A billion beats in a lifetime...

Stanford Cardiovascular Institute
Annual Report
6"-18F-fluoromaltotriose PET/CT in a rat with an incidental Staph infection after cardiac surgery before and after antibiotic therapy. Mirwais Wardak

CT coronary angiogram showing a severe lesion in the distal left circumflex coronary artery. Dynamic myocardial perfusion CT demonstrated lower myocardial blood flow during pharmacological vasodilation in the corresponding inferolateral wall (blue). Koen Nieman

CVI Logo 3D printed in Bioink. Vahid Serpooshan

4D blood flow MRI of a patient with pulmonary stenosis. Myriam Amsallem, Francois Haddad, Dominik Fleishman

iPS cells. Antje Ebert
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Dear Friends,

Stanford Medicine is poised to lead the biomedical revolution in Precision Health by leveraging the art and science of medicine to predict and prevent disease before it strikes, and cure it decisively if it does. To achieve this bold vision, we must protect and promote high-risk, high-reward scientific discovery, give our students and trainees the skills they will need for a changing biomedical landscape, and deliver health care that helps individuals thrive based on all factors unique to them.

It is exciting to witness the growth and development of the Stanford Cardiovascular Institute under the leadership of Joseph C. Wu, MD, PhD, Simon H. Stertzer MD Professor of Cardiovascular Medicine and of Radiology. Stanford has a long, proud history of being at the forefront of cardiovascular research and patient care. Transformative innovations emerging from the Institute — from groundbreaking stem cell discoveries to novel methods and tools for disease detection and treatment — continue to revolutionize cardiovascular care. I am especially impressed by the Institute’s commitment to education through its intensive training programs and many forums for trainees and faculty to exchange and build on new ideas. As an excellent example, the upcoming Stanford Drug Discovery Conference in April 2018 will bring some of world’s most accomplished leaders in cardiovascular medicine, research, and pharmaceutical development to the Stanford Medicine community.

The Stanford Cardiovascular Institute is on the cutting edge of basic, applied, and clinical cardiovascular research. It provides state-of-the-art facilities and unique resources that enable brilliant scientists to open up new realms of scientific exploration in cardiovascular medicine. With valuable contributions from all its members, I am confident that the Stanford Cardiovascular Institute will remain an international leader in driving the transformation toward more proactive and personalized Precision Health Care.

Sincerely,

Lloyd B. Minor, MD
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 (CVI), this approach has yielded incredible biomedical advances, marked in part by the over 1,000 manuscripts published by our members in 2017. 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 CVI has grown to include over 100 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: 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 utilize this coded information in clinical decisions; applying cell-based approaches to therapy; and promoting innovative methods of delivering factors that reverse the harmful consequences of aging. As the 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 strength of our Institute comes from our talented students and postdoctoral and clinical fellows. We make their training and professional development a top priority, ensuring that they pursue funding opportunities, offering grant writing support through courses like “Tackling your K” and “Rolling into your R,” and providing a junior faculty mentorship program. We are committed to providing 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. 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 Child Health Research Institute and the Steven M. Gootter Foundation, the Institute awarded twelve seed awards 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 facilitates the promulgation of 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 2017, we also hosted leaders from major Chinese hospitals and Dr. Victor Dzau, President of the National Academy of Medicine, to discuss the current advances in cardiovascular medicine and innovation in both continents during our two-day Stanford-China Cardiovascular Symposium in September. For 2018, we look forward to bringing our community together for two outstanding conferences. In April, we will host the 3rd Annual Stanford Drug Discovery Conference featuring presentations from leading academic researchers, titans of the pharmaceutical and biotechnology industries, and federal and foundation policy makers. Later in the year, we will partner with the Duke Cardiovascular Institute to explore the latest research 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.

Joseph C. Wu, MD, PhD
Leadership

Joseph C. Wu, MD, PhD
Director, Stanford Cardiovascular Institute
Simon H. Stertzer 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
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Mark Nicolls, MD

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Joseph Woo, MD

Cardiovascular Imaging
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Michael V. McConnell, MD, MSEE

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Kenneth W. Mahaffey, MD

Cardiovascular Medicine
Alan C. Yeung, MD
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Finance and Administration
Jason Irwin, MBA

Innovation
Paul Yock, MD

Outcome & Prevention
Mark Hlatky, MD
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
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.

