vogels A, Budde RPJ, Nieman K. *Radiology*. 2018 Jan;286(1):71-80.



Latha Palaniappan, MD, MS

Professor of Medicine - General Medical Disciplines

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EDUCATION/TRAINING

INTERNSHIP & RESIDENCY Kaiser Foundation Hospital, CA

MD University of Michigan School of Medicine MI

BOARD CERTIFICATION Internal Medicine, American Board of Internal Medicine

MS Stanford University, Epidemiology

BA University of Michigan

CLINICAL FOCUS

Internal Medicine

HONORS & AWARDS

"Top Physician", Consumers Research Council of America

Fellow, American College of Physicians

Fellow, American College of Cardiology

Healthcare Hero Award, Silicon Valley Business Journal

CURRENT RESEARCH

My work focuses on the study of diverse populations, chronic disease, and prevention. My group specifically seeks to address the gap in knowledge of health in Asian subgroups and other understudied racial/ethnic minorities (PACS 5R01DK081371, CASPER R01HL126172, and CAUSES R01MD007012). I co-founded (with Dr. Bryant Lin) the Center for Asian Health Research and Education (CARE) at Stanford in 2018. My current work examines the clinical effectiveness of structured physical activity programs for diabetes management (Initiate and Maintain Physical Activity in Clinics - IMPACT, 5R18DK096394), as well as best exercise regimens for normal-weight diabetics (Strength Training Regimen for Normal Weight Diabetics - STRONG-D, 2R01DK081371). I implement evidence based genetic and pharmacogenetic testing in Primary Care Clinics as the Scientific Director of Precision Genomics and Pharmacogenomics in Primary Care. I am the faculty lead of the Precision Health Biobank at Stanford, a population based biobank designed to accelerate genetic and other -omics discovery.

SELECTED PUBLICATIONS

Socioeconomic Differences in the Epidemiologic Transition From Heart Disease to Cancer as the Leading Cause of Death in the United States, 2003 to 2015: An Observational Study. Hastings KG, Boothroyd DB, Kappahn K, Hu J, Rehkopf DH, Cullen MR, Palaniappan L. *Ann Intern Med.* 2018 Nov 13.

Evaluating the clinical implementation of structured exercise: A randomized controlled trial among non-insulin dependent type II diabetics. Contemporary clinical trials. Dpm, L. F., Wong, M., Bonde, S., Wong, C. W., Walai, K., West, W., Goni, D. T., Araya, S., Azamey, S., Nacif-Coelho, C., Raghuram, S. S., Vera, K., Mittal, A., Cde, L. G., Christensen, M., Johannsen, N., Haddad, F., Moharir, M., Palaniappan, L. *Contemp Clin Trials.* 2018 Nov;74:25-31.

Public health and health systems: implications for the prevention and management of type 2 diabetes in south Asia. Hills AP, Misra A, Gill JMR, Byrne NM, Soares MJ, Ramachandran A, Palaniappan L, Street SJ, Jayawardena R, Khunti K, Arena R. *Lancet Diabetes Endocrinol.* 2018 Dec;6(12):992-1002. doi: 10.1016/S2213-8587(18)30203-1.

Clinical and Personal Utility of Genetic Risk Testing. David SP, Palaniappan L. *Am Fam Physician.* 2018 May 1;97(9):600-602.

Leading Causes of Death among Asian American Subgroups (2003-2011). Hastings, K. G., Jose, P. O., Kappahn, K. I., Frank, A. T., Goldstein, B. A., Thompson, C. A., Eggleston, K., Cullen, M. R., Palaniappan, LP; *PLOS One*; 2015; 10 (4).



Marco V. Perez, MD

Assistant Professor, Medicine - Cardiovascular Medicine

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WEB familyheart.stanford.edu

CURRENT RESEARCH

Dr. Marco Perez's research goal is to better understand the fundamental causes of cardiovascular disease through the study of genetics and epidemiology. His group studies the genetic variations and environmental exposures that are associated with conditions such as atrial fibrillation and heart failure. He has led the studies of atrial fibrillation in Women's Health Initiative, one of the largest nation-wide population-based cohorts. He is currently conducting a large study monitoring for silent or asymptomatic atrial fibrillation in women from the WHI randomized to exercise intervention, and is co-PI in the Apple Heart Study, a clinical trial using the Apple Watch to screen for atrial fibrillation. He is interested in understanding the paradox that atrial fibrillation is less common in African Americans and Hispanics, despite a greater burden of risk factors such as hypertension. As director of the Stanford Inherited Arrhythmia Clinic, he evaluates families with rare inherited arrhythmias associated with sudden death such as Long QT and Brugada Syndromes and explores their links with novel genes. He is particularly interested in studying the genetic causes of very early onset atrial fibrillation. He also studies how best to use the electrocardiogram to identify patients at risk for atrial fibrillation and athletes at risk for life-threatening arrhythmias due to conditions such as hypertrophic cardiomyopathy. His genetic studies have led to the discovery of promising novel therapeutic targets that his group is now studying at a functional level.

SELECTED PUBLICATIONS

Incident Atrial Fibrillation is Associated with MYH7 Sarcomeric Gene Variation in Hypertrophic Cardiomyopathy. Seung-Pyo Lee, MD, PhD, Euan A. Ashley MRCP, DPhil, Colleen Caleshu, MS, Eric M. Green, MD, PhD, Daniel Jacoby, MD, Steve D. Colan, MD, Alexandre Pereira, MD, Sharlene M. Day, MD, Francesca Girolami, BSc, Iacopo Olivetto, MD, Michelle Michels, MD, PhD, Carolyn Y. Ho, Marco V. Perez, MD, *Circulation Heart Failure* 2018; Sep;11(9).

Rationale and design of a large-scale app-based study to identify cardiac arrhythmias using a smartwatch: The Apple Heart Study. Mintu P. Turakhia MD MAS, Manisha Desai PhD, Haley Hedlin PhD, Amol Rajmane MD MBA, Nisha Talati MBA, Todd Ferris MD MS, Sumbul Desai MD, Divya Nag, Mithun Patel MD, Peter Kowey MD, John S. Rumsfeld MD PhD, Andrea M. Russo MD, Mellanie True Hills1, Christopher B. Granger MD, Kenneth W. Mahaffey MD, Marco V. Perez MD. *American Heart Journal* 2019 Jan;207:66-75.

Large Q and S waves in Lead III on the Electrocardiogram Distinguish Patients with Hypertrophic Cardiomyopathy from Athletes. Alvin S. Chen, MD, Rachel E. Bent, BA, Matthew T. Wheeler, MD, PhD, Joshua W. Knowles, MD, PhD, Francois Haddad, MD, Victor Froelicher, MD, Euan Ashley, MRCP, DPhil, and Marco V. Perez, MD. *Heart* Nov;104(22):1871-1877.

Large-scale analyses of common and rare variants identify 12 new loci associated with atrial fibrillation. Ingrid E Christophersen, Michiel Rienstra, Carolina Roselli, Xiaoyan Yin, Bastiaan Geelhoed, John Barnard, Dan E Arking...Marco Perez...Susan R Heckbert, Emelia J Benjamin, Toshihiro Tanaka, Kathryn L Lunetta, Steven A Lubitz & Patrick T Ellinor (150 authors). *Nature Genetics* 2017 Jun;49(6):946-952.

EDUCATION/TRAINING

MD Harvard University

RESIDENCY & INTERNSHIP

Massachusetts General Hospital

FELLOWSHIP Stanford University

BOARD CERTIFICATION

American Board of Internal Medicine (ABIM), Cardiovascular Disease,

HONORS & AWARDS

NIH/NHLBI 1R01HL136390-01 (PI)

Apple Heart Study, Apple Inc. (Co-PI)

NIH/NHLBI HHSN268201100003C (Co-I)

Weston Havens Foundation Grant (PI)



Ada Poon, PhD

Associate Professor, Electrical Engineering

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WEB biosystems.stanford.edu

EDUCATION/TRAINING

PHD UC Berkeley

HONORS & AWARDS

CURRENT RESEARCH

Our research focuses on providing theoretical foundations and engineering innovations for realizing microelectronics that seamlessly integrate with the body. Such systems will allow precise recording or perturbation of physiological processes for advancing basic scientific discovery, and restoring or augmenting biological functions for clinical applications. Although microelectronics can be made extremely small, existing methods for powering them involve large batteries or energy harvesting modules. The size of these powering components severely constrains the integration of microelectronics in living systems. The main thrust of our research aims to address these obstacles through fundamental understanding of power transfer physics with advances in low-power integrated circuits in order to demonstrate the injection of fully operational sensors, electrodes, light sources, and other electronics deep inside the body. An array of these tiny probes enables measurement or perturbation of physiological parameters in previously inaccessible locations and over long time periods.

Angels can fly because they take themselves lightly.
— G.K. Chesterton

SELECTED PUBLICATIONS

Wirelessly powering miniature implants for optogenetic stimulation. Yeh AJ, Ho JS, Tanabe Y, Neofytou E, Beygui RE, Poon ASY. *Appl Phys Lett*. 2013; 103: 163701.

Midfield wireless powering of subwavelength autonomous devices. Kim S, Ho JS, Poon ASY. *Phys Rev Lett*. 2013; 110: 203905.

Midfield wireless powering for implantable systems. Ho JS, Kim S, Poon ASY. *Proc IEEE*. 2013; 101(6): 1369-78.

Wireless power transfer to a cardiac implant. Kim S, Ho JS, Chen LY, Poon ASY. *Appl Phys Lett*. 2012; 101: 073701.

A mm-sized wirelessly powered and remotely controlled locomotive implantable device. Yakovlev A, Pivonka D, Meng TH, Poon ASY. *Proc IEEE Intl Solid-State Circuits Conf. (ISSCC)* 2012; 302-4.



Stephen Quake, PhD

Lee Otterson Professor in the School of Engineering
and Professor of Bioengineering, Applied Physics, and (by courtesy), of Physics

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DIVISION cvmedicine.stanford.edu

LAB quakelab.stanford.edu

EDUCATION/TRAINING

PHD University of Oxford

HONORS & AWARDS

R29 "FIRST" Award, NIH (1997)

Career Award, NSF (1997)

Packard Fellow, Packard Foundation (1999)

Participant, NAS Symposium for Frontiers in Science (1999, 2000)

100 Young Innovators that will create the future, MIT Tech Review Magazine (2002)

CURRENT RESEARCH

Professor Quake's interests lie at the nexus of physics, biology and biotechnology. His group pioneered the development of Microfluidic Large Scale Integration (mLSI), demonstrating the first integrated microfluidic devices with thousands of mechanical valves. This technology is helping to pave the way for large scale automation of biology at the nanoliter scale, and he and his students have been exploring applications of lab-on-a-chip technology in functional genomics, genetic analysis, and structural biology. Professor Quake is also active in the field of single molecule biophysics.

SELECTED PUBLICATIONS

Role of epithelial to mesenchymal transition associated genes in mammary gland regeneration and breast tumorigenesis. Sikandar SS, Kuo AH, Kalisky T, Cai S, Zabala M, Hsieh RW, Lobo NA, Scheeren FA, Sim S, Qian D, Dirbas FM, Somlo G, Quake SR, Clarke MF. *Nat Commun*. 2017 Nov 21;8(1):1669.

Classifying *Drosophila* olfactory projection neuron subtypes by single-cell RNA sequencing. Li H, Horns F, Wu B, Xie Q, Li J, Li T, Luginbuhl DJ, Quake SR, Luo L. *Cell*. 2017 Nov 16;171(5):1206-1220.e22

T cell receptor sequencing of early-stage breast cancer tumors identifies altered clonal structure of the T cell repertoire. Beausang JF, Wheeler AJ, Chan NH, Hanft VR, Dirbas FM, Jeffrey SS, Quake SR. *Proc Natl Acad Sci USA*. 2017 Nov 14.

Noninvasive prenatal diagnosis of single-gene disorders by use of droplet digital PCR. Camunas-Soler J, Lee H, Hudgins L, Hintz SR, Blumenfeld YJ, El-Sayed YY, Quake SR. *Clin Chem*. 2017 Nov 2.

Single-cell RNA-Seq analysis of infiltrating neoplastic cells at the migrating front of human glioblastoma. Darmanis S, Sloan SA, Croote D, Mignardi M, Chernikova S, Samghabadi P, Zhang Y, Neff N, Kowarsky M, Caneda C, Li G, Chang SD, Connolly ID, Li Y, Barres BA, Gephart MH, Quake SR. *Cell Rep*. 2017 Oct 31;21(5):1399-1410.

Single-cell transcriptional dynamics of flavivirus infection. Zanini F, Pu Szu-Yuan, Bekerman E, Einav S, Quake SR. *Posted to Biorxiv* on Oct. 14, 2017.



Thomas Quertermous, MD

William G. Irwin Professor in Cardiovascular Medicine
Chief (Research), Division of Cardiovascular Medicine

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EDUCATION/TRAINING

MD University of Chicago

MEDICINE RESIDENCY & INTERNSHIP

University of Chicago

CARDIOLOGY FELLOWSHIP

Massachusetts General Hospital

RESEARCH FELLOWSHIP

Harvard Medical School

BOARD CERTIFICATION

Cardiology, ABIM

HONORS & AWARDS

ESTABLISHED INVESTIGATOR

American Heart Association

Pfizer New Faculty Award

University of Chicago Distinguished
Service Award

MD Degree with honors

FORMER HJ MORGAN CHAIR IN

MEDICINE Vanderbilt University

FORMER DIRECTOR

Donald W. Reynolds Cardiovascular
Clinical Research Center

MEMBER

American Society for Clinical
Investigation (Young Turks); Association
of University Cardiologists

WILLIAM G. IRWIN CHAIR IN MEDICINE

Stanford University

CURRENT RESEARCH

My laboratory is interested in the molecular mechanisms that mediate vascular disease pathophysiology and the risk for these diseases. The approach is primarily genetic, using human cohorts and large scale genome wide studies to identify genes that associate with disease and risk, and molecular genetic studies to define the mechanisms of these associations. At the human level, we collaborate with a number of centers around the world through the CARDIoGRAM+ C4D consortium to further identify coronary heart disease loci, and our group serves as the organizing center searching for loci that associate with gold standard measures of insulin sensitivity, the GENESIS study. For loci identified through these studies, we work to identify mechanisms by which causal variation is responsible for altered gene structure or function, and employ cellular and genetic mouse models to identify how encoded factors participate in the disease process.

When not working on disease genes, I enjoy
listening to blues music.

SELECTED PUBLICATIONS

Integrative functional genomics identifies regulatory mechanisms at coronary artery disease loci. Miller CL, Milos Pjanic M, Wang T, Nguyen T, Cohain A, Lee JD, Perisic L, Hedin U, Kundu RK, Majmudar D, Kim JB, Wang O, Betsholtz C, Ruusalepp A, Franzén O, Assimes TL, Montgomery SB, Schadt EE, Björkegren JLM, Quertermous T. *Nat Commun*, 2016;7:12092.

Coronary artery disease genes SMAD3 and TCF21 promote opposing interactive genetic programs that regulate smooth muscle cell differentiation and disease risk. Iyer D, Zhao Q, Wirka R, Naravane A, Nguyen T, Liu B, Nagao M, Cheng P, Miller CL, Kim JB, Pjanic M, Quertermous T. *PLOS Genetics*, 2018; 201;14:e1007681.