**Steering Committee**

Joseph C. Wu, MD, PhD  
Euan A. Ashley, MRCP, DPhil  
Daniel Bernstein, MD  
Michael D. Dake, MD  
Ronald L. Dalman, MD  
Alexander Dunn, PhD  
William Fearon, MD  
Dominik Fleischmann, MD  
Francois Haddad, MD  
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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

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

Ronald Dalman, MD
Walter Clifford Chidester and Elsa Rooney Chidester Professor of Surgery, Division of Vascular Surgery

Alexander Dunn, PhD
Associate Professor of Chemical Engineering

Michael Fischbein, MD, PhD
Associate Professor of Cardiothoracic Surgery (Adult Cardiac Surgery)

Francois Haddad, MD
Clinical Associate Professor, Medicine - Cardiovascular Medicine

Nicholas Leeper, MD
Associate Professor of Surgery (Vascular Surgery) and Medicine (Cardiovascular Medicine)

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

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

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

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

Sean M. Wu, MD, PhD
Associate Professor of Medicine (Cardiovascular Medicine) and, by Courtesy, of Pediatrics
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New York University School of Medicine

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Northwestern University Feinberg School of Medicine
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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.

**Research Disciplines**

**BIOENGINEERING:**
Alexander Dunn, PhD
Sarah Heilshorn, PhD
Ngan F. Huang, PhD
Ellen Kuhl, PhD
Nick Melosh, PhD
Ada Poon, PhD
Beth Pruitt, PhD
Stephen Quake, DPhil
Fan Yang, PhD
Peter Yang, PhD
Richard Zare, PhD

**BIOMARKERS:**
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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
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
Brian Kobilka, MD
Matthew Porteus, MD
James Spudich, PhD

**CLINICAL (ADULT):**
Michael D. Dake, MD
William Fearon, MD
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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
David Rosenthal, MD
Stephen J. Roth, MD, MPH
DEVELOPMENTAL BIOLOGY:
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Gerald R. Crabtree, MD
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Mark Mercola, MD
Sean M. Wu, MD, PhD

GENOMICS & BIOINFORMATICS:
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Themistocles Assimes, MD, PhD
Euan A. Ashley, MRCP, DPhil
Carlos Bustamante, PhD
Joshua W. Knowles, MD, PhD
Thomas Quertermous, MD
Michael Snyder, PhD

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Merritt Maduke, PhD
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Daria Mochly-Rosen, PhD
Paul Yock, MD

METABOLIC DISEASES:
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Fred Kraemer, MD
Thomas Quertermous, MD
Gerald Reaven, MD

OUTCOMES & PREVENTION:
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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
Kenneth W. Mahaffey, MD
David J. Maron, MD
Jonathan Myers, PhD
Marcia L. Stefanick, PhD
Minang ‘Mintu’ Turakhia, MD, MAS

STEM CELL BIOLOGY:
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Michael Longaker, MD
Mark Mercola, MD
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
Marcia L. Stefanick, PhD
Jennifer A. Tremmel, MD, MS
Stanford CVI Human iPSC Biobank Service

Normal and patient-derived reprogrammed 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 free of cost.

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 have 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
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, 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 twenty-one 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:** Cardiovascular Blood Oxygenation and flow MRI in Congenital Heart Disease Detection

**NICOLE DE JESUS, PHD**
**Project:** Tools for mending broken hearts: non-invasive imaging assessing stemcell based therapy for treatment post myocardial infarction and heart failure.

**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
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.

**DANIELLE NAGELBERG, PHD**

*Project*: Role of Ino80 in coronary artery development through regulation of endothelial metabolic states.

**JIN QIAN, MD, PHD**

*Project*: Development of PAH by progressive infiltration of activated macrophages that secrete LTB4 in the lung and mediate vascular remodeling.

**AMBER SMITH, PHD**

*Project*: Exploration of hysteresis during miR-126-mediated lymphangiogenesis; and exploration of miR-126 hysteresis in blood endothelial cells.

**PATRICK THOMPSON, MD**

*Project*: Innovation in medical devices and technology that address important unmet healthcare needs: developing health technology to transform patient care.

**ABBYGAIL FOSTER, PHD**

*Project*: The use of biomaterials to probe cell interactions and modulate cell function with the goal of translating insights to clinically relevant regenerative cardiovascular therapies.

**SHEEVA RAJAEI, MD**

*Project*: A mendelain randomization study of breast feeding duration and the risk of adverse cardiometabolic traits and outcomes.
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.

**PROGRAM DIRECTOR**
Daniel Bernstein, MD

**CO-DIRECTOR**
Tom Quertermous, MD

**TRAINING COORDINATOR**
Euan Ashley, MRCP, DPhil

**SHARON PAIGE, MD**
*Project:* In vitro modeling of congenital heart disease using cardiac chamber specific reporters in patient-derived induced pluripotent stem cells

**WILLIAM GOODYER, MD**
*Project:* Elucidation of the development and regenerative capacity of the cardiac conduction system

**ALISON SCHROER, PHD**
*Project:* Enrichment of mature human induced pluripotent stem cell-derived cardiomyocytes

**CHI KEUNG LAM, PHD**
*Project:* Dissecting the pathogenesis of prese-nilin-2 mutation in dilated cardiomyopathy and arrhythmia
Sudden Cardiac Death

The support from the Steven M. Gootter Foundation upport 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 and will fund research projects in the upcoming years.

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

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 first 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
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 Children’s Health Institute (CHRI) and the Gootter Foundation, the CVI is excited to support research for the twelve outstanding investigators in 2017.

**James Priest, MD**  
Assistant Professor of Pediatrics (Cardiology)  
Collaborator: Mads Melbye, MD, DMSc  
A Sensitized Genetic Association Study for Congenital Heart Disease  
Research Funded by CHRI

**Christopher Gardner, PhD**  
Rehborg Farquhar Professor of Medicine  
Collaborators: Michael Snyder, PhD (Genetics) & Francois Haddad, MD (Medicine/Cardiology)  
Addressing the Obesity and Diabetes Epidemic Through Understanding Personalized Energy Expenditure  
Research Funded by CHRI

**Doff McElhinney, MD**  
Professor of Cardiothoracic Surgery (Pediatric Cardiac Surgery) and of Pediatrics (Cardiology)  
Psychosocial, Cognitive, and Quality of Life Outcomes in Children and Adults with Repaired Tetrology of Fallot with Pulmonary Atresia and Major Aortopulmonary Collateral Arteries  
Research Funded by CHRI

**Oscar Abilez, MD, PhD**  
Instructor, Medicine (Cardiovascular Medicine)  
Collaborators: Huaxiao Yang, PhD, Hung-Ta Wo, MD, Sanjiv Narayan, MD, PhD (Medicine/Cardiology)  
Early Detection of Arrhythmogenesis due to Cardiac Fibrosis via Correlation of In Vitro Modeling and Clinical Assessment  
Research Funded by the Gootter Foundation

**Tara Chang, MD, MS**  
Assistant Professor of Medicine (Nephrology)  
Collaborators: Venita Chandra, MD (Surgery), Nicholas Leeper, MD (Surgery/Medicine), Maria Montez-Rath, PhD (Medicine)  
Harnessing Big Data to Reduce Peripheral Artery Disease-Related Leg Amputation in Chronic Kidney Disease

**Sarah Heilshorn, PhD**  
Associate Professor of Materials Science and Engineering and (by courtesy) of Chemical Engineering and Bioengineering  
Collaborator: Joseph Woo, MD (CT Surgery)  
Stem Cell-derived Exosomes as Potential Therapy for Acute Myocardial Infarction

**Kiran Khush, MD**  
Associate Professor of Medicine (Cardiovascular Medicine)  
Collaborator: Ash Alizadeh, MD, PhD (Medicine/Oncology)  
A Genomic Approach for Early Noninvasive Detection of Post-Transplant Malignancies

**Laura Lazzeroni, PhD**  
Professor (Research) of Psychiatry and Behavioral Sciences and (by courtesy) of Biomedical Data Science  
Collaborator: Thomas Quertermous, MD (Medicine/Cardiology)  
Integrating MultiOmic Data in Coronary Heart Disease: A Pilot Study for New Statistical Methods

**Koen Nieman, MD, PhD**  
Associate Professor of Medicine (Cardiovascular Medicine) and Radiology (CV Imaging)  
Collaborators: Jennifer Tremmel, MD (Medicine/Cardiology), Dominik Fleischmann, MD (Radiology)  
Computed Tomography Guided Revascularization of Chronic Coronary Occlusions

**Jayakumar Rajadas, PhD**  
Director, BioADD, and Assistant Director of CV Pharmacology, Biomaterials & Advanced Drug Delivery  
Collaborator: Ronglih Liao, PhD (Medicine/Cardiology)  
Study of Aggregation Mechanism of Ig Light Chains from Light Chain Amyloidosis Patients