Genetic Regulatory Mechanisms of Smooth Muscle Cells Map to Coronary Artery Disease Risk Loci. Liu B, Pjanic M, Wang T, Nguyen T, Gloudemans M, Rao A, Castano VG, Nurnberg S, Rader DJ, Elwyn S, Ingelsson E, Montgomery SB, Miller CL, Quertermous T. *Am J Hum Genet*. 2018 Sep 6;103(3):377-388



Marlene Rabinovitch, MD

Endowed Chair, Dwight and Vera Dunlevie Professorship in Pediatric Cardiology
Director, Basic Science and Engineering Initiative, Stanford Children's Health
Betty Irene Moore Children's Heart Center

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CURRENT RESEARCH

We investigate mechanisms leading to pulmonary arterial hypertension (PAH) with the view that we might better treat this devastating condition that has no cure except for lung transplantation. We discovered relationships between degradation of elastin by an endogenous elastase, loss of pre-capillary vessels, and proliferation of vascular cells and showed that suppression of elastase activity could reverse experimentally-induced PAH; we are now embarking on a translational project to bring elastase inhibitors into the clinic. We focus on inflammation and autoimmunity in PAH. CyToF and multiple high throughput approaches are applied in immunophenotyping patients and experimental models of PAH. In addition, we investigate the use of induced pluripotent stem cells to understand the genetic and epigenetic factors that cause PAH. We recently discovered molecular pathways downstream of bone morphogenetic protein receptor (BMPR)2 explaining how activation of this receptor protects EC from apoptosis preventing obliteration and loss of pre-capillary arteries and attenuates proliferation of SMC and fibroblasts. Using human cells and genetically modified mice, we elucidate interactions between BMPR2 signaling and PPAR γ mediated gene regulation. We relate mutant BMPR2 to heightened GM-CSF mediated macrophage recruitment, and PPAR γ to DNA damage/repair mechanisms and preservation of mitochondrial function.

The patient with pulmonary hypertension still mystifies even the most astute of physicians.

SELECTED PUBLICATIONS

BMPR2 Preserves Mitochondrial Function and DNA Integrity During Reoxygenation to Promote Endothelial Survival and Reverse Pulmonary Hypertension. Diebold I, Hennigs JK, Miyagawa K, Li CG, Nickel NP, Kaschwich M, Cao A, Wang L, Reddy S, Chen P-I, Nakahira K, Alejandro Alcazar MA, Hopper RK, Ji L, Feldman BJ, Rabinovitch M. *Cell Metab* 2015 Apr 7;21(4):596-608.

Patient-Specific iPSC Derived Endothelial Cells Uncover Pathways that Protect Against Pulmonary Hypertension in BMPR2 Mutation Carriers. Gu M, Shao N-Y, Silin Sa S, Li D, Termglinchan V, Ameen M, Karakikes I, Sosa G, Grubert F, Lee J, Cao A, Taylor S, Ma Y, Zhao Z, Chappell J, Hamid R, Austin ED, Gold JD, Wu JC, Snyder MP, Rabinovitch M. *Cell Stem Cell*. 2017 Apr 6;20(4):490-504.

Smooth Muscle Contact Drives Endothelial Regeneration by BMPR2-Notch1 Mediated Metabolic and Epigenetic Changes. Miyagawa K, Shi, Chen P-I, Hennigs JK, Zhao Z, Wang M, Li CG, Saito T, Taylor S, Sa S, Cao A, Wang L, Snyder MP, Rabinovitch M. *Circulation Research* 2019.

EDUCATION/TRAINING

MD McGill University

PEDIATRICS RESIDENCY & INTERNSHIP
University of Colorado

PEDIATRIC CARDIOLOGY FELLOWSHIP
Baylor College of Medicine

PEDIATRIC CARDIOLOGY FELLOWSHIP
Harvard Medical School

PEDIATRIC CARDIOLOGY RESEARCH FELLOWSHIP Harvard Medical School

BOARD CERTIFICATION
General Pediatrics, ABP
Pediatric Cardiology, ABP

CLINICAL FOCUS

Pulmonary Hypertension, Pulmonary Vascular Diseases, Vascular Biology
Congenital Heart Disease

HONORS & AWARDS

The American Heart Association
Distinguished Scientist Lecturer

Robert F. Grover Prize, Assembly on Pulmonary Circulation, American Thoracic Society

J. Burns Amberson Lecturer

American Heart Association (AHA) Basic Research Prize

AHA Distinguished Scientist Award

ATS, Recognition Award for Scientific Accomplishment

Louis and Artur Lucian Award for Research in Circulatory Diseases

SCIENTIFIC ADVISORY BOARD

Children's Discovery Institute,
Washington Univ; NHLBI Lung Repair and Regeneration Cons; Max Planck Institute for Heart and Lung Research



Jayakumar Rajadas, PhD

Founding Director, Biomaterials and Advanced Drug Delivery Laboratory
Assistant Director, Cardiovascular Pharmacology, Stanford CVI
Adjunct Full Professor, UCSF

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EDUCATION/TRAINING

PHD Indian Institute of Technology

HONORS & AWARDS

YOUNG INVESTIGATOR AWARDS

Young Scientist Award in Chemistry,
Council of Scientific and Industrial
Research, India

TANSA Award, Government of Tamil
Nadu, India

VISITING SCIENTIST

CNRS - National Centre for Scientific
Research, France; ETH Zurich;

National Institute on Aging (NIA), NIH

CONSULTING PROFESSOR

Department of Chemical Engineering,
Stanford University

VISITING PROFESSOR (STANFORD UNIVERSITY)

Department of Biological Sciences;
Department of Chemical Engineering;
Department of Psychiatry

STEERING COMMITTEE MEMBER

Stanford Cardiovascular Institute

FORMER FOUNDING CHAIR (INDIA)

Bioorganic and Neurochemistry
Laboratory, CLRI, Council of Scientific
and Industrial Research

ADJUNCT FULL PROFESSOR (UCSF)

Department of Bioengineering and
Therapeutic Sciences
School of Pharmacy, University of
California San Francisco

CURRENT RESEARCH

My research oversees the application of various technologies in a research domain aimed at the development of novel formulations and therapeutics and inventing targeted drug delivery systems. For the past 20 years, I have been studying how protein aggregation in cardiomyocytes and neurons affects their functions. I have shown that misfolded protein accumulation is involved in the dysregulation of calcium homeostasis and cellular function. Recently, I discovered that the misfolding stress is initiated by phospho-Tau in the brain could affect the heart function with compromised brain perfusion. We have shown apelin therapy could recover the heart function significantly using the mutant human tau -expressing PS19 mouse model. In addition, I have used biophysical and pharmacological approaches to identify optimal microenvironments in which implanted cardiomyocytes to repair injured hearts.

Somewhere, something incredible is waiting to be
known — Blaise Pascal

SELECTED PUBLICATIONS

Transdermal deferroxamine prevents pressure-induced diabetic ulcers. Duscher D, Neofytou E, Wong VW, Maan ZN, Rennert RC, Inayathullah M, Januszyk M, Rodrigues M, Malkovskiy AV, Whitmore AJ, Walmsley GG, Galvez MG, Whittam AJ, Brownlee M, Rajadas J*, Gurtner GC*. *Proc Natl Acad Sci USA*. 2015, 112(1):94-99.

[Pyr1]-Apelin-13 delivery via nano-liposomal encapsulation attenuates pressure overload-induced cardiac dysfunction. Serpooshan V, Sivanesan S, Huang X, Mahmoudi M, Malkovskiy AV, Zhao M, Inayathullah M, Wagh D, Zhang XJ, Metzler S, Bernstein D, Wu JC, Ruiz-Lozano P, Rajadas J*, *Biomaterials*, 2015, 37:289-98.

A Thermo-sensitive Delivery Platform for Topical Administration of Inflammatory Bowel Disease Therapies. Sidhartha R. Sinha*, Linh P. Nguyen, Mohammed Inayathullah, Andrey Malkovskiy, Frezghi Habte, Jayakumar Rajadas*, Aida Habtezion*. *Gastroenterology*. 2015, 149: 52–55.

Prolonged survival of transplanted stem cells after ischemic injury via the slow release of pro-survival peptide analogs crosslinked to an injectable collagen matrix. Lee AS, Inayathullah M, Lijkwan MA, Zhao X, Park WSS, Hong WX, Parekh MB, Malkovskiy AV, Lau E, Qin X, Pothineni VR, Sanchez-Freire V, Zhang WY, Kooreman N, Ebert AD, Chan CK, Nguyen PK*, JRajadas J*, Wu JC*. *Nature Biomedical Engineering*, 2018 (In press).

Endothelial APLNR regulates tissue fatty acid uptake and is essential for apelin's glucose-lowering effects. Hwangbo C, Wu J, Papangeli I, Adachi T, Sharma B, Park S, Zhao L, Ju H, Go GW, Cui G, Inayathullah M, Job JK, Rajadas J, Kwei SL, Li MO, Morrison AR, Quertermous T, Mani A, Red-Horse K, Chun HJ. *Sci Transl Med*. 2017 Sep 13;9(407).



Kristy Red-Horse, PhD

Assistant Professor, Department of Biology

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EDUCATION/TRAINING

PHD University of California, San Francisco

POSTDOCTORAL TRAINING
Genentech, Inc.

POSTDOCTORAL TRAINING
Stanford University

HONORS & AWARDS

Searle Scholar 2013–2016

New York Stem Cell Foundation
Robertson Investigator 2015–2020

CURRENT RESEARCH

My laboratory uses cardiovascular development as a model to study the signals that instruct cell fate and guide morphogenesis during organ formation in the mammalian embryo. Our current focus is to fate-map the different cellular sources that give rise to the coronary arteries of the heart and to identify the molecules that direct their migration and differentiation. Our long-term goal is to use this information to better understand and treat cardiovascular diseases.

SELECTED PUBLICATIONS

DACH1 stimulates shear stress guided endothelial cell migration and coronary artery growth through the CXCL12-CXCR4 signaling axis. Andrew H. Chang, Brian C. Raftrey, Gaetano D'Amato, Vinay N. Surya, Aruna Poduri, Heidi I. Chen, Andrew B. Goldstone, Joseph Woo, Gerald G. Fuller, Alexander R. Dunn, and Kristy Red-Horse. (2017) *Genes and Development*, 31:1308-1324.

Alternative progenitor cells compensate to rebuild the coronary vasculature in Apj- and Elabela-deficient hearts. Bikram Sharma, Lena Ho, Heidi I. Chen, Andrew B. Goldstone, Y. Joseph Woo, Thomas Quertermous, Bruno Reversade, and Kristy Red-Horse. (2017) *Developmental Cell*, Sep 25;42(6):655-666

Endothelial cells respond to the direction of mechanical stimuli through SMAD signaling to regulate coronary artery size. Aruna Poduri, Andrew H Chang, Brian Raftrey, Mike Van, Kristy Red-Horse. *Development*, Sep 15;144(18):3241-3252.

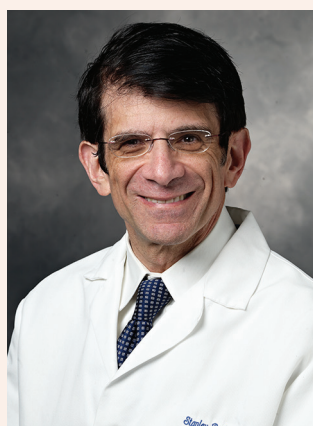
Cellular Plasticity in cardiovascular development and disease. Das S, Red-Horse K. (2017) *Dev Dyn*. Jan 18

Coronary Artery Development: Progenitor Cells and Differentiation Pathways. Sharma B, Chang A, Red-Horse K. (2016) *Annu Rev Physiol*. Dec 9.

Pericytes are epicardial-derived intermediate progenitors for coronary artery smooth muscle. Volz, K, Chen, H, Poduri, A, McKay, A, Jacobs, A, Kofler, N, Kitajewski, J, Weissman, I, and Red-Horse, K. (2015) *eLife*. Oct: 19(4).

The sinus venosus contributes to coronary vasculature through VEGFC-stimulated angiogenesis. Chen HI, Sharma B, Akerberg BN, Numi HJ, Kivelä R, Saharinen P, Aghajanian H, McKay AS, Bogard PE, Chang AH, Jacobs AH, Epstein JA, Stankunas K, Alitalo K, Red-Horse K. *Development*. 2014 Dec;141(23):4500-12.

VEGF-C and aortic cardiomyocytes guide coronary artery stem development. Chen HI, Poduri A, Numi H, Kivela R, Saharinen P, McKay AS, Raftrey B, Churko J, Tian X, Zhou B, Wu JC, Alitalo K, Red-Horse K. *J Clin Invest*. 2014 Nov 3;124(11):4899-914.



Stanley G. Rockson, MD

Allan and Tina Neill Professor of Lymphatic Research
and Medicine Chief of Consultative Cardiology
Director, Stanford Center for Lymphatic and Venous Disorders

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CENTER stanfordhospital.org/cardiovascularhealth/lymphaticvenous

EDUCATION/TRAINING

MD Duke University

MEDICINE RESIDENCY & INTERNSHIP

Harvard University

CARDIOLOGY FELLOWSHIP

Harvard University

BOARD CERTIFICATION

Internal Medicine, ABIM

Cardiovascular Disease, ABIM

CLINICAL FOCUS

Lymphatic and Venous Disease

Peripheral Vascular Disease

Consultative Cardiology

HONORS & AWARDS

Morris and Caroline Barkon Lecture,
University of Pittsburgh

Pioneer Award, Lymphatic Research
Foundation

E. William Hancock Cardiovascular
Medicine Teaching Award, Stanford
University

Franklin G. Ebaugh Jr. Award for
Mentoring Medical Students, Stanford
University

CHAIR, SCIENTIFIC ADVISORY

COMMITTEE Lymphatic Research
Foundation

FELLOW

American College of Cardiology;

American College of Angiology;

American College of Physicians; Society
of Vascular Medicine and Biology

CURRENT RESEARCH

I have devoted the last fifteen years of my career to the clinical and translational investigation of lymphatic vascular disease. More specifically, my laboratory and clinical research team focus on: biomarker identification and validation in lymphatic vascular disease; applications of therapeutic lymphangiogenesis; drug therapies for acquired lymphedema; and pharmacologic prevention of cancer-induced lymphedema. Having studied and characterized lymphatic vascular disease in small animal models, we are increasingly attempting to apply these insights to the human clinical problem of lymphedema. In 1995, I co-founded, and currently direct, the Stanford Center for Lymphatic and Venous Disorders, a specialized center for the diagnostic evaluation and focused therapy of lymphedema and allied diseases.

I agree with Woody Allen: “I don't want to achieve immortality through my work. I want to achieve it by not dying.”

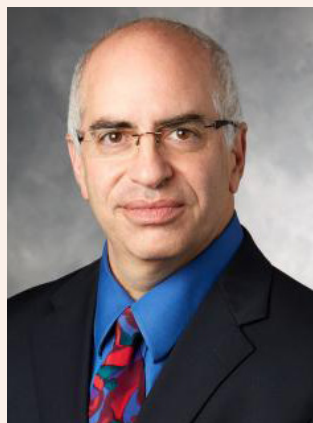
SELECTED PUBLICATIONS

Lymphedema after Breast Cancer Treatment. Rockson SG. *N Engl J Med.* 2018; 379(20):1937-1944.

Pilot studies demonstrate the potential benefits of anti-inflammatory therapy in human lymphedema. Rockson SG, Tian W, Jiang X, Kuznetsova T, Haddad F, Zampell J, Mehrara B, Sampson JP, Roche L, Kim J, Nicolls MR. *JCI Insight.* 2018; 3(20). pii: 123775. [Epub ahead of print]

Lymphatic Dysfunction, Leukotrienes, and Lymphedema. Jiang X, Nicolls MR, Tian W, Rockson SG. *Annu Rev Physiol.* 2018; 80:49-70.

Regulatory T Cells Mediate Local Immunosuppression in Lymphedema. García Nores GD, Ly CL, Savetsky IL, Kataru RP, Ghanta S, Hespe GE, Rockson SG, Mehrara BJ. *J Invest Dermatol.* 2018; 138(2):325-335.