**Fatima Rodriguez, MD, MPH**  
Clinical Instructor, Medicine- Cardiovascular Medicine  
Collaborator: Rajesh Dash, MD, 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

**Sean Wu, MD, PhD**  
Associate Professor of Medicine (Cardiovascular Medicine) and (by courtesy) of Pediatrics  
Collaborator: Marlene Rabinovitch, MD (Pediatrics/Cardiology)  
A Perfusion Bioreactor for Understanding Endocardial-Myocardial Interactions in Hypoplastic Left Heart Syndrome
WntSA: A Master Regulator of Compensatory Angiogenesis in the Right Ventricle and Lung
Venicio de Jesus Perez, MD, Assistant Professor of Medicine (Pulmonary and Critical Care Medicine)

Angiographic and Psychosocial Evaluation of Peripartum vs. Non-Peripartum Spontaneous Coronary Artery Dissection: A Collaborative Study
Katharine Edwards, MD
Jennifer Tremmel, MD
Stanford Women's Heart Health
This research was funded by CHRI

Estimation of False-Lumen Pressure in Aortic Dissection using Patient-Specific Computational Fluid Dynamic Simulations
Dominik Fleischmann, MD, Professor of Radiology. Collaborators: Kathrin Baeumler, PhD, Anna M. Karmann Sailer, BS, Alison L. Marsden, PhD

Generation of Endothelial Cells Resistant to Hyperglycemia-Induced Endothelial Cell Dysfunction
Eric Gross, MD, Assistant Professor of Anesthesiology, Perioperative and Pain Medicine

Developing a Cardiovascular Simulator for the Cardiovascular Institute
Ellen Kuhl, MD, Professor of Mechanical Engineering and, by courtesy, of Bioengineering

Assessing the Potential Health Risk of e-Cigarettes in Diabetes
Won Hee Lee, PhD, Instructor, Cardiovascular Institute Collaborators: Kari Nadeau, PhD, Sang Ging Ong, PhD

Identification of Genetic Variation Determining Patient-Specific Responses to Anti-Diabetic Drugs
Elena Matsa, PhD, Instructor, Cardiovascular Institute Collaborators: Kenneth Mahaffey, Michael P. Snyder, PhD

Predicting Cardiovascular Benefits of Anti-diabetic Drugs
Tracey McLaughlin, MD, Associate Professor of Medicine (Endocrinology) Collaborators: Nazish Sayed, MD, PhD, Ian Chen, MD, PhD
This research was funded by CHRI

Epigenetic Regulation of Cardiac Development
Ashby Morrison, PhD, Assistant Professor of Biology Collaborators: Kristy Red-Horse, PhD and Will Greenleaf, PhD
This research was funded by CHRI

Efficacy of Home-Based Cardiac Rehabilitation for Improving Clinical and Imaging Markers of Cardiovascular Health
Jonathan Myers, PhD, Clinical Professor of Medicine, Palo Alto VA Collaborators: Victor Froelicher, MD, Dominik Fleischmann, MD

Computational Mapping to Guide Therapy in Atrial Fibrillation
Sanjiv Narayan, MD, Professor of Medicine (Cardiovascular Medicine)

Endothelial Dysfunction in Preeclampsia
Virginia Winn, MD Associate Professor of Obstetrics and Gynecology
This research was funded by CHRI

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 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.

**JOETSAROOP BAGGA**  
**MD CANDIDATE**  
The Role of Vascular Smooth Muscle Cell Phenotype in Coronary Artery Disease

**VERONICA TORO**  
**MD CANDIDATE**  
Construction of Patient Specific Models from Angiography for CABG Surgery Planning

**ANGELA ZHANG**  
**MD PHD CANDIDATE**  
Using Nano Straws to Improve the Delivery of CRISPR/CAS 9 System to Cardiomyocytes

**XINYUAN LISA ZHANG**  
**MD CANDIDATE**  
The Role of Epicardial-Endocardial Dissociation in Atrial Fibrillation Measured with a Novel Electrode Sensor Array with High Spatiotemporal Resolution

Manuscript Awards 2017

Each winter, CVI recognizes the authors of outstanding publications.

**Patient-Specific iPSC-Derived Endothelial Cells Uncover Pathways that Protect against Pulmonary Hypertension in BMPR2 Mutation Carriers.**  
MINGXIA GU, PHD  

**Attenuated-Signal Plaque Progression Predicts Long-Term Mortality After Heart Transplantation: IVUS Assessment of Cardiac Allograft Vasculopathy.**  
KOZO OKADA, MD  

**Association Between Intensity of Statin Therapy and Mortality in Patients With Atherosclerotic Cardiovascular Disease.**  
FATIMA RODRIGUEZ, MD, MPH  

**Transcriptome Profiling of Patient-Specific Human iPSC-Cardiomyocytes Predicts Individual Drug Safety and Efficacy Responses In Vitro.**  
ELENA MATSA, PHD  
**2016**

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

**Alexandre J. S. Ribeiro, PhD**


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**Epicardial FSTL1 Reconstitution Regenerates the Adult Mammalian Heart.**

**Ke Wei, PhD**


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

**Haodi Wu, PhD**


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

**Yuhei Kobayashi MD**


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**miR-24 Limits Aortic Vascular Inflammation and Murine Abdominal Aneurysm Development.**

**Joshua Spin, MD**


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**A Long Noncoding RNA Protects the Heart from Pathological Hypertrophy.**

**Pei Han, PhD**


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**Human Induced Pluripotent Stem Cell-Derived Cardiomyocytes as an in vitro Model for Coxsackievirus B3-Induced Myocarditis and Antiviral Drug Screening Platform.**

**Arun Sharma, PhD**


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**Characterization of the Molecular Mechanisms Underlying Increased Ischemic Damage in the Aldehyde Dehydrogenase 2 Genetic Polymorphism Using a Human Induced Pluripotent Stem Cell Model System.**

**Antje Ebert, PhD**

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 9, 2018
JENNIFER VAN EYK, PHD
Director, Advanced Clinical Biosystems Institute in the Department of Biomedical Sciences; Director, Basic Science Research in the Women's Heart Center; Erika J. Glazer Chair in Women's Heart Health Cedars Sinai

January 16, 2018
ERIK INGELSSON, MD
Professor of Medicine (Cardiovascular Medicine) and, by courtesy, of Health Research and Policy (Epidemiology) Stanford

January 23, 2018
JAMES F. MARTIN, MD, PHD
Professor, Vivian L. Smith Chair in Regenerative Medicine Baylor College of Medicine

January 30, 2018
ALISON L. MARSDEN, PHD
Associate Professor of Pediatrics (Cardiology) and of Bioengineering and, by courtesy, of Mechanical Engineering Stanford

February 6, 2018
(1:30 p.m., Munzer Auditorium)
BRIAN BLACK, PHD
Professor, Cardiovascular Research Institute, Department of Biochemistry and Biophysics, UCSF

February 13, 2018
WALTER J. KOCH, PHD
William Wikoff Smith Endowed Chair in Cardiovascular Medicine; Professor and Chair, Pharmacology, Temple University

February 20, 2018
KAJIMURA SHINGO, PHD
Associate Professor, Department of Cell and Tissue Biology UCSF

March 6, 2018
The Steven M Gootter Foundation Lecture
MARK E. ANDERSON, MD, PHD
William Osler Professor of Medicine; Chair, Department of Medicine, Johns Hopkins University

March 13, 2018
KAM W. LEONG, PHD
Samuel Y. Sheng Professor; EiC, Biomaterials; Department of Biomedical Engineering, Columbia University

March 20, 2018
RICHARD SCHELLER, PHD
Chief Science Officer & Head of Therapeutics, 23andme

March 27, 2018
SARAH C. HEILSHORN, PHD
Associate Professor, Materials Science & Engineering, Stanford

April 10, 2018
THOMAS M. VONDRI SKA, PHD
Professor of Anesthesiology, Medicine and Physiology, UCLA

April 17, 2018
PEIPEI PING, PHD
Professor, Physiology; Professor, Medicine/Cardiology, and Bioinformatics, UCLA; Director, NIH BD2K Center of Excellence at UCLA; Director, NIH BD2K Centers-Coordination Center at UCLA

May 1, 2018
GEOFFREY PITT, MD, PHD
Director of the Cardiovascular Research Institute; The Ida and Theo Rossi Distinguished Professor of Medicine, Weill Cornell Medical College

May 8, 2018
ROBERT J. GROPLER, MD
Professor of Radiology, Medicine and Biomedical Engineering
Senior Vice-Chair and Division Director Radiological Sciences & Chief, Cardiovascular Imaging Laboratory Washington University School of Medicine

May 15, 2018
BRADFORD C. BERK, MD, PHD
Distinguished University Professor in Medicine, Neurology, Pathology, and Pharmacology & Physiology
Director, University of Rochester Neurorestoration Institute University of Rochester Medical Center