David Rosenthal, MD

Professor of Pediatrics (Pediatric Cardiology)

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EDUCATION/TRAINING

MD Albert Einstein College of Medicine

INTERNSHIP Columbia Presbyterian Medical Center

RESIDENCY Columbia Presbyterian Medical Center

FELLOWSHIP Yale School of Medicine

BOARD CERTIFICATION
Pediatric Cardiology (ABP)

CLINICAL FOCUS

Pediatric Cardiology
Cardiology (Heart)
Pediatric Heart Failure
Heart Transplantation
Cardiomyopathies
Ventricular Assist Devices

CURRENT RESEARCH

As director of the PACT program for pediatric heart failure and transplantation at Lucile Packard Children's Hospital and Stanford University, I am primarily interested in improving clinical care for children with heart failure and heart transplantation. This includes improving survival and functional outcomes of children treated with mechanical circulatory support; and improved utilization of heart donors. We are actively involved in the creation of a national learning network to share, develop and disseminate best practices in this field as a way of complementing traditional research activities.

SELECTED PUBLICATIONS

Temporary Circulatory Support in U.S. Children Awaiting Heart Transplantation. Yarlagadda VV, Maeda K, Zhang Y, Chen S, Dykes JC, Gowen MA, Shuttleworth P, Murray JM, Shin AY, Reinhartz O, Rosenthal DN, McElhinney DB, Almond CS. *J Am Coll Cardiol*. 2017 Oct 31;70(18):2250-2260.

Impact of a modified anti-thrombotic guideline on stroke in children supported with a pediatric ventricular assist device. Rosenthal DN, Lancaster CA, McElhinney DB, Chen S, Stein M, Lin A, Doan L, Murray JM, Gowen MA, Maeda K, Reinhartz O, Almond CS. *J Heart Lung Transplant*. 2017 Nov;36(11):1250-1257.

Rehospitalization after pediatric heart transplantation: Incidence, indications, and outcomes. Hollander SA, McElhinney DB, Almond CS, McDonald N, Chen S, Kaufman BD, Bernstein D, Rosenthal DN. *Pediatr Transplant*. 2017 Feb;21(1).



Stephen J. Roth, MD, MPH

Professor, Pediatrics

Chief, Division of Pediatric Cardiology, Lucile Packard Children's Hospital

Interim Chief, Pediatric Critical Care, Lucile Packard Children's Hospital

Director, The Children's Heart Center, Lucile Packard Children's Hospital

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DEPARTMENT pedcard.stanford.edu

EDUCATION/TRAINING

MD Yale University

MPH Harvard School of Public Health

MEDICINE RESIDENCY & INTERNSHIP

Boston Children's Hospital

PEDIATRIC CARDIOLOGY FELLOWSHIP

Boston Children's Hospital

RESEARCH FELLOWSHIP

Harvard Medical School

BOARD CERTIFICATION

Pediatric Cardiology, ABP

CLINICAL FOCUS

Pediatric Cardiology

Pediatric Cardiac Intensive Care

HONORS & AWARDS

Clinical Investigator Development Award, NIH

PRESIDENT

Western Society of Pediatric Cardiology (2016-18)

BOARD OF DIRECTORS

Pediatric Cardiac Intensive Care Society (2009-12, 2013-16)

FORMER STEERING COMMITTEE

MEMBER

Pediatric Heart Network, NIH

MEMBER

Cardiovascular Development Clinical and Translational Committee, American Heart Association

CURRENT RESEARCH

My clinical and translational research interests focus on improving the outcomes of newborns, infants, and children following cardiopulmonary bypass surgery for congenital heart defects. Mortality for these patients is fortunately now low, but morbidity related to prolonged ICU stay persists and can have a lifelong impact on neurologic development and functional outcomes.

It is estimated that there are now 2 million people living in the United States with congenital heart disease. More than half of these individuals are now adults. This represents both great success in treating congenital heart disease in children as well as a major challenge for cardiovascular health care providers and the institutions caring for adult survivors.

SELECTED PUBLICATIONS

A Double-Blinded, Randomized, Placebo-Controlled Clinical Trial of Aminophylline to Prevent Acute Kidney Injury in Children Following Congenital Heart Surgery With Cardiopulmonary Bypass. Axelrod DM, Sutherland SM, Anglemeyer A, Grimm PC, Roth SJ; *Pediatr Crit Care Med*; 2016; Feb; 17 (2): 135-43.

Association of presence and timing of invasive airway placement with outcomes after pediatric in-hospital cardiac arrest. Gupta P, Rettiganti M, Gossett JM, Kuo K, Chow V, Dao DT, Roth SJ; *Resuscitation*; 2015; Jul; 92: 53-8.

Task Force 5: Pediatric Cardiology Fellowship Training in Critical Care Cardiology. Feltes TF, Roth SJ, Almodovar MC, Andropoulos DB, Bohn DJ, Costello JM, Gajarski RJ, Mott AR, Koenig P; Society of Pediatric Cardiology Training Program Directors.; American College of Cardiology.; American Academy of Pediatrics; American Heart Association; *Circulation*; 2015; Aug 11; 132 (6): e81-90.

Utility of clinical biomarkers to predict central line-associated bloodstream infections after congenital heart surgery. Shin AY, Jin B, Hao S, Hu Z, Sutherland S, McCammond A, Axelrod D, Sharek P, Roth SJ, Ling XB. *Pediatr Infect Dis J*.; 2015; Mar; 34 (3): 251-4.



Ingela Schnittger, MD

Professor, Medicine - Cardiovascular Medicine
 Medical Director, Stanford Echocardiography Laboratory
 Chief of Academic Affairs & Associate Chief, Division of Cardiovascular Medicine

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EDUCATION/TRAINING

MD Karolinska Institute, Sweden

INTERNSHIP Seraphimer Hospital, Sweden

FELLOWSHIP Stanford University

RESIDENCY Seraphimer Hospital, Sweden; University of Connecticut Health Center; Stanford University

FELLOWSHIP (2nd) Stanford University

The American Board of Internal Medicine, Internal Medicine, ABIM (1980 - present)

The American Board of Internal Medicine, Cardiovascular Disease, ABIM (1983 - present)

North American Society of Pacing & Electrophysiology, Cardiac Pacing, NASPE (1988 - present)

Special Competence in Echocardiography Exam [ASEeXAM], Echo (1998 - present)

Recertification Examination of Special Competence in Adult Echocardiography, Echo (2018-present)

CLINICAL FOCUS

Cardiovascular disease

Coronary artery myocardial bridge

Echocardiography

CURRENT RESEARCH

My main research continues to be in the field of echocardiography. Several areas of research are currently being pursued: 1) Coronary artery myocardial bridge; anatomic, physiologic and hemodynamic assessment. Clinical manifestations and treatment. 2) Exercise/stress echocardiography. 3) Echocardiographic evaluation of Cardiac structures and function.

Our team wants to spread the word, to educate the medical community that myocardial bridge is a real thing.

SELECTED PUBLICATIONS

Surgical un-roofing of hemodynamically significant myocardial bridges in a pediatric population. Maeda K, Schnittger I, Murphy DJ, Tremmel JA, Boyd JH, Peng L, Okada K, Pargaonkar VS, Hanley FL, Mitchell RS, Rogers IS. *J Thorac Cardiovasc Surg.* 2018 Oct;156(4):1618-1626.

Myocardial Bridges on Coronary Computed Tomography Angiography—Correlation With Intravascular Ultrasound and Fractional Flow Reserve. Forsdahl, S. H., Rogers, I. S., Schnittger, I., et al. *Circulation Journal.* 2017.

Myocardial bridging is associated with exercise-induced ventricular arrhythmia and increases in QT dispersion. Nishikii-Tachibana, M., Pargaonkar, V. S., Schnittger, I., Haddad, F., Rogers, I. S., Tremmel, J. A., Wang, P. J. *Annals of noninvasive electrocardiology.* 2017.

Myocardial bridges: Overview of diagnosis and management. Rogers, I.S., Tremmel, J.A., Schnittger, I. *Congenital Heart Disease.* 2017.

Surgical Unroofing of Hemodynamically Significant Left Anterior Descending Myocardial Bridges. Boyd, J.H., Pargaonkar, V.S., Scoville, D.H., Rogers, I.S., Kimura, T., Tanaka, S., Yamada, R., Fischbein, M.P., Tremmel, J.A., Mitchell, R.S., Schnittger, I; *Annals of Thoracic Surgery*; 2016; Oct. 1.

Myocardial Bridge and Acute Plaque Rupture. Perl, L., Daniels, D., Schwartz, J., Tanaka, S., Yeung, A., Tremmel, J. A., Schnittger, I. *Journal of Investigative Medicine High Impact Case Report* 2016; 4 (4).



Michael Snyder, PhD

Stanford W. Ascherman, MD, FACS, Professor in Genetics
Chair, Department of Genetics
Director, Center for Genomics and Personalized Medicine

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EDUCATION/TRAINING

PHD California Institute of Technology

HONORS & AWARDS

Pioneer Award, HUPO

Connecticut Medal of Science

Burroughs Wellcome Scholar Award

Lewis B. Cullman Professor of MCDB

EXECUTIVE COMMITTEE

HUPO

SCIENTIFIC ADVISORY COMMITTEE

EMBL

SCIENTIFIC ADVISORY COMMITTEE

Northeast Structural Genomics Consortium

SCIENTIFIC ADVISORY BOARD

Integrated Genomics Project, University of Toronto

SCIENTIFIC ADVISORY BOARD

Duke University Systems Biology Center

PRINCIPAL INVESTIGATOR

Yale Center of Excellence in Genome Sciences

FORMER COUNCIL MEMBER

Genetics Society of America

FORMER DIRECTOR

Yale Center for Genomics and Proteomics

FORMER CHAIR

Department of Molecular, Cellular and Developmental Biology, Yale University

CURRENT RESEARCH

Precision health relies on the ability to assess disease risk at an individual level, detect early preclinical conditions and initiate preventive strategies. We have used deep longitudinal omics profiling and wearable monitoring to better manage health and make health-related discoveries, to identify relevant molecular pathways associated with standard clinical measures, and to assess the impact of personalized longitudinal big data on a understanding health and early detection of disease. Altogether, we conclude that deep longitudinal profiling can lead to actionable health discoveries and provide important information relevant for precision health.

I'm a believer in the future—genomics will move medicine from 'diagnose and treat' to 'predict and prevent'.

SELECTED PUBLICATIONS

Smooth Muscle Contact Drives Endothelial Regeneration by BMPR2-Notch1 Mediated Metabolic and Epigenetic Changes. Miyagawa K, Shi M, Chen PI, Hennigs JK, Zhao Z, Wang M, Li CG, Saito T, Taylor S, Sa S, Cao A, Wang L, Snyder MP, Rabinovitch M. *Circ Res*. 2018 Nov 21.

Multomics modeling of the immunome, transcriptome, microbiome, proteome and metabolome adaptations during human pregnancy. Ghaemi MS, DiGiulio DB, Contrepolis K, Callahan B, Ngo TTM, Lee-McMullen B, Lehallier B, Robaczewska A, McIlwain D, Rosenberg-Hasson Y, Wong RJ, Quaintance C, Culos A, Stanley N, Tanada A, Tsai A, Gaudilliere D, Ganio E, Han X, Ando K, McNeil L, Tingle M, Wise P, Maric I, Sirota M, Wyss-Coray T, Winn VD, Druzin ML, Gibbs R, Darmstadt GL, Lewis DB, Partovi Nia V, Agard B, Tibshirani R, Nolan G, Snyder MP, Relman DA, Quake SR, Shaw GM, Stevenson DK, Angst MS, Gaudilliere B, Aghaeepour N. *Bioinformatics*. 2019 Jan 1;35(1):95-103.

Understanding health disparities. Stevenson DK, Wong RJ, Aghaeepour N, Angst MS, Darmstadt GL, DiGiulio DB, Druzin ML, Gaudilliere B, Gibbs RS, B Gould J, Katz M, Li J, Moufarrej MN, Quaintance CC, Quake SR, Relman DA, Shaw GM, Snyder MP, Wang X, Wise PH. *J Perinatol*. 2018 Dec 18.



Edda Spiekerkoetter, MD

Assistant Professor of Medicine, Pulmonary and Critical Care Medicine

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EDUCATION/TRAINING

MD University Hospital Freiburg, Germany

RESIDENCY and PCCM FELLOWSHIP
Medizinische Hochschule Hannover, Germany

POSTDOCTORAL RESEARCH FELLOWSHIP Pediatric Cardiology, Stanford

PCCM FELLOWSHIP
Stanford Hospital and Clinics

HONORS & AWARDS

Cardiovascular Institute Stanford: Seed Grant-BMP signaling in the RV

Wall Center of Pulmonary Vascular Disease and SPARK and Spectrum: Stanford Seed Grant - Phase II Clinical Trial

Pulmonary Hypertension Association K08 Career development grant

American Society of Clinical Investigation's (ASCI) 2015 Young Physician-Scientist Award

Pulmonary Vascular Research Institute (PVRI)

R01 Grant HL128734: Targeting Novel BMPR2 modifiers in Pulmonary Hypertension with Repurposed Drugs

DoD Grant PR161256: Targeting BMPR2 Signaling to Improve Right Ventricular Function in Congenital Heart Disease

CURRENT RESEARCH

My research focuses on the importance of the Bone Morphogenetic Protein Receptor 2 (BMPR2) signaling pathway in pulmonary-vascular, cardiac disease as well as hereditary hemorrhagic telangiectasia (HHT). In 2000, two independent groups discovered mutations in the BMPR2 pathway as the genetic basis for pulmonary arterial hypertension (PAH). Over the past years more mutations either directly involved in the BMPR2 pathway (Endoglin, ALK1, Smad9) or indirectly linked to the BMPR2 pathway (Caveolin-1) have been discovered, emphasizing the central role of BMPR2 signaling in familial PAH. It was subsequently found that reduced BMPR2 expression and signaling is a feature of other sporadic or idiopathic forms of PAH. Hypothesizing that increasing BMPR2 signaling might improve PAH, we performed a High-Throughput Screen of FDA approved drugs and identified the immuno-suppressive drug FK506 (Tacrolimus) as the main BMPR2 activator. We have subsequently shown that FK506 could rescue endothelial dysfunction in PAH, and prevent and reverse PAH in rodent models of experimental PAH (JCI 2013). This discovery has led to the compassionate use of the compound in end-stage PAH patients (AJRCCM 2015) and a phase II clinical trial to test the safety, tolerability and efficacy of low-dose FK506 in PAH at Stanford (ERJ 2017). We discovered a second drug, Enzastaurin, that increases the novel modifier gene of BMPR2, FHIT (Fragile Histidine Triad) and also is able to reverse experimental PAH.

The most current research in the lab focuses on the role of BMPR2 signaling in RV failure, using different mouse models with cell specific deficient BMPR2 signaling, deep tissue imaging as well as patient derived iPSC- Cardiomyocytes as well as modulation of the BMPR2 pathway in HHT.

Ever tried. Ever failed. No matter. Try again. Fail again. Fail better. —Samuel Beckett

SELECTED PUBLICATIONS

Fragile Histidine Triad (FHIT), a Novel Modifier Gene in Pulmonary Arterial Hypertension. Dannewitz Prosseda S, Tian X, Kuramoto K, Boehm M, Sudheendra D, Miyagawa K, Zhang F, Solow-Cordero D, Saldivar JC, Austin ED, Loyd JE, Wheeler L, Andruska A, Donato M, Wang L, Huebner K, Metzger RJ, Khatri P, Spiekerkoetter E. *Am J Resp Crit Care Med* 2018 Aug 14.

New and Emerging Therapies for Pulmonary Arterial Hypertension. Annual Review of Medicine Edda Spiekerkoetter, Steven M Kawut, Vinicio A De Jesus Perez. *Annu Rev Med.* 2018 Sep 14.

Consequences of BMPR2 Deficiency in the Pulmonary Vasculature and Beyond: Contributions to Pulmonary Arterial Hypertension. Andruska A, Spiekerkoetter E. *Int J Mol Sci* Aug 24;19(9).p Review.