May 22, 2018
PETER LIBBY, MD
Mallinckrodt Professor of Medicine, Harvard Medical School
Senior Physician, Brigham and Women’s Hospital

June 5, 2018
CHRISTINE MUMMERY, PHD
Professor of Developmental Biology, Chair Dept. of Anatomy & Embryology, Leiden University Medical Center
MED 223: Cardiovascular Research & Medicine

Winter 2018

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: Patricia Nguyuen, MD; Themistocles L. Assimes, MD, PhD; Ioannis Karkikes, PhD; Ngan Huang, PhD

January 11, 2018
KIRAN K. KHUSH, MD, MAS
Associate Professor of Medicine, Cardiovascular Medicine

January 18, 2018
SIDDHARTHA JAISWAL, MD, PhD
Assistant Professor of Pathology

January 25, 2018
OLIVER O. AALAMI, MD
Clinical Associate Professor of Surgery, Vascular Surgery

February 1, 2018
JOSHUA W. KNOWLES, MD, PHD
Assistant Professor of Medicine, Cardiovascular Medicine

February 8, 2018
ALEXANDER DUNN, PHD
Associate Professor of Chemical Engineering

February 15, 2018
MICHAEL SNYDER, PHD
Stanford W. Ascherman, MD, FACS, Professor in Genetics
Chair, Department of Genetics

February 22, 2018
JAMES R. PRIEST, MD
Assistant Professor of Pediatrics, Cardiology

March 1, 2018
SANJIV NARAYAN, MD
Professor of Medicine, Cardiovascular Medicine

March 8, 2018
RONGLIH LIAO, PHD
Professor of Medicine, Cardiovascular Medicine

March 15, 2018
NICHOLAS J. LEEPER, MD
Associate Professor of Surgery, Vascular Surgery and
Associate Professor of Medicine, Cardiovascular Medicine
Chair, Department of Genetics
Dr. Norman Shumway, a pioneering cardiothoracic surgeon at Stanford, performed the first successful heart transplant in the US in 1968.

Credit: Jose Mercado / Stanford News Service
Christopher Almond, MD
Associate Professor of Pediatrics (Cardiology)
at the Lucile Salter Packard Children’s Hospital
Director, Cardiac Anticoagulation Services, Stanford Children’s Health

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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


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

CURRENT RESEARCH

I am interested in the application of computational technologies to problems in molecular biology of relevance to medicine. In particular, my laboratory focuses on drug response at the molecular level, working in three areas. First, we are building a comprehensive pharmacogenomics knowledge base (http://www.pharmgkb.org/) that provides access to information relating genotype to phenotype (in particular, how variation in genetics leads to variation in response to drugs). We are interested in collaboratively discovering and applying new pharmacogenomics knowledge. Second, we are interested in the analysis of three dimensional biological structures. We have methods for analyzing protein structures to recognize and annotate active sites and binding sites, particularly in the context of interactions with small molecule drugs. We are also interested in physics-based simulation of biological structures to understand how their dynamics impact their function (http://simbios.stanford.edu/). Finally, we are interested in computational methods for analyzing functional genomics information. We use natural language processing techniques for extracting and summarizing information in the literature, chemoinformatics methods for understanding small molecule function, and machine learning & data mining techniques to understand the molecular responses to drugs.

SELECTED PUBLICATIONS


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

Professor, Medicine - Cardiovascular Medicine
Professor, Genetics, Biomedical Data Science, and (by courtesy) Pathology
Director, Stanford Center for Inherited Cardiovascular Disease
Co-Director, Clinical Genomics Service

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LAB ashleylab.stanford.edu
CENTER familyheart.stanford.edu

CURRENT RESEARCH

The Ashley lab is focused on the science of precision medicine. We study the human genome and apply computational approaches like machine learning to understand the integrated effects of genes and proteins on human health and disease. We are particularly interested in the extremes of human performance. We are fascinated by the heart - how it develops, adapts, contracts, and fails. In our wet lab, we explore cardiac biology, from the whole heart all the way down to single cells including induced pluripotent stem cells from our patients. We push them towards a cardiac myocyte fate and characterize them using a variety of bioengineering approaches. Developing new therapies 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. Our group is one of the most diverse on campus - from mathematicians to molecular biologists, undergrads to junior faculty, physicists to genetic counselors.

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

SELECTED PUBLICATIONS


Themeostoles (Tim) Assimes, MD, PhD, FRCPC, FAHA
Associate Professor, Medicine - Cardiovascular Medicine
Attending Cardiologist, Palo Alto VA Health Care System

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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


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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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 also involved in research with the Thoracic Surgical Health Services Research group, and has grant funding through the Veterans Affairs Administration. Her current research interests are in imaging surveillance following treatment for lung cancer and cancer survivorship. She is a member of the National Lung Cancer Roundtable of the American Cancer Society serving as Chair of the Task Group on Lung Cancer in Women. She also serves as a professional member of the Patient Centered Outcomes Research Institute (PCORI) Advisory Panel on Improving Healthcare Systems. As an educator, Dr. Backhus is the Associate Program Director for the Thoracic Track Residency and serves on the ACGME Residency Review Committee for Thoracic Surgery which is the accrediting body for all cardiothoracic surgery training programs in the US.

SELECTED PUBLICATIONS


Hans-Christoph Becker, MD
Professor of Radiology (General Radiology) at the Stanford University Medical Center

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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

Daniel Bernstein, MD
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

CURRENT RESEARCH
Recent basic science work has been focused on: (1) on the role of alterations in mitochondrial function and dynamics (fission, fusion, mitophagy and biogenesis) in both normal cardiac physiology and in cardiac disease. (2) using human induced pluripotent stem cell derived cardiomyocytes (hiPSC-CMs) to determine the mechanism by which mutations in beta-myosin heavy chain (beta-MHC) cause hypertrophic cardiomyopathy (HCM). In collaboration with colleagues in Bioengineering (Beth Pruitt), Biochemistry (Jim Spudich), Medicine (Sean Wu) and Chemical Engineering (Alex Dunn), as well as an international team, we have developed a multi-scale platform to study the effect of HCM mutations on the crystal structure and biomechanical function of the myosin molecule, and contractile function of the individual myofibril, the whole cell, and bioengineered heart tissue. (3) using murine models of congenital heart disease affecting the right ventricle (RV), we are collaborating with Dr. Sushma Reddy to study the mechanisms by which the RV transitions from stable hypertrophy to overt heart failure, the role of micro-RNAs in this process, and potential biomarkers of early RV failure in children with congenital heart disease.

Recent clinical/translational work has focused on: (1) an NIH funded multi-center clinical study to evaluate two novel biomarkers for post-transplant lymphoproliferative disorder in pediatric solid organ transplant patient; (2) using immune profiling to determine risk factors for and mechanisms of serious complications (infection, thrombosis, death) in pediatric patients treated with a left ventricular assist device.

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

SELECTED PUBLICATIONS
Helen M. Blau, PhD

Donald E. and Delia B. Baxter Foundation Professor
Director, Baxter Laboratory for Stem Cell Biology
Director, Gene Therapy Technology, Stanford University School of Medicine

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CURRENT RESEARCH

Helen M. Blau, Ph.D., is the Donald E. and Delia B. Baxter Foundation Professor and Director of the Baxter laboratory for Stem Cell Biology at Stanford University. Blau’s research area is regenerative medicine with a focus on stem cells. She is world-renowned for her work on nuclear reprogramming and the demonstration of the plasticity of cell fate using cell fusion. These studies provided the scientific underpinnings for mammalian cloning and induced pluripotent stem cells. Blau also led the field with novel approaches to treating muscle damaged due to disease, injury, or aging. She pioneered the design of biomaterials to mimic the in vivo microenvironment and direct stem cell fate. A major focus of her current work is the rejuvenation of muscle stem cell function to enhance skeletal muscle repair in the aged. In addition, her laboratory made the unexpected discovery that shortened telomeres are a hallmark of genetic cardiomyopathies. A major effort in her laboratory is directed at establishing the cause and effect of premature telomere shortening in cardiomyocytes in disease states, with a view toward novel therapeutic interventions.

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


EDUCATION/TRAINING

PhD Harvard University

HONORS & AWARDS

FASEB Excellence in Science Award
NIH MERIT AWARD
NIH Challenge Grant
NIH Transformative Research Award
Fullbright Senior Scholar Award
Yvette Mayent Rothschild Award
McKnight Technological Innovations for Neuroscience Award
Senior Career Women in Cell Biology Recognition Award
Glenn Award for Research in Biological Mechanisms of Aging
AACR-Irving Weinstein Award for Outstanding Innovations
Hall of Fame, Stanford Office of Technology Licensing
HONORARY DOCTORATE
University of Nijmegen, the Netherlands
ELECTED member of
National Academy of Sciences, National Academy of Medicine, Pontifical Academy of Sciences, American Institute for Medical and Biological Engineering, American Academy of Arts and Sciences, Fellow of the American Association for the Advancement of Science.