James Spudich, PhD

Douglass M. and Nola Leishman Professor of Cardiovascular Disease
Professor, Biochemistry

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LAB spudlab.stanford.edu

EDUCATION/TRAINING

PHD Stanford University

HONORS & AWARDS

University of Illinois Alumni
Achievement Award

Biophysical Society Founders Award

Massry Prize

Ahmed H. Zewail Award Gold Medal

Albert Lasker Basic Medical Research
Award

Wiley Prize in Biomedical Sciences

The Arthur Kornberg and Paul Berg
Lifetime Achievement Award in

Biomedical Sciences

E.B. Wilson Medal, American Society for
Cell Biology (ASCB)

Biophysics Society Award for

Outstanding Investigator in the Field of
Single Molecule Biology

American Heart Association Research
Prize

CO-FOUNDER AND FORMER FIRST

DIRECTOR Interdisciplinary Program
in Bioengineering, Biomedicine and
Biosciences – Bio-X

ELECTED FELLOW

American Academy of Arts and
Sciences; American Association for the
Advancement of Science

ELECTED MEMBER

National Academy of Sciences

SCIENTIFIC ADVISORY BOARD

Curie Institute, Paris; Mechanobiology
Institute, Singapore

ADJUNCT PROFESSOR

National Center for Biological Sciences,
TFIR, Bangalore, India

CURRENT RESEARCH

Our general research interest is the structure and function of molecular motors in vitro and in vivo, with emphasis on understanding the molecular basis of muscle contraction. Our major areas of specific interest are the molecular basis of energy transduction that leads to ATP-driven myosin movement on actin, the roles of the myosin family of molecular motors in eukaryotic cells, the regulation of actin and myosin interaction and their assembly states, and the biochemistry and regulation of the attachment of molecular motors to their corresponding cargo.

The detailed understanding we have developed of how myosin transduces the chemical energy of ATP hydrolysis into mechanical movement has led us to our current focus on human hypertrophic cardiomyopathy (HCM) caused by missense mutations in human β -cardiac myosin. Our goal is to elucidate the molecular basis of hyper-contractility seen clinically resulting from HCM mutations. We postulated that a majority of HCM mutations shift β -cardiac myosin heads from a sequestered off-state to an active on-state for interaction with actin, resulting in the hyper-contractility seen clinically. This is different from earlier prevailing views, and is the basis of all of our current research. We now have extensive evidence for this hypothesis using a combination of the various high-resolution technologies we have developed over the years as well as new approaches. Our work is now providing possible paths forward for therapeutic intervention for cardiomyopathy patients.

SELECTED PUBLICATIONS

Biophysical Properties of Human β -cardiac Myosin with Converter Mutations that Cause Hypertrophic Cardiomyopathy. Kawana, M. Sarkar, S.S., Sutton, S., Ruppel, K.M., Spudich, J.A. (2017). *Science Adv.* Feb 10;3(2):e1601959.

The Myosin Mesa and the Basis of Hyper-contractility Caused by Hypertrophic Cardiomyopathy Mutations. Nag, S., Trivedi, D.V., Sarkar, S.S., Adhikari, A.S., Sunitha, M.S., Sutton, S., Ruppel, K.M., Spudich, J.A. (2017). *Nat Struct Mol Biol.* 24:525-533.

Controlling load-dependent kinetics of β -cardiac Myosin at the Single-molecule Level. Liu, C., Kawana, M., Song, D., Ruppel, K.M. and Spudich, J.A. (2018). *Nat Struct Mol Biol.* 25:505-514.

Mavacamten Stabilizes a Folded-back Sequestered Super-relaxed State of β -cardiac Myosin. Anderson, R.L., Trivedi, D.V., Sarkar, S.S., Henze, M., Ma, W., Gong, H., Rogers, C.S., Wong, F.L., Morck, M.M., Seidman, J.G., Ruppel, K.M., Irving, T.C., Cooke, R., Green, E.M and Spudich, J.A. (2018). *Proc Natl Acad Sci USA.* 2018 Aug 28;115(35):E8143-E8152.



Marcia L. Stefanick, PhD

Professor, Medicine - Stanford Prevention Research Center
Professor, Obstetrics and Gynecology

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CENTER wsdm.stanford.edu

EDUCATION/TRAINING

PHD Stanford University

HONORS & AWARDS

Iris F. Litt Faculty Fellowship, Clayman Institute of Gender Research (2009-2010)

PHS-NRS Award - Training Grant in Systems Biology (1976-1981)

Cardiovascular Disease Prevention Training Grant (1983-1986)

Principal Investigator of the Western Regional Center for the Women's Health Initiative Extension (2010-2015)

CO-DIRECTOR

Stanford Center for Health Research on Women and Sex Differences in Medicine (WSDM)

COUNCILOR

Organization for the Study of Sex Differences (OSSD)

FELLOW

American College of Sports Medicine; American Heart Association (AHA); AHA Council on Arteriosclerosis, Thrombosis and Vascular Biology

CO-DIRECTOR

Women's Cardiovascular Disease Strategic Planning Group

STEERING, EXECUTIVE & EDUCATION COMMITTEE MEMBER

Stanford Cardiovascular Institute

FORMER CHAIR

Steering and Executive Committees, Women's Health Initiative (1998-2011)

CURRENT RESEARCH

My research focuses on chronic disease prevention—particularly, heart disease, breast cancer, and osteoporosis—and aging, in both women and men. As the principal investigator (PI) of the Women's Health Initiative (WHI), I have conducted large randomized controlled studies of diet, menopausal hormone therapy, and calcium and vitamin D supplementation as population-based strategies to prevent heart disease, stroke, cancer, fractures and dementia and plan to conduct a large physical activity trial in the WHI cohort. I mentor several junior and senior faculty and fellows on WHI analyses from across the School of Medicine. I am also PI of the multi-center Osteoporotic Fractures in Men (MrOS) Study, which is determining risk factors for bone and muscle loss (sarcopenia) and reduced physical function in older men, and the MrOS Sleep Study, which is focusing on cardiovascular outcomes.

Menopausal hormone therapy should not be used to prevent cardiovascular disease in women; the focus should be on lifestyle, i.e., physical activity and weight control.

SELECTED PUBLICATIONS

Use of medicare data to identify coronary heart disease outcomes in the women's health initiative. Hlatky MA, Ray RM, Burwen DR, Margolis KL, Johnson KC, Kucharska-Newton A, Manson JE, Robinson JG, Safford MM, Allison M, Assimes TL, Bavry AA, Berger J, Cooper-DeHoff RM, Heckbert SR, Li W, Liu S, Martin LW, Perez MV, Tindle HA, Winkelmayer WC, Stefanick ML. *Circ Cardiovasc Qual Outcomes*. 2014; 7(1): 157-62.

Menopausal hormone therapy and health outcomes during the intervention and extended post-stopping phases of the women's health initiative randomized trials. Manson JE, Chlebowski RT, Stefanick ML, [13 authors], Beresford SA, Cauley JA, Eaton CB, Gass M, Hsia J, Johnson KC, Kooperberg C, Kuller LH, Lewis CE, Liu S, Martin LW, Ockene JK, O'Sullivan MJ, Powell LH, Simon MS, Van Horn L, Vitolins MZ, Wallace RB. *JAMA*. 2013; 310(13): 1353-68.

Changes in physical activity and body composition in postmenopausal women over time. Sims ST, Kubo J, Desai M, Bea J, Beasley JM, Manson JM, Allison M, Sequin RA, Chen Z, Michael YL, Sullivan SD, Beresford S, Stefanick ML. *Med Sci Sports Exerc*. 2013; 45(8): 1486-92.



Elif Seda Selamet Tierney, MD

Associate Professor of Pediatrics (Cardiology)
 Director of Pediatric Vascular Research Laboratory
 Lucile Packard Children's Hospital at Stanford University
 Director of Research, Non-Invasive Imaging,
 Lucile Packard Children's Hospital at Stanford University

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PROFILE <https://profiles.stanford.edu/elif-seda-selamet-tierney>

LAB med.stanford.edu/pediatricvascularlab.html

EDUCATION/TRAINING

MD Istanbul University CMF Medicine,
 Istanbul, Turkey

INTERNSHIP/RESIDENCY in Pediatrics
 SUNY Stony Brook, NY

FELLOWSHIP in Pediatric Cardiology
 Columbia University, NY

ADVANCED FELLOWSHIP in Pediatric
 Cardiology/Imaging Columbia
 University, NY

FACULTY Instructor in Pediatrics,
 Pediatric Cardiology, Harvard Medical
 School

Assistant Professor in Pediatrics,
 Pediatric Cardiology, Harvard Medical
 School

HONORS & AWARDS

Resident Research Award, Suffolk
 County Pediatric Society, NY

Fellow, American Society of
 Echocardiography
 American College of Cardiology

National Scientist Development Award,
 American Heart Association

Outstanding Research Award, American
 Heart Association, International
 Kawasaki Disease

Spectrum Child Health Research
 Institute Grant Support Award

Cardiovascular Institute Grant Award

Grant in Aid, American Heart
 Association- Western States Affiliate

National Marfan Fdn Faculty Grant

CHRI Faculty Scholar Award

CURRENT RESEARCH

My research focus is an amalgam of pediatric echocardiography, vascular health in children, and use of the internet to deliver care to children with acquired and congenital heart disease. We have various noninvasive modalities to easily acquire vascular health measures in children. In the past year, we completed a study investigating telehealth interventions in pediatric heart transplant patients to improve their vascular health. We discovered that lifestyle interventions delivered via live-video conferencing is a feasible and maintainable method to manage long-term care in this patient population. We have also completed a pilot home tele-echo study where we taught parents of pediatric heart transplant patients to acquire echo images of their children's hearts. This study showed that parents are able to acquire reliable images for evaluation by an experienced echocardiographer. Using the same idea of a home-echo, and incorporating other home acquisition of key clinical data such as height, weight, digital cardiac auscultation, and medical history, we hope to show that home tele-clinic visits delivered via live-video conferencing is reliable and clinically comparable to regular clinic visits. Emerging new tools makes the landscape for innovative long-term surveillance care exciting. It is a field with which we hope to explore further to be able to incorporate cost-effective, maintainable, accessible, and specialized care.

Healthy hearts for life.

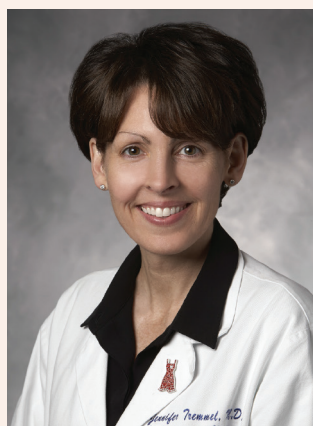
SELECTED PUBLICATIONS

Healthy hearts in pediatric heart transplant patients with an exercise and diet intervention via live video conferencing—Design and rationale. Chen AC, Rosenthal DN, Couch SC, Berry S, Stauffer KJ, Brabender J, McDonald N, Lee D, Barkoff L, Nourse SE, Kazmucha J, Wang CJ, Olson I, Selamet Tierney ES. *Pediatr Transplant*. 2018;e13316.

Influence of Aortic Stiffness on Aortic-Root Growth Rate and Outcome in Patients With the Marfan Syndrome. Selamet Tierney ES, Levine JC, Sleeper LA, Roman MJ, Bradley TJ, Colan SD, Chen S, Campbell MJ, Cohen MS, De Backer J, Heydarian H, Hoskoppal A, Lai WW, Liou A, Marcus E, Nutting A, Olson AK, Parra DA, Pearson GD, Pierpont ME, Printz BF, Pyeritz RE, Ravekes W, Sharkey AM, Srivastava S, Young L, Lacro RV; Pediatric Heart Network Investigators. *Am J Cardiol*. 2018 May 1;121(9):1094-1101.

Peripheral Endothelial Function After Arterial Switch Operation for D-looped Transposition of the Great Arteries. Sun HY, Stauffer KJ, Nourse SE, Vu C, Selamet Tierney ES. *Pediatr Cardiol*. 2017;38:1010-5

Maternal Arterial Stiffness and Fetal Cardiovascular Physiology in Diabetic Pregnancies. Moodley S, Arunamata A, Stauffer KJ, Nourse SE, Chen A, Selamet Tierney ES. *Ultrasound Obstet Gynecol*. 2017.



Jennifer A. Tremmel, MD, MS

Assistant Professor, Medicine - Cardiovascular Medicine
Clinical Director, Women's Heart Health at Stanford

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CLINIC stanfordhospital.org/cardiovascularhealth/womenHeartHealth

EDUCATION/TRAINING

MD University of Iowa

MS Harvard University School of Public Health

MEDICINE RESIDENCY

Dartmouth-Hitchcock Medical Center

GENERAL CARDIOLOGY FELLOWSHIP

Stanford University

PREVENTIVE CARDIOLOGY FELLOWSHIP

Stanford University

INTERVENTIONAL CARDIOLOGY FELLOWSHIP

Stanford University

BOARD CERTIFICATION

Cardiology, ABIM

Interventional Cardiology, ABIM

CLINICAL FOCUS

Interventional Cardiology
Women's Cardiovascular Disease

HONORS & AWARDS

Society for Cardiovascular Angiography and Interventions (SCAI) Emerging Leader Mentorship Fellow

NIH Career Development Award

EDITORIAL BOARD MEMBER

Catheterization and Cardiovascular Interventions

EXECUTIVE COUNCIL MEMBER

SCAI Transradial Working Group

LEADERSHIP COUNCIL MEMBER

American College of Cardiology Women in Cardiology Section

CURRENT RESEARCH

As the Clinical Director of the Women's Heart Health at Stanford, I support several ongoing research studies focusing on women and sex differences in cardiovascular disease. We are studying patients who have chest pain, but normal appearing coronary arteries on angiography to understand sex differences in vascular function abnormalities, such as endothelial dysfunction, microvascular disease, and myocardial bridging. We are also investigating the best therapies for such patients, and have found that mindfulness-based stress reduction may reduce chest pain episodes. In addition, we are investigating the role of insomnia treatment for improving cardiac risk factors, trying to find ways of getting more women to cardiac rehab, and testing interventions to improve the cardiac health of women around the time of pregnancy.

The study of sex differences isn't just about the study of women. It's about taking a more careful look at both women and men.

SELECTED PUBLICATIONS

Myocardial bridging. Tremmel JA, Schnittger I. *J Am Coll Cardiol.* 2014 Nov 18;64(20):2178-9.

Continuous flow left ventricular assist device placement complicated by aortic valve thrombus and myocardial infarction. Kim JB, Rhee JW, Brenner DA, Ha R, Banerjee D, Yeung AC, Tremmel JA. *Int J Cardiol.* 2014 Oct 20;176(3):e102-3.

Best practices for transradial angiography and intervention: a consensus statement from the society for cardiovascular angiography and intervention's transradial working group. Rao SV, Tremmel JA, Gilchrist IC, Shah PB, Gulati R, Shroff AR, Crisco V, Woody W, Zoghbi G, Duffy PL, Sanghvi K, Krucoff MW, Pyne CT, Skelding KA, Patel T, Pancholy SB; Society for Cardiovascular Angiography and Intervention's Transradial Working Group. *Catheter Cardiovasc Interv.* 2014 Feb;83(2):228-36.



Sandra Tsai, MD, MPH

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Primary Care, Population Health, and Cardiovascular Institute

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EDUCATION/TRAINING

MD University of Texas Southwestern
Medical Center

MEDICINE RESIDENCY & INTERNSHIP
UT Southwestern, Dallas, TX

RESEARCH FELLOWSHIP
Stanford University

BOARD CERTIFICATION
Internal Medicine, ABIM

HONORS & AWARDS

Fellow, AHA 34th Seminar on the
Epidemiology and Prevention of CVD

CURRENT RESEARCH

My research focuses on the development of behavioral modification strategies to improve cardiovascular health in pregnant women at risk for blood pressure complications, such as preeclampsia. We are interested in understanding how improvements in cardiovascular risk factors during pregnancy may affect rates of pregnancy complications and future cardiovascular risk. We collaborate with the Stanford Department of Obstetrics to care for women who either start pregnancy obese or gain too much weight during pregnancy.

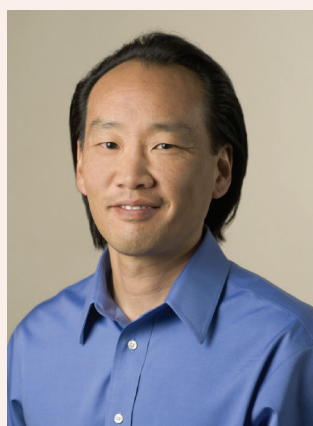
SELECTED PUBLICATIONS

Trends in menopausal hormone therapy use of US office-based physicians, 2000–2009. Tsai, S. A., Stefanick, M. L., Stafford, R. S. 2011. *Menopause*. 2011 Apr;18(4):385-92.

Gender Differences in Weight-Related Attitudes and Behaviors Among Overweight and Obese Adults in the United States. Tsai SA, Lv N, Xiao L, Ma J. *Am J Mens Health*. 2015 Jan 15.

Association of the Cardiometabolic Staging System with Individual Engagement and Quality of Life in the US Adult Population. Tsai SA, Xiao L, Lv N, Liu Y, Ma J. *Obesity*. 2017 Sep;25(9):1540-1548.

Association of triglyceride to HDL ratio with cardiometabolic outcomes. Yang M, Rigdon J, Tsai SA. *J Investig Med*. 2018 Dec 9.



Philip S. Tsao, PhD

Professor, Medicine - Cardiovascular Medicine
Associate Chief of Staff for Research and Development, VAPAHCS
Director, VA Epidemiology Research and Information Center for Genomics at VAPAHCS

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EDUCATION/TRAINING

PHD Thomas Jefferson University

HONORS & AWARDS

CO-DIRECTOR, CVI T32: Mechanisms and Innovation in Vascular Disease

ESTABLISHED INVESTIGATOR AWARD
American Heart Association

DEPARTMENT OF MEDICINE FACULTY
MENTORING AWARD
Stanford University

EXECUTIVE & STEERING COMMITTEE
Stanford Cardiovascular Institute

FELLOW
ATVB Council of the American Heart Association

VISITING PROFESSOR
University of Nis, Serbia (2013)
Kobe University School of Medicine,
Kobe, Japan (2014)
University of Erlangen, Germany (2015)

SPECIAL RECOGNITION AWARD
for Vascular Biology
ATVB Council of the AHA

MEMBER
American Heart Association;
American Society of Human Genetics

CONSULTING EDITOR
Arteriosclerosis, Thrombosis, and Vascular Biology

CURRENT RESEARCH

My laboratory's primary interests are in understanding the molecular underpinnings of vascular disease as well as assessing disease risk. We use a wide range of biochemical, molecular, and physiological techniques to make primary observations in cell systems as well as preclinical models. Furthermore, we continue to extend our findings to human subjects in order to confirm their clinical applicability. Current research projects include the role of microRNAs in regulating atherosclerosis and abdominal aortic aneurysm disease; elucidating the impact of insulin resistance and obesity in vascular disease; and identification of biomarkers (genetic and protein) for risk assessment. I am VA Palo Alto Epidemiology Research and Information Center (ERIC) for Genomics as well as Co-Principal Investigator of the VA's national Million Veteran Program, currently the world's largest biobank for genomic health research.

The Stanford Cardiovascular Institute is a place where clinicians and basic scientists can seamlessly collaborate on important clinical issues.

SELECTED PUBLICATIONS

Dichloroacetate prevents restenosis in preclinical animal models of vessel injury. Deuse T, Hua X, Wang D, Maegdefessel L, Heeren J, Scheja L, Bolaños JP, Rakovic A, Spin JM, Stubbendorff M, Ikeno F, Länger F, Zeller T, Schulte-Uentrop L, Stoeckel A, Itagaki R, Haddad F, Eschenhagen T, Blankenberg S, Kiehm R, Reichenspurner H, Velden J, Klein C, Yeung A, Robbins RC, Tsao PS, Schrepfer S. *Nature*. 2014 May 29;509(7502):641-4.

Cloud-based interactive analytics for terabytes of genomic variants data. Pan C, McInnes G, Deflaux N, Snyder M, Bingham J, Datta S, Tsao PS. *Bioinformatics* 2017 33: 3709-3715.

Decoding the genomics of abdominal aortic aneurysm. Li J, Pan C, Zhang S, Spin JM, Deng A, Leung LLK, Dalman RL, Tsao PS*, Snyder M*. *Cell* 2018;174:1361-1372.

Genetics of blood lipids among ~300,000 multi-ethnic participants of the Million Veteran Program. Klarin D*, Damrauer SM*, [35 authors], Global Lipids Genetics Consortium; Myocardial Infarction Genetics (MIGen) Consortium; Geisinger-Regeneron DiscovEHR Collaboration; VA Million Veteran Program, Concato J, Gaziano JM, O'Donnell CJ*, Tsao PS*, Kathiresan S*, Rader DJ*, Wilson PWF*, Assimes TL*. *Nat Genet* 2018;50:1514-1523.



Mintu P. Turakhia, MD, MAS

Associate Professor, Medicine - Cardiovascular Medicine
Executive Director, Stanford Center for Digital Health
Chief, Cardiac Electrophysiology at the VA Palo Alto Health Care System

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EDUCATION/TRAINING

MD, MAS UCSF

MEDICINE RESIDENCY & INTERNSHIP

Brigham and Women's Hospital

FELLOWSHIP

Cardiology & Cardiac
Electrophysiology, UCSF

Stanford Biodesign Faculty Fellow

BOARD CERTIFICATION

Cardiac Electrophysiology, ABIM
Cardiovascular Disease, ABIM
Internal Medicine, ABIM

CLINICAL FOCUS

Catheter ablation, Atrial Fibrillation,
Ventricular Tachycardia, Sudden
Cardiac Death, Pacemakers, Implantable
Defibrillators, Digital Health

HONORS & AWARDS

VA Career Development Award

American Heart Association (AHA)
National Scientist Development Award

Gilead Sciences Scholars Program in
Cardiovascular Disease

American College of Cardiology (ACC)
Foundation Emerging Faculty Fellow

E. William Hancock Stanford Faculty
Teaching Award

AHA Top Ten Scientific Advances in
Cardiology

FELLOW: ACC; AHA; Heart Rhythm
Society; American Soc Clinical Inv

Associate Editor *JAMA Cardiology*

Cardiology Today Next Gen Innovator

Awardee, American Thrombosis
Investigator Initiated Research Program

CURRENT RESEARCH

I am a cardiac electrophysiologist, outcomes researcher, and clinical trialist. The goal of my research is to improve the outcomes of the treatment of heart rhythm disorders, with a focus on atrial fibrillation (AF), which affects 5 million Americans and can cause stroke and heart failure. By using large administrative, medical record, registry, and implantable device data, my group takes a "Big Data" approach to fill evidence gaps in understanding quality of care, predicting AF-related complications, and comparing effectiveness of treatment strategies. This has led to important contributions in health services and outcomes research that have reshaped professional society guidelines and clinical practice. More recently, we have extended our work to answer questions regarding atrial fibrillation screening, medication adherence, and digitally-enabled treatment strategies. Dr. Marco Perez and I are co-PIs of the Apple Heart Study, a fully digital and virtual end-to-end study to evaluate whether smartwatches can effectively and accurately identify atrial fibrillation. This work has allowed a large team at Stanford to develop the infrastructure for pragmatic studies using smartphone applications and wearable sensors and devices.

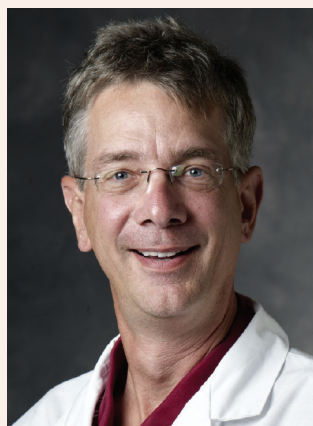
Atrial fibrillation is one of the most commonly treated conditions in all of health care. Yet, it is astonishing how little we understand the disease, how to best treat it, and who is at highest risk for complications.

SELECTED PUBLICATIONS

Rationale and design of a large-scale, app-based study to identify cardiac arrhythmias using a smartwatch: The Apple Heart Study. Turakhia MP, Desai M, Hedlin H, Rajmane A, Talati N, Ferris T, Desai S, Nag D, Patel M, Kowey P, Rumsfeld JS, Russo AM, Hills MT, Granger CB, Mahaffey KW, Perez MV. *Am Heart J*. 2019 Jan;207:66-75.

Treating Specialty and Outcomes in Newly Diagnosed Atrial Fibrillation: From the TREAT-AF Study. Perino AC, Fan J, Schmitt SK, Askari M, Kaiser DW, Deshmukh A, Heidenreich PA, Swan C, Narayan SM, Wang PJ, Turakhia MP. *J Am Coll Cardiol*. 2017 Jul 4;70(1):78-86.

Atrial Fibrillation Burden: Moving Beyond Atrial Fibrillation as a Binary Entity: A Scientific Statement From the American Heart Association. Chen LY, Chung MK, Allen LA, Ezekowitz M, Furie KL, McCabe P, Noseworthy PA, Perez MV, Turakhia MP; American Heart Association Council on Clinical Cardiology; Council on Cardiovascular and Stroke Nursing; Council on Quality of Care and Outcomes Research; and Stroke Council. *Circulation*. 2018 May 15;137(20):e623-e644. Review.



Paul J. Utz, MD

Professor of Medicine

Associate Dean for Medical Student Research, Stanford School of Medicine
 Director Emeritus, Stanford Medical Scientist Training Program
 Faculty Director and Founder, Stanford Institutes of Medical Research (SIMR)
 Associate Director of Education, Institute for Immunity, Transplantation and Infection (ITI), Division of Immunology & Rheumatology

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EDUCATION/TRAINING

MD Stanford University

MEDICINE RESIDENCY & INTERNSHIP

Brigham and Women's Hospital

CLINICAL IMMUNOLOGY AND RHEUMATOLOGY FELLOWSHIP

Brigham and Women's Hospital

RESEARCH FELLOWSHIP

Dana Farber Cancer Institute

BOARD CERTIFICATION

Medicine, ABIM Eligible
 Rheumatology, ABIM Eligible

CLINICAL FOCUS

Immunology
 Rheumatology

HONORS & AWARDS

ELECTED

The Kunkel Society; American Society for Clinical Investigation

The Mary Jane Kugel Award, Juvenile Diabetes Research Foundation

Department of Medicine Teaching Award, Stanford Medicine

Mayo Clinic, Distinguished Visiting Professor, Department of Medicine

Immunology and Rheumatology Division Teaching Award, Stanford University School of Medicine

Rheumatology Visiting Professor and Grand Rounds Speaker, UC Denver

Speaker, Immunology Seminar Series and Grand Rounds, University of Pittsburgh

CURRENT RESEARCH

My lab actively collaborates with many investigators on the Stanford campus, and across the world to disseminate and implement newly-invented technologies. We study autoimmune diseases, including systemic lupus erythematosus, rheumatoid arthritis, scleroderma, myositis, primary biliary cirrhosis, Sjögren's disease, type I diabetes, vasculitis, multiple sclerosis, and mixed connective tissue disease. In addition to better understanding the pathogenic mechanisms involved in autoimmunity, we are developing bench-to-bedside technologies for immune diseases. Our group made several breakthrough inventions, such as protein arrays, peptide arrays, HIT, lysate arrays, Intel arrays, and EpiTOF. Additionally, I am the Director of Stanford's Autoimmunity Center of Excellence and have extensive expertise in coordinating program project grants over the last 12 years, including Program Director of Francis Collins' \$41M Accelerating Medicines Partnership in RA/SLE initiative.

I am Founder and Program Director for the Stanford Institutes of Medicine Research (SIMR) Program for high school students, which has hosted ~800 students in labs over 20 years. I also developed the Stanford EXPLORE Lecture Series. This program covers the basic science fundamentals represented by various research areas at Stanford Medicine. In 2018, I was appointed Stanford Associate Dean for Medical Student Research to promote physician investigator development across the physician-scientist career continuum. I will continue to provide high-level oversight of SIMR and the MSTP while focusing on new efforts to create programs for MD students to build careers as investigators and leaders.

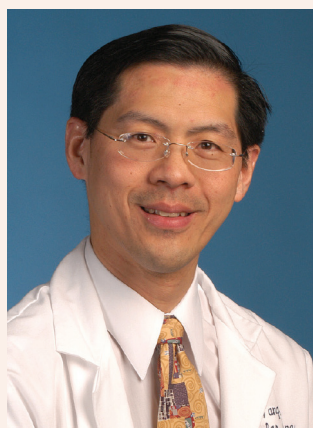
SELECTED PUBLICATIONS

Single-cell chromatin modification profiling reveals increased epigenetic variations with aging. Cheung P, Vallania F, Warsinske HC, Donato M, Schaffert S., Chang SE, Dekker CL, Davis MM, Utz PJ, Khatri P, Kuo AJ. 2018. *Cell*, 173:1385-1397.

KLRD1-expressing natural killer cells predict influenza susceptibility. Bongen E, Vallania F, Utz PJ, Khatri P. 2018. *Genome Med.*, 10:45.

Single-cell epigenetics – chromatin modification atlas unveiled by mass cytometry. Cheung P, Vallania F, Dvorak M, Chang SE, Schaffert S, Donato M, Rao AM, Mao R, Utz PJ, Khatri P, Kuo AJ. 2018 *Clin. Immunol.* S1521-6616(18):30363-2.

Quantification of cDNA on GMR biosensor array towards point-of-care gene expression analysis. Ravi N, Rizzi G, Chang SE, Cheung P, Utz PJ, Wang SX. 2018. *Biosens Bioelectron.* S0956-5663(18)30736-X.



Paul J. Wang, MD

Professor, Medicine (Cardiovascular Medicine)

Director, Cardiac Arrhythmia Service and Cardiac Electrophysiology Laboratory

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LAB stanfordhospital.org/cardiovascularhealth/arrhythmia/team

EDUCATION/TRAINING

MD Columbia University College of Physicians and Surgeons

MEDICINE RESIDENCY & INTERNSHIP

New York Presbyterian Medical Center

CARDIOVASCULAR DISEASE

FELLOWSHIP

Brigham and Women's Hospital

BOARD CERTIFICATION

Internal Medicine, ABIM

Cardiovascular Disease, ABIM

Clinical Cardiac Electrophysiology, ABIM

CLINICAL FOCUS

Cardiac Electrophysiology ,
Cardiac Arrhythmias, Hypertrophic
Cardiomyopathy

HONORS & AWARDS

DIRECTOR

Arrhythmia Advanced Treatment Center,
Stanford Cardiovascular Health

CO-DIRECTOR

Stanford Center for Arrhythmia Research

MEMBER

American Heart Association Council
on Clinical Cardiology; Committee on
Council Operations; National Science
and Clinical Education Life-Long
Learning Committee

CO-DIRECTOR

2018 Stanford Biodesign New
Arrhythmia Technologies Retreat

RECIPIENT

2017 American Heart Association
Clinical Cardiology Distinguished
Achievement Award

EDITOR-IN-CHIEF

*Circulation: Arrhythmia and
Electrophysiology*

CURRENT RESEARCH

My research centers on the development of innovative approaches to the treatment of arrhythmias, including catheter ablation techniques, implantable devices, and less invasive treatments. My clinical research includes atrial fibrillation, ventricular tachycardia, supraventricular arrhythmias and implantable devices. I have collaborations with Bioengineering, Mechanical Engineering, and Electrical Engineering. I am the Center Director for the AHA Strategically Focused Research Network Joe and Linda Chlapy DECIDE Grant for Shared Decision Making in Atrial Fibrillation Stroke Prevention. Some goals of my research program are to create: 1) a more effective methods of catheter ablation, 2) more reliable implantable pacemakers and leads, 3) a combined surgical-catheter approach to ablation, 4) noninvasive methods of ablation, 5) new solutions to prevent sudden cardiac death.

Advances in engineering, biology, chemistry, computer science, material science, and physics will result in major developments in arrhythmia therapy and device innovation. We are poised to make significant contributions in this area.

SELECTED PUBLICATIONS

Retrospective review of Arctic Front Advance Cryoballoon Ablation: a multicenter examination of second-generation cryoballoon (RADICOL trial). Su W, Orme GJ, Hoyt R, Baker J, Compton S, Fellows C, Harding J, Svinarich JT, Kowalski M, Piedad B, Kenigsberg D, Seger J, Ahmad ZK, Wang P. *J Interv Card Electrophysiol*. 2018 Apr;51(3):199-204.

Cryoballoon Best Practices II: Practical guide to procedural monitoring and dosing during atrial fibrillation ablation from the perspective of experienced users. Su W, Aryana A, Passman R, Singh G, Hokanson R, Kowalski M, Andrade J, Wang P. *Heart Rhythm*. 2018 Apr 20.

Clinical Implications of Ablation of Drivers for Atrial Fibrillation: A Systematic Review and Meta-Analysis. Baykaner T, Rogers AJ, Meckler GL, Zaman JAB, Navara R, Rodrigo M, Alhusseini M, Kowalewski CAB, Viswanathan MN, Clopton PL, Heidenreich PA, Narayan SM, Wang PJ. *Circulation: Arrhythm Electrophysiol* 2018.

Hybrid Atrial Fibrillation Ablation: Current Status and a Look Ahead. Khoynzhad A, Ellenbogen KA, Al-Atassi T, Wang PJ, Kasirajan V, Wang X, Edgerton JR. *Circ Arrhythm Electrophysiol*. 2017 Oct;10(10).



Irving Weissman, MD

Virginia and DK Ludwig Professor for Clinical Investigation in Cancer Research
Professor, Developmental Biology and Pathology
Professor (by courtesy), Biology and Neurosurgery
Director, Institute for Stem Cell Biology and Regenerative Medicine
Director, Stanford Ludwig Center for Cancer Stem Cell Research and Medicine

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CURRENT RESEARCH

My laboratory studies stem cell biology and regenerative medicine. We are particularly interested in hematopoiesis, hematopoietic stem cells (HSCs), leukemia, and the clonal events leading from HSC to leukemia. Our research encompasses the phylogeny and developmental biology of blood-forming cells and immune systems. My laboratory was the first to identify and isolate the blood-forming hematopoietic stem cell (HSC) from mice, and we have defined, by lineage analysis, the stages of development between the stem cells and mature progeny. We also discovered the human HSC, a human brain-forming stem cell population, mouse skeletal muscle stem cells, and an osteochondral stem cell in mice. Another research focus of my laboratory is cancer stem cell biology. In recent years, we have studied the potential of CD47 (a molecule on the surface of cancer stem cells that protects them by providing a 'don't eat me' signal to phagocytic cells of the innate immune system) as a cancer therapeutic, and identifying cancer stem cells from a variety of blood and solid cancers.

In every aspect of stem cell and progenitor cell biology, and its applications to regenerative medicine, I believe it must start with purification, purification, and purification; substituting impure or unsubstantiated cell populations will in the end only confuse the scientist and the clinical trialist.

SELECTED PUBLICATIONS

PD-1 expression by tumour-associated macrophages inhibits phagocytosis and tumour immunity. Gordon SR, Maute RL, Dulken BW, Hutter G, George BM, McCracken MN, Gupta R, Tsai JM, Sinha R, Corey D, Ring AM, Connolly AJ, Weissman IL. *Nature*. (2017) May 25;545(7655):495-499

Unifying mechanism for different fibrotic diseases. Wernig G, Chen SY, Cui L, Van Neste C, Tsai JM, Kambham N, Vogel H, Natkunam Y, Gilliland DG, Nolan G, Weissman IL. *Proc Natl Acad Sci USA*. (2017) 114(18):4757-62.

The Role of Efferocytosis in Atherosclerosis. Kojima Y, Weissman IL, Leeper NJ. *Circulation*. (2017) 135(5):476-89.

CD47-blocking antibodies restore phagocytosis and prevent atherosclerosis. Kojima, Y, JP Volkmer, K McKenna, M Civelek, AJ Lusis, CL Miller, D Drenzo, V Nanda, J Ye, AJ Connolly, EE Schadt, T Quertermous, P Betancur, L Maegdefessel, LP Matic, U Hedin, IL Weissman, and NJ Leeper (2016). *Nature*. 536(7614): 86-90.

Evolution of normal and neoplastic tissue stem cells: progress after Robert Hooke. Weissman, I. (2015) *Philos Trans R Soc Lond B Biol Sci*. Oct 19;370(1680):20140364.

EDUCATION/TRAINING

MD Stanford University

HONORS & AWARDS

NATIONAL ACADEMY OF SCIENCE

COUNCIL National Academy of Science

Max Delbruck Medal, University of Berlin

Jessie Stevenson Kovalenko Medal,
National Academy of Sciences Council

California Scientist of the Year

Robert Koch Award, Koch Foundation,
Berlin, Germany

Lewis S. Rosenstiel Award for
Distinguished Work in Basic Medical
Science

FELLOW

American Association for the
Advancement of Science

ELECTED MEMBER

Institute of Medicine, National Academy
of Sciences; American Philosophical
Society

BOARD OF SCIENTIFIC ADVISORS

National Cancer Institute

BOARD OF DIRECTORS

Institute for Systems Biology;
International Society for Stem Cell
Research (ISSCR)

SCIENTIFIC ADVISORY BOARD

Gladstone Institutes; Institute of
Medical Biology, A*STAR, Singapore

BOARD OF SCIENTIFIC COUNSELORS

Memorial Sloan Kettering Cancer Center



Cornelia M. Weyand, MD, PhD

Professor, Medicine - Immunology and Rheumatology
Chief, Division of Immunology and Rheumatology

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DIVISION immunology.stanford.edu

EDUCATION/TRAINING

MD University of Aachen

DR. MED University of Bonn

PHD University of Heidelberg

MEDICINE RESIDENCY

Hannover Medical School

RHEUMATOLOGY FELLOWSHIP

Stanford University

BOARD CERTIFICATION

Internal Medicine (Germany)

Rheumatology (Germany)

CLINICAL FOCUS

Vasculitis

HONORS & AWARDS

Henry Kunkel Young Investigator Award

Henry Christian Award for Excellence in Research

Ciba-Geigy Award for Excellence in Rheumatology Research

Carol Nachmann Award for Rheumatology

Paul Klemperer Award, New York Academy of Medicine

Mayo Distinguished Alumni Award

MEMBER

American Society for Clinical Investigation; Association of American Physicians

CURRENT RESEARCH

My research is focused on defining and characterizing pathogenic immune responses in humans with emphasis on 2 disease models; inflammatory blood vessel disease and rheumatoid arthritis. In large vessel vasculitis, we have defined disease-relevant T cells, discerned mechanisms of T cell-antigen recognition, connected different T cell lineages to early and late disease and discovered microenvironmental signals that shape pathogenic immunity in the walls of human arteries. We were the first to describe the role of arterial wall dendritic cells in sensing danger-associated molecular patterns and initiating vasculitis and have implicated NOTCH-NOTCH ligand interactions in directing the tissue tropism of large vessel vasculitis. We build patient-relevant experimental models by engrafting human blood vessels, human atherosclerotic plaque and human immune cells into mice. Work in rheumatoid arthritis has identified premature immune aging as a typifying defect in this autoimmune syndrome. We are examining the contribution of DNA instability, telomeric damage and metabolic abnormalities in accelerated immune cell aging and inflammatory disease.

The immune system is everywhere. All diseases have their roots in the immune system.

SELECTED PUBLICATIONS

Inhibition of JAK-STAT Signaling Suppresses Pathogenic Immune Responses in Medium and Large Vessel Vasculitis. Zhang H, Watanabe R, Berry GJ, Tian L, Goronzy JJ, Weyand C. *Circulation*. 2017 Dec 18.

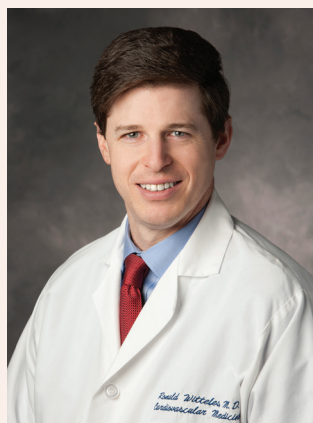
The microvascular niche instructs T cells in large vessel vasculitis via the VEGF-Jagged1-Notch pathway. Wen Z, Shen Y, Berry G, Shahram F, Li Y, Watanabe R, Liao YJ, Goronzy JJ, Weyand CM. *Sci Transl Med*. 2017 Jul 19;9(399).

Pyruvate controls the checkpoint inhibitor PD-L1 and suppresses T cell immunity. Watanabe R, Shirai T, Namkoong H, Zhang H, Berry GJ, Wallis BB, Schaefgen B, Harrison DG, Tremmel JA, Giacomini JC, Goronzy JJ, Weyand CM. *J Clin Invest*. 2017 Jun 30;127(7):2725-2738.

Immunoinhibitory checkpoint deficiency in medium and large vessel vasculitis. Zhang H, Watanabe R, Berry GJ, Vaglio A, Liao YJ, Warrington KJ, Goronzy JJ, Weyand CM. *Proc Natl Acad Sci USA*. 2017 Feb 7;114(6):E970-E979.

Metabolic control of the scaffold protein TKS5 in tissue-invasive, proinflammatory T cells. Shen Y, Wen Z, Li Y, Matteson EL, Hong J, Goronzy JJ, Weyand CM. *Nat Immunol*. 2017 Sep;18(9):1025-1034.

The glycolytic enzyme PKM2 bridges metabolic and inflammatory dysfunction in coronary artery disease. Shirai T, Nazarewicz RR, Wallis BB, Yanes RE, Watanabe R, Hilhorst M, Tian L, Harrison DG, Giacomini JC, Assimes TL, Goronzy JJ, Weyand CM. *J Exp Med* 213:337-354, 2016.



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Co-Director, Stanford Amyloid Center
Program Director, Internal Medicine Residency Training Program

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AMYLOID CENTER stanfordhospital.org/cardiovascularhealth/amyloid

RESIDENCY PROGRAM medicine.stanford.edu/education/residency.html

EDUCATION/TRAINING

MD University of Chicago

MEDICINE RESIDENCY

Stanford University

CHIEF RESIDENT IN INTERNAL MEDICINE

Stanford University

CARDIOLOGY FELLOWSHIP

Stanford University

BOARD CERTIFICATION

Internal Medicine, ABIM
Cardiovascular Disease, ABIM
Advanced Heart Failure/Transplant
Cardiology, ABIM

CLINICAL FOCUS

Heart Failure
Amyloidosis
Cardiac complications of cancer
therapy ("Cardio-Oncology")
Sarcoidosis

HONORS & AWARDS

David Rytand Award for Excellence
in Clinical Teaching, Department of
Medicine (2009, 2010)

Heart Failure Society of America

National Research Fellowship Award

Timothy F. Beckett, Jr. Award for
Excelling in Clinical Teaching

FELLOW

American College of Cardiology;
American College of Physicians

CURRENT RESEARCH

My research focuses on three primary areas: amyloidosis, cardiac complications of cancer therapy, and cardiac sarcoidosis. As Co-Director of one of the nation's largest Amyloid Centers, I collaborate with partners throughout the campus on clinical trials, epidemiologic research, and laboratory-based research dedicated to a better understanding of and better treatments for cardiac amyloidosis. In the area of cardiac complications of cancer therapy ("Cardio-Oncology"), I collaborate with partners in the Divisions of Hematology and Medical Oncology to investigate optimal screening and treatment of cancer-therapy associated cardiac disease. In the area of cardiac sarcoidosis, I collaborate with colleagues in Nuclear Imaging and Immunology to better image and treat the disease.

My career goal is to pursue excellence in and
integration of the three cornerstones of academic
medicine—clinical care, scholarship, and education.

SELECTED PUBLICATIONS

Tafamidis treatment for patients with transthyretin amyloid cardiomyopathy. Maurer MS, Schwartz JH, Gundapaneni B, Elliott PM, Merlini G, Waddington-Cruz M, Kristen AV, Grogan M, Witteles R, Damy T, Drachman BM, Shah SJ, Hanna M, Judge DP, Barsdorf AI, Huber P, Patterson TA, Riley S, Schumacher J, Stewart M, Sultan MB, Rapezzi C; ATTR-ACT Study Investigators. *N Engl J Med*. 2018 Sep;379(11):1007-1016.

Functional cardiac recovery and hematologic response to chemotherapy in patients with light-chain amyloidosis. Tuzovic M, Kobayashi Y, Wheeler M, Barrett C, Liedtke M, Lafayette R, Schrier S, Haddad F, Witteles R. *Am J Cardiol*. 2017 Oct;120(8):1381-1386.

The state of medical school performance evaluations: Improved transparency or continued obfuscation? Hom J, Richman I, Hall P, Ahuja N, Harman S, Harrington R, Witteles R. *Academic Medicine*. 2016 Nov;91(11):1534-39.

Myocardial protection during cardiotoxic chemotherapy. Witteles RM, Bosch X. *Circulation*. 2015 Nov;132(19):1835-45.

Changing outcomes after heart transplantation in patients with amyloid cardiomyopathy. Davis MK, Lee PH, Witteles RM. *J Heart Lung Transplant*. 2015 Sep;34(5):685-66.

Radiation-induced heart disease: an under-recognized entity? Davis M, Witteles RM. *Curr Treat Options Cardiovasc Med*. 2014 Jun;16(6):317.



Y. Joseph Woo, MD

Norman E. Sumway Professor and Chair
Department of Cardiothoracic Surgery
Professor, by courtesy, Department of Bioengineering

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DEPARTMENT ctsurgery.stanford.edu

CURRENT RESEARCH

My research focus is the development of novel genetic, molecular and cellular strategies for treating myocardial ischemia and heart failure. We are investigating new paths to myocardial repair through angiogenesis, stem cells and tissue engineering. We are also exploring the newest techniques and devices for heart care: innovative approaches to mitral and aortic valve repair; smaller, more efficient mechanical heart pumps; and operations performed without stopping the heart.

Innovative pioneering cardiovascular surgeons Shumway, Reitz, and Robbins built and led the Stanford program to preeminence. It is truly a privilege to become a part of this amazingly prestigious, high- powered academic institution.

SELECTED PUBLICATIONS

Modeling Conduit Choice for Valve-Sparing Aortic Root Replacement on Biomechanics with a 3D-Printed Heart Simulator. Paulsen MJ, Kasinipila P, Imbrie-Moore AM, Wang H, Hironaka CE, Koyano TK, Fong RM, Farry JM, Chiu PE, Goldstone AB, Stapleton LM, Steele AN, Ma M, Woo YJ. *J Thorac Cardiovasc Surg* 2019 (in press).

Rapid Self-Assembly of Bioengineered Cardiovascular Bypass Grafts from Scaffold-Stabilized, Tubular Bilevel Cell Sheets. Von Bornstadt D, Wang H, Paulsen MJ, Goldstone AB, Eskandari A, Thakore A, Stapleton L, Steele AN, Truong VN, Jaatinen, Hironaka C, Woo YJ. *Circulation* 2018 Nov 6;138(19):2130-2144.

Second Arterial versus Venous Conduits for Multi-Vessel Coronary Artery Bypass Surgery in California. Goldstone AB, Chiu P, Baiocchi M, Wang H, Lingala B, Boyd JH, Woo YJ. *Circulation* 2018 Apr 17;137(16):1698-1707.

Mechanical or Biologic Prostheses for Aortic- and Mitral-Valve Replacement. Goldstone AB, Chiu PE, Baiocchi M, Lingala B, Patrick WL, Fischbein MP, Woo YJ. *New England Journal of Medicine* 2017 Nov 9;377(19):1847-1857.

An Innovative Biologic System for Photo-Powered Myocardium in the Ischemic Heart. Cohen JE, Goldstone AB, Paulsen MJ, Shudo Y, Steele AN, Edwards BB, Patel JB, MacArthur JW, Hopkins MS, Burnett CE, Jaatinen KJ, Thakore AD, Farry JM, Truong VN, Bourdillon AT, Stapleton LM, Eskandari A, Fairman AS, Hiesinger W, Esipova TV, Patrick WL, Ji K, Shizuru JA, Woo YJ. *Science Advances* 2017 Jun 14;3(6):e1603078.

One Hundred Years at Stanford University: Thoracic and Cardiovascular Surgery. Woo YJ and Reitz BR. *Semin Thorac and Cardiovasc Surg* 2015 Winter;27(4):388-397.

EDUCATION/TRAINING

MD University of Pennsylvania

BS Massachusetts Institute of Technology

SURGERY RESIDENCY & INTERNSHIP
University of Pennsylvania

RESEARCH FELLOWSHIP
University of Pennsylvania

CARDIOTHORACIC SURGERY FELLOWSHIP
University of Pennsylvania

BOARD CERTIFICATION
Surgery, ABS
Thoracic Surgery, ABTS

CLINICAL FOCUS

Cardiothoracic Surgery

HONORS & AWARDS

Clinical Research Forum, USA Top Ten Clinical Research Award Recipient (2018)

Top Doctor of Bay Area, San Francisco Magazine (2015, 2016, 2017, 2018)

Surgical Mentorship Teaching Award, University of Pennsylvania (2013)

Luigi Mastroianni Clinical Innovator Award, University of Pennsylvania (2012)

ASSOCIATE EDITOR
Journal of Thoracic and Cardiovascular Surgery

FELLOW American Heart Association, American College of Cardiology, American College of Surgeons



Joseph C. Wu, MD, PhD

Director, Stanford Cardiovascular Institute

Simon H. Stertz, MD, Professor of Cardiovascular Medicine & Radiology

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EDUCATION/TRAINING

MD Yale University

PHD UCLA

MEDICINE RESIDENCY

UCLA Medical Center

CARDIOLOGY FELLOWSHIP

UCLA Medical Center

BOARD CERTIFICATION

Cardiovascular Disease, ABIM

CLINICAL FOCUS

Adult Congenital Heart Disease

Cardiovascular Imaging

HONORS & AWARDS

NIH Director's New Innovator Award

NIH Roadmap Transformative Award

Presidential Early Career Award for Scientists and Engineers, White House Office of Technology

American Heart Association Established Investigator Award

Academy of Radiology Research Distinguished Investigator Award

Burroughs Wellcome Foundation

American Heart Association Merit Award

AHA Distinguished Scientist

MEMBER

American Society for Clinical Investigation; Association of University Cardiologists; Scientific Advisory Board Keystone Symposia (2014-2020); Association of American Physicians AHA Chair of Research Committee & National Board of Directors (2017-2019); FDA Cellular, Tissue, and Gene Advisory Committee (2017-2020); Burroughs Wellcome Foundation Innovatoin in Regulatory Science

CURRENT RESEARCH

My lab focuses on biological mechanisms of patient-specific and disease-specific induced pluripotent stem cells (iPSCs). The main goals are to (i) understand basic cardiovascular disease mechanisms, (ii) accelerate drug discovery and screening, (iii) develop the "clinical trial in a dish" concept, and (iv) implement precision cardiovascular medicine for disease prevention and treatment of patients. My lab uses a combination of advanced genomics, stem cells, cellular & molecular biology, physiological testing, and molecular imaging technologies to better understand molecular and pathophysiological processes.

The missions of the Stanford CVI are to deliver excellence in clinical care, world-class education, and cutting-edge research that will improve the medical care and quality of life of our patients.

SELECTED PUBLICATIONS

Autologous iPSC-based vaccines elicit anti-tumor responses in vivo. Kooreman NG, Kim Y, de Almeida PE, Termglinchan V, Diecke S, Shao NY, Wei TT, Yi H, Dey D, Nelakanti R, Brouwer TP, Paik DT, Barfi I, Han A, Quax PHA, Hamming JF, Levy R, Davis MM, Wu JC. *Cell Stem Cell* 2018;22(4):501-537.

High-throughput screening of tyrosine kinase inhibitor-induced cardiotoxicity using human induced pluripotent stem cells. Sharma A, Burrridge PW, McKeithan WL, Serrano R, Shukla P, Sayed N, Churko JM, Kitani T, Wu H, Holmstrom A, Matsa E, Zhang Y, Kumar A, Fan AC, del Alamo JC, Wu SM, Moslehi JJ, Mercola M, Wu JC. *Sci Transl Med* 2017;9(377).

Transcriptome profiling of patient-specific human iPSC-cardiomyocytes predicts individual drug safety and efficacy responses in vitro. Matsa E, Burrridge PW, Yu KH, Ahrens JH, Termglinchan V, Wu H, Liu H, Shukla P, Sayed N, Churko JM, Shao N, Woo NA, Chao AS, Gold JD, Karakikes I, Snyder MP, Wu JC. *Cell Stem Cell* 2016;19:311-325.

Abnormal activation of TGFbeta signaling as a pathogenesis of left ventricular non-compaction cardiomyopathy. Kodo K, Ong SG, Jahanbani F, Termglinchan V, Hirano K, Inanloo Rahatloo K, Ebert AD, Shukla P, Abilez OJ, Churko JM, Karakikes I, Jung G, Ichida F, Wu SM, Snyder MP, Bernstein D, Wu JC. *Nature Cell Biology* 2016;18(10):1031-42.

Human induced pluripotent stem-derived cardiomyocytes recapitulate the predilection of breast cancer patients to doxorubicin-induced cardiotoxicity. Burrridge PW, Li YF, Matsa E, Wu H, Ong SG, Sharma A, Chang AC, Coronado MJ, Ebert AD, Knowles JW, Tellis ML, Witteles RM, Blau HM, Bernstein D, Altman RB, Wu JC. *Nature Medicine* 2016;22(5):547-56.

Chemically defined generation of human cardiomyocytes. Burrridge PW, Matsa E, Shukla P, Lin ZC, Churko JM, Ebert AD, Lan F, Diecke S, Huber B, Mordwinkin NM, Plews JR, Abilez OJ, Cui B, Gold JD, Wu JC. *Nature Methods* 2014;11(8):855-860.



Sean M. Wu, MD, PhD

Associate Professor of Medicine (Cardiovascular Medicine) and
Associate Professor (by courtesy), Pediatrics
Endowed Faculty Scholar, Child Health Research Institute

EMAIL smwu@stanford.edu

PROFILE med.stanford.edu/profiles/Ming-Wu

LAB seanwulab.stanford.edu

EDUCATION/TRAINING

MD Duke University

PHD Duke University

MEDICINE RESIDENCY

Duke University Hospital

CARDIOLOGY FELLOWSHIP

Massachusetts General Hospital

RESEARCH FELLOWSHIP

Boston Children's Hospital

BOARD CERTIFICATION

Internal Medicine, ABIM

Cardiovascular Medicine, ABIM

CLINICAL FOCUS

General Cardiology

HONORS & AWARDS

Kenneth D. Bloch Memorial Lecturer,
American Heart Association Scientific
Sessions (2018)

Established Investigator Award,
American Heart Association (2016)

Elected Member, American Society for
Clinical Investigation (2016)

Department of Medicine Teaching Award,
Stanford University School of Medicine
(2015)

NIH Director's Pioneer Award, NIH Office
of the Director (2014)

David Lawrence Stein Award, American
Heart Association-Western Affiliate
(2014)

Fellow, American College of Cardiology
(2009)

NIH Director's New Innovator Award, NIH
Office of the Director (2008)

CURRENT RESEARCH

My research laboratory seeks to identify mechanisms responsible for human congenital heart disease, the most common cause of still-births in the U.S. and one of the major contributors to morbidity and mortality in infants and toddlers. We believe that by understanding the mechanisms regulating growth and differentiation of heart precursor cells during early embryonic development we can then apply these principles to understand the pathogenesis of adult onset heart diseases such as heart failure and arrhythmia where re-activation of early embryonic developmental program plays a central role. We currently use both genetically-modified mice as our living model to understand the biology of heart development as well as embryonic stem cells as a test-tube model to study the process of heart cell formation.

SELECTED PUBLICATIONS

Single-cell transcriptomics of 20 mouse organs creates a Tabula Muris. Schaum N, Karkanias J, Neff NF, ... (260 authors) ...Wu SM, Quake SR, Wyss-Coray T. (2018) *Nature*. 562(7727):367-372.

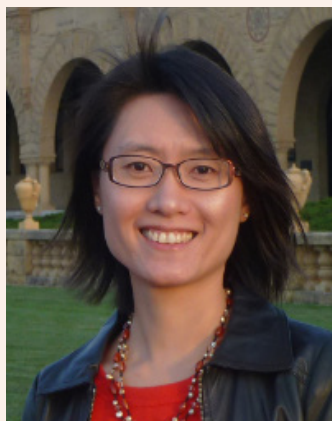
Bioacoustic-enabled assembly of human iPSC-derived cardiomyocytes into 3D cardiac tissues. Serpooshan V, Chen P, Wu H, Lee S, Sharma A, Hu DA, Venkatraman S, Ganesan AV, Yarmush M, Yang F, Wu JC, Demirci U, Wu SM. (2017) *Biomaterials*. 131:47-57.

YY1 expression is sufficient for the maintenance of cardiac progenitor cell state. Gregoire S, Li G, Sturzu A, Schwartz RJ, Wu SM. (2017) *Stem Cells*. 35(8):1913-1923

Transcriptomic profiling maps anatomically patterned subpopulations among single embryonic cardiac cell. Li G, Xu A, Sim S, Priest JR, Tian X, Khan T, Zhou B, Quertermous T, Tsao PS, Quake SR, Wu SM. (2016) *Dev Cell*. 39(4):491-507.

The fetal mammalian heart generates a robust compensatory response to cardiac cell loss. Sturzu, A.C., Kuppusamy, R., Passer, D., Plonowska, K., Riley, A., Tan, T.C., Sharma, A., Xu, A.F., Engels, M.C., Feistritz, R., Li, G., Selig, M.K., Geissler, R., Robertson, K.D., Sherrer-Crosbie, M., Domian, I.J., Wu, S.M. (2015) *Circulation*. 132(2):109-21.

Identification of cardiovascular lineage descendants at single cell resolution. Li, G., Plonowska, K., Kuppusamy, R., Sturzu, A., Wu, S.M. (2015) *Development*. 142(5):846-57.



Fan Yang, PhD

Associate Professor of Orthopedic Surgery and of Bioengineering

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EDUCATION/TRAINING

PHD Johns Hopkins University,
Biomedical Engineering

HONORS & AWARDS

Society for Biomaterials Young
Investigator Award (2016)

Biomaterials Science Lectureship Award
(2016)

California Institute of Technology Tools
and Technologies Award (2015-2018)

NSF Faculty Early Career Development
(CAREER) award, National Science
Foundation (2014-2019)

2011 Technology Review TR35 Global
List (2011)

3M Nontenured Faculty Grant Award, 3M
(2012-2015)

Stanford Asian American Faculty Award,
Stanford University (2013)

Mission for Learning Faculty Scholar
Award in Pediatric Translational
Medicine, Child Health Research
Institute (2013-2015)

Young Investigator Award, Alliance for
Cancer and Gene Therapy, Alliance for
Cancer and Gene Therapy (2013)

Basil O' Connor Starter Scholar Research
Award, March of Dimes Foundation
(2012-2014)

McCormick Faculty Award (2011)

Faulty Scholar of the Donal E. and Delia
B. Baxter Foundation (2010)

CURRENT RESEARCH

A bioengineer by training, I work at the interface of biomaterials, stem cell biology, engineering, and medicine. Using an interdisciplinary approach, my research seeks: (1) to decipher how interactive microenvironmental cues (cell-matrix or cell-cell interactions) regulate cell fate during normal tissue development and during disease progression (cancer), and (2) to develop novel biomaterials and stem cell-based therapeutics to improve tissue regeneration. Using biomaterials-mediated approaches, my lab employs two strategies to engineer stem cells: from the "outside in" via novel scaffold design and from the "inside out" via non-viral gene delivery. In the first strategy, we engineer injectable hydrogels using a "lego-building" approach in order to independently tune cell-niche properties including biochemical, mechanical, and topographical cues. These biomaterials are useful for elucidating the mechanisms of multifactorial cell-niche interactions, and for enabling desirable cell fates and tissue regeneration with particular functions. In the second strategy, we harness the ability of stem cells to home to diseases sites and their ability to enhance tissue regeneration via paracrine signaling. We further modulate the paracrine signaling of stem cells using biodegradable polymeric nanoparticle-mediated non-viral gene delivery, which is safer than conventional viral vectors. Using relevant animal models, we have demonstrated the potential applications of such stem cell- and biomaterials-based strategies for treating musculoskeletal diseases, cardiovascular diseases, and cancer.

SELECTED PUBLICATIONS

Contractile force generation by 3D hiPSC-derived cardiac tissue is enhanced by rapid establishment of cellular interconnection in matrix with muscle-mimicking stiffness. Lee S*, Serpooshan V*, Tong X, Venkatraman S, Lee M, Wu SM, Yang F. *Biomaterials*. 2017 Jul;131:111-120.

Polymer-DNA nanoparticle induced CXCR4 overexpression improves stem cell engraftment and tissue regeneration in a mouse hindlimb ischemia model. Devezza L, Choi J, Lee J, Huang N, Cooke J, Yang F. *Theranostics*, 2016 May 23;6(8):1176-89.

Adipose Derived Stromal Cells Overexpressing Vascular Endothelial Growth Factor Accelerate Wound Closure in a Mouse Excisional Wound Healing Model. Nauta A, Seidel C, Devezza L, Montoro D, Grova M, Ko SH, Hyun J, Gurtner G, Longaker MT, Yang F. *Molecular Therapy*, 2013 Feb;21(2):445-55.

Nanoparticle engineered TRAIL-overexpressing adipose-derived stem cells target and eradicate glioblastoma via intracranial delivery. Jiang X, Fitch S, Wang C, Wilson C, Li JF, Song B, Grant G, Yang F. *Proc Natl Acad Sci USA*, 2016 Nov 29;113(48):13857-13862. Epub 2016 Nov 14.

Sliding hydrogels with mobile molecular ligands and crosslinks as 3D stem cell niche. Tong X, Yang F. *Advanced Materials*, 2016 Sep;28(33):7257-63.



Phillip C. Yang, MD

Associate Professor, Medicine - Cardiovascular Medicine
 Director, Cardiovascular Stem Cell Laboratory
 Director, Cardiothoracic MRI Program

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CURRENT RESEARCH

Our research interest focuses on the fundamental molecular and cellular processes of myocardial regeneration and restoration. We employ novel *in vivo* multi-modality molecular and cellular imaging technology to translate basic discovery in stem cell biology. Autologous iPSCs are considered a potential landmark solution. Translational effort of this revolutionary biology is investigated through the exosomes generated from patient- and disease-specific iPSC-cardiovascular cells and their molecular cargo to implement precision medicine. Through NIH/NHLBI-sponsored Cardiovascular Cell Therapy Research Network, the feasibility of a pilot clinical trial of this innovative therapeutic approach is investigated.

Success consists of going from failure to failure without loss of enthusiasm. — Winston Churchill

SELECTED PUBLICATIONS

Induced Pluripotent Stem Cell (iPSC)-Derived Exosomes for Precision Medicine in Heart Failure. Yang PC. *Circ Res*. 2018 Mar 2;122(5):661-663

Paracrine Effects of the Pluripotent Stem Cell-Derived Cardiac Myocytes Salvage the Injured Myocardium. Tachibana A, Mahmoudi M, Shukla P, Rulifson E, Santoso MR, Bennett M, Goldstone AB, Wang M, Fukushi M, Ebert A, Wu J, Woo YJ, Yang PC. *Circ Res* 2017 Sep 1;121(6):e22-e36.

Myocardial Edema on T2-Weighted MRI: New Marker of Ischemia Reperfusion Injury and Adverse Myocardial Remodeling. Tada Y, Yang PC. *Circ Res*. 2017 Aug 4;121(4):326-328.

Exosomes generated from iPSC-derivatives: new direction for stem cell therapy in human heart diseases. Jung J, Fu X, Yang PC. *Circulation Res* 2017 Jan 20;120(2):407-417

Circulating Biomarkers to Identify Responders in Cardiac Cell therapy. Jokerst J, Cauwenberghs N, Kouznetsova T, Haddad F, Sweeney T, Hou J, Rosenberg-Hasson Y, Zhao E, Schutt R, Bolli R, Traverse J, Henry J, Pepine C, Schulman I, Moye L, Taylor D, Yang, PC. *Nature Sci Rep*. 2017 Jun 30;7(1):4419.

Novel MRI Contrast Agent from Magnetotactic Bacteria Enables In Vivo Tracking of iPSC-derived Cardiomyocytes. Mahmoudi M, Tachibana A, Gladstone AB, Woo YJ, Chakraborty P, Muth K, Foote C, Pieciewicz S, Barrozo J, Wakeel A, Rice B, Bell III C, Yang PC. *Nature Sci Rep*. 2016 Jun 6;6:26960.

Epicardial FSTL1 Reconstitution Regenerates the Adult Mammalian Heart. Wei K, Serpooshan V, Hurtado C, Diez-Cunado M, Zhao M, Maruyama S, Zhu W, Fajaro G, Nosedo M, Nakamura K, Tian X, Liu Q, Wang A, Matsuura Y, Bushway P, Cai W, Savchenko A, Mahmoudi M, Schneider M. Epicardial FSTL1 Reconstitution Regenerates the Adult Mammalian Heart. *Nature* 2015 Sep 24;525(7570):479-85

EDUCATION/TRAINING

MD Yale University

MEDICINE RESIDENCY & INTERNSHIP
 UCLA

CARDIOLOGY FELLOWSHIP
 Stanford University

ADVANCED CARDIOLOGY IMAGING
 FELLOWSHIP Stanford University

BOARD CERTIFICATION
 Cardiovascular Disease, ABIM
 Echocardiography, Level III, ASE
 Cardiac MRI, Level III, SCMR

CLINICAL FOCUS

General Cardiology
 Cardiovascular Imaging
 Cardiovascular and Molecular Therapy

HONORS & AWARDS

Young Investigator Award, American
 College of Cardiology (ACC)

Burroughs Wellcome Scholar

NIH Career Development Award

NIH Career Enhancement Award in Stem
 Cell Research

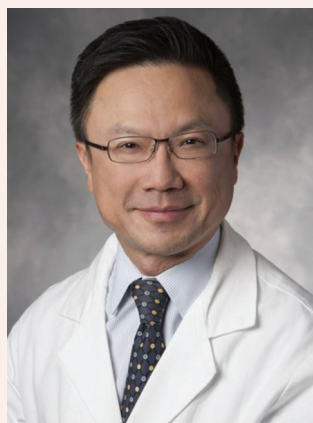
Young Investigator Award, American

Melvin Judkins YIA, AHA (Senior author,
 2009, 2010, 2012, 2014, 2016, 2018)

Co-Chair, AHA Cardiovascular Stem Cell
 Writing Group

PRINCIPAL INVESTIGATOR

NIH Patient-Oriented Research in Cell
 Therapy
 NIH Cardiovascular Cell Therapy
 Research Network
 Novartis, Investigator Initiated Research



Alan C. Yeung, MD

Li Ka Shing Professor of Medicine (Cardiology)
Medical Director, Cardiovascular Health, Stanford Medicine
Chief (Clinical), Division of Cardiovascular Medicine
Former Director, Interventional Cardiology

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EDUCATION/TRAINING

MD Harvard Medical School

MEDICINE RESIDENCY & INTERNSHIP

Massachusetts General Hospital

CLINICAL CARDIOLOGY FELLOWSHIP

Brigham and Women's Hospital

RESEARCH CARDIOLOGY FELLOWSHIP

Harvard Medical School

BOARD CERTIFICATION

Internal Medicine, ABIM

Cardiovascular Disease, ABIM

Interventional Cardiology, ABIM

CLINICAL FOCUS

Interventional Cardiology

HONORS & AWARDS

BOARD OF TRUSTEES

Li Ka Shing Foundation and Shantou University, Hong Kong

BOARD OF DIRECTORS

Cardiology Research Foundation, South Korea; Chien Foundation, Hong Kong

EDITORIAL BOARD

Journal of the American College of Cardiology (JACC)

REVIEW BOARD

Circulation

FORMER CHAIR

ABIM Interventional Cardiology Examination Board Chair

CURRENT RESEARCH

My current research extends beyond stents and devices, focusing on interventions that could lead to long term health in all our cardiac patients. We are exploring this through mobile health as well as big data. I remain interested in device development such as percutaneous valves, new bioabsorbable stents and new ways to treat hypertension using renal denervation techniques. I am the Medical Director of Cardiovascular Health at Stanford Medicine and Chief (Clinical), of Division of Cardiovascular Medicine and Former Director of Interventional Cardiology.

Imagine a day when the interests of patients, physicians and the health care system are all aligned: to enhance the health of our patients physically and mentally.

SELECTED PUBLICATIONS

Efficacy and safety of novel multi-lumen catheter for chronic total occlusions: From preclinical study to first-in-man experience. Mitsutake Y, Ebner A, Yeung AC, Taber MD, Davidson CJ, Ikeno F. *Catheter Cardiovasc Interv*. 2014 Oct 20.

Continuous flow left ventricular assist device placement complicated by aortic valve thrombus and myocardial infarction. Kim JB, Rhee JW, Brenner DA, Ha R, Banerjee D, Yeung AC, Tremmel JA. *Int J Cardiol*. 2014 Oct 20;176(3):e102-3.

Dichloroacetate prevents restenosis in preclinical animal models of vessel injury. Deuse T, Hua X, Wang D, Maegdefessel L, Heeren J, Scheja L, Bolaños JP, Rakovic A, Spin JM, Stubbendorff M, Ikeno F, Länger F, Zeller T, Schulte-Uentrop L, Stoehr A, Itagaki R, Haddad F, Eschenhagen T, Blankenberg S, Kiefmann R, Reichenspurner H, Velden J, Klein C, Yeung A, Robbins RC, Tsao PS, Schrepfer S. *Nature*. 2014 May 29;509(7502):641-4.

Clinical interpretation and implications of whole-genome sequencing. Dewey FE, Grove ME, Pan C, Goldstein BA, Bernstein JA, Chaib H, Merker JD, Goldfeder RL, Enns GM, David SP, Pakdaman N, Ormond KE, Caleshu C, Kingham K, Klein TE, Whirl-Carrillo M, Sakamoto K, Wheeler MT, Butte AJ, Ford JM, Boxer L, Ioannidis JP, Yeung AC, Altman RB, Assimes TL, Snyder M, Ashley EA, Quertermous T. *JAMA*. 2014 Mar 12;311(10):1035-45.



Paul Yock, MD

Martha Meier Weiland Professor of Medicine
Professor, Bioengineering
Professor, Medicine - Cardiovascular Medicine
Professor (by courtesy), Mechanical Engineering and Graduate School of Business
Director, Stanford Byers Center for Biodesign

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EDUCATION/TRAINING

MD Harvard University

MEDICINE RESIDENCY & INTERNSHIP
USCF

CARDIOLOGY FELLOWSHIP
Stanford University

CORONARY ANGIOPLASTY FELLOWSHIP
Sequoia Hospital

BOARD CERTIFICATION
Internal Medicine, ABIM
Cardiovascular Disease, ABIM

CLINICAL FOCUS

Cardiovascular Disease

HONORS & AWARDS

Transcatheter Therapeutics (TCT) Career Achievement Award

Distinguished Scientist Award, American College of Cardiology

DOCTOR OF SCIENCE (HONORIS CAUSA)
Amherst College

FOUNDING CO-CHAIR
Bioengineering, Stanford University

ADVISORY BOARD
Stanford Technology Ventures Programs

LEADERSHIP GROUP
Stanford CTSA application and program

FELLOW
American College of Cardiology;
American Institute for Medical and Biological Engineering

MEMBER
Association of American Physicians
National Academic of Engineering
Stanford Cardiovascular Institute

CURRENT RESEARCH

I direct the Byers Center in Biodesign, a unit of Stanford's Bio-X initiative that focuses on invention and technology transfer related to biomedical engineering. The Biodesign program includes courses, training, mentoring and seed grant programs for faculty and postdoctoral, graduate and undergraduate students.

A well-characterized need is the DNA of a good invention.

SELECTED PUBLICATIONS

Noninvasive estimation of right ventricular systolic pressure by Doppler ultrasound in patients with tricuspid regurgitation. Yock PG, Popp RL. *Circulation*, 70: 657-662, 1984.

The safety of intracoronary ultrasound: A multi-center survey of 2207 examinations. Hausmann D, Erbel R, Alibelli-Chemarin MJ, Boks W, Yock PG. *Circulation*, 91(3): 623-30, 1995.

Angioplasty method. Yock P. Issued August 20, 1991; US patent no. 5,040,548.

Biodesign: The Process of Innovating Medical Technologies. Yock, P, Zenios S, Makower J, senior editors: New York: Cambridge University Press, 2015. 839 pp.

Outcomes from a postgraduate biomedical technology innovation training program: The first 12 years of Stanford Biodesign. Brinton TJ, Kurihara CQ, Camarillo DB, Pietzsch JB, Gorodsky J, Zenios SA, Doshi R, Shen C, Kumar U, Mairal A, Watkins J, Popp RL, Wang PJ, Makower J, Krummel TM, Yock PG. *Annals of Biomedical Engineering*, 41(9): 1803-1810, 2013.



Roham Zamanian, MD, FCCP

Associate Professor - Med Center Line, Medicine - Pulmonary & Critical Care Medicine
Director, Stanford Adult Pulmonary Hypertension Program
Vera Moulton Wall Center for Pulmonary Vascular Disease

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EDUCATION/TRAINING

MD University of California Irvine

RESIDENCY and INTERNSHIP
University of Irvine Medical Center

FELLOWSHIP
Stanford University

SUPER-FELLOWSHIP (2004-2006)
eBay Pulmonary Vascular Fellow, Vera Moulton Wall Center for Pulmonary Vascular Disease

BOARD CERTIFICATION
Pulmonary Disease, ABIM (2006)

HONORS & AWARDS

Junior Faculty Scholar Award, Vera Moulton Wall Center (2013-2018)

Fellow of the American College of Chest Physicians, American College of Chest Physicians (2008)

Faculty Teaching Award, Dept of Medicine, Stanford (2007)

Young Investigator Career Development Award, Entelligence Actelion Young

Investigators Program (2006-2007)

Fellow of the Year, Univ of California, Irvine Medical Center (2002-2003)

Resident Research Presentation Award, Univ of Calif, Irvine Medical Center -

Dept of Medicine (2001)

Case Presentation Award, ACCP - Chest 2000 (2000)

CURRENT RESEARCH

My research is focused on the development of risk prediction and leading-edge phenotyping strategies for patients with pulmonary arterial hypertension (PAH), as well as the translation of basic laboratory discoveries into clinical therapeutics at bedside. Over the past 5 years, I have been involved in the design, implementation, analysis, and reporting of phase 1 and phase 2 proof of concept PAH clinical trials.

My heroes are the ones who survived doing it wrong,
who made mistakes, but recovered from them —
Bono, U2.

SELECTED PUBLICATIONS

Features and Outcomes of Methamphetamine Associated Pulmonary Arterial Hypertension. Zamanian RT, Hedlin H, Greuenwald P, Wilson DM, Segal JI, Jorden M, Kudelko K, Liu J, Hsi A, Rupp A, Sweatt AJ, Tudor R, Berry GJ, Rabinovitch M, Doyle RL, De Jesus Perez V, Kawut SM. *Am J Respir Crit Care Med*. 2017 Sep 21.

Randomised placebo-controlled safety and tolerability trial of FK506 (tacrolimus) for pulmonary arterial hypertension. Spiekerkoetter E, Sung YK, Sudheendra D, Scott V, Del Rosario P, Bill M, Haddad F, Long-Boyle J, Hedlin H, Zamanian RT. *Eur Respir J*. 2017 Sep 11;50(3).

Low-Dose FK506 (Tacrolimus) in End-Stage Pulmonary Arterial Hypertension. Spiekerkoetter E, Sung YK, Sudheendra D, Bill M, Aldred MA, van de Veerdonk MC, Vonk Noordegraaf A, Long-Boyle J, Dash R, Yang PC, Lawrie A, Swift AJ, Rabinovitch M, Zamanian RT. *Am J Respir Crit Care Med*. 2015 Jul 15;192(2):254-7

Single- vs double-lung transplantation in patients with chronic obstructive pulmonary disease and idiopathic pulmonary fibrosis since the implementation of lung allocation based on medical need. Schaffer JM, Singh SK, Reitz BA, Zamanian RT, Mallidi HR. *JAMA*. 2015 Mar 3;313(9):936-48.



Richard Zare, PhD

Marguerite Blake Wilbur Professor in Natural Science and Professor (by courtesy) of Physics

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EDUCATION/TRAINING

PHD Harvard University

HONORS & AWARDS

National Medal of Science, National Science Foundation (1983)

Wolf Prize in Chemistry (2005)

Presidential Award for Excellence in Science, Mathematics, and Engineering Mentoring (PAESMEM), U.S. Office of Science and Technology Policy (2009)

Priestley Medal of the American Chemical Society (2010)

BBVA Foundation Frontiers of Knowledge Award in the Basic Sciences category (2010)

King Faisal International Prize in Science, King Faisal Foundation (2011)

Othmer Gold Medal from the Chemical Heritage Foundation (2017)

CURRENT RESEARCH

Current research in the Zare lab explores wide-ranging questions in physical and analytical chemistry, from the study of elementary chemical reactions to chemical analysis of extraterrestrial materials. The major focus of these efforts is chemical analysis on the nanoscale. The team has devised tools and techniques to examine molecules in extremely tiny volumes – the volumes characteristic of what is found in heterogeneous structures in mineral samples or in the contents of cells and subcellular compartments. Group members have also made contributions to understanding chemical reactions in microdroplets.

SELECTED PUBLICATIONS

Diagnosis of Prostate Cancer by Desorption Electrospray Ionization Mass Spectrometric Imaging of Small Metabolites and Lipids. S. Banerjee, R. N. Zare, R. J. Tibshirani, C. A. Kunder, R. Nolley, R. Fan, J. D. Brooks, and G. A. Sonn. *Proc. Natl. Acad. Sci. USA* 114, 3334-3339 (2017).

Abiotic Production of Sugar Phosphates and Uridine Ribonucleoside in Aqueous Microdroplets. I. Nam, J. K. Lee, H. G. Nam, and R. N. Zare. *Proc. Nat. Acad. Sci. USA* 114, 12396-12400 (2017).

"On-Droplet" Chemistry: The Cycloaddition of Diethyl Azodicarboxylate and Quadricyclane. R. M. Bain, S. Sathyamoorthi, and R. N. Zare, *Angew. Chemie Int. Ed.* 56, 15083-15087 (2017).