PRESIDENT of
American Society for Developmental Biology
International Society of Differentiation

COUNCIL MEMBER
Institute of Medicine (National Academy of Medicine)
NIH National Institute on Aging

BOARD MEMBER
Harvard Board of Overseers
Ellison Medical Scientific Advisory Board
Pew Scholars Advisory Board

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


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

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EDUCATION/TRAINING
 PHD Harvard University

HONORS & AWARDS
Sloan Research Fellow in Molecular Biology, Sloan Foundation (2007-9) 
Provost Award for Distinguished Research, Cornell University (2008) 

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


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

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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 involves exploration of 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


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

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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


RESEARCHER PROFILES

Gerald Crabtree, MD

Department of Pathology Professor in Experimental Pathology and Professor of Developmental Biology

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LAB crablab.stanford.edu/

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


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


Michael D. Dake, MD
Thelma and Henry Doelger Professor of Cardiothoracic Surgery
Medical Director, Cath/Angio Laboratories

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DEPARTMENT ctsurgery.stanford.edu

CURRENT RESEARCH
Improved endovascular procedures and devices to treat aortic lesions, peripheral arterial disease and venous abnormalities. Focused interest in drug-eluting stents and balloons, endovascular stent-grafts, including branched aortic devices and techniques for the endovascular management of aortic dissection. Current clinical research projects include drug-eluting stents for superficial femoral arterial disease and multiple device trials to evaluate stent-grafts for the treatment of aortic lesions.

I have a broad background in working with young investigators to collaboratively develop opportunities with medical devices that address unmet clinical needs or limitations of current therapeutic approaches.

SELECTED PUBLICATIONS
Midterm survival after thoracic endovascular aortic repair in more than 10,000 Medicare patients Schaffer JM, Lingala B, Miller DC, Woo YJ, Mitchell RS, Dake MD. J Thorac Cardiovasc Surg. 2014 Oct 18


Ronald L. Dalman, MD
Dr. Walter C. Chidester Professor of Surgery
Chief, Division of Vascular Surgery

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DIVISION vascular.stanford.edu

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


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

EMAIL: rhombus@stanford.edu
PROFILE: med.stanford.edu/profiles/Rajesh-Dash

CURRENT RESEARCH

My research focuses on the prediction of coronary and cardiovascular disease in high risk patient populations, using population health and molecular imaging techniques. I am Medical and Scientific Director of the Stanford South Asian Translational Heart Initiative, and 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 we validate our local discoveries and hypotheses in population studies we are doing with clinical partners in India. I also study cell signaling in the heart and develop 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 Director of the Falk Cardiovascular MRI Facility. I am applying some of these imaging strategies in select high-risk patients, such as chemotherapy patients.

There is nothing like returning to a place that remains unchanged to find the ways in which you yourself have altered. — Nelson Mandela,
‘A Long Walk to Freedom’

SELECTED PUBLICATIONS


Mark M. Davis, PhD
Burt and Marion Avery Family Professor
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

CURRENT RESEARCH
My laboratory is interested in the molecular basis of T and B lymphocyte recognition, as well as the control of differentiation and functional responses in these cells. These studies have ranged from analyzing the inherent diversity of these highly diverse molecules and relating it to their function and specificity, to basic aspects of TCR biochemistry and cell biology. We also developed peptide-MHC tetramers which are useful for staining and isolating specific T cells in both basic science and clinical applications. We also try to relate what we have learned in basic immunology using mouse models to understanding the human immune system. Here we 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. Investigator, Howard Hughes Medical Institute; Director, Stanford Institute for Immunity, Transplantation and Infection (ITI).

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


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.

First things first, but not in that particular order.
Anne Dubin, MD
Professor of Pediatrics (Pediatric Cardiology) at the Lucile Salter Packard Children’s Hospital
Director, Pediatric Arrhythmia Service

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CURRENT RESEARCH
I have been 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


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


William Fearon, MD
Professor of Medicine - Cardiovascular Medicine
Director, Interventional Cardiology

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WEB stanfordhospital.org/cardiovascularhealth/interventionalCardiology

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


Brian Feldman, MD, PhD
Assistant Professor of Pediatrics (Endocrinology)
Bechtel Endowed Faculty Scholar

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PROFILE med.stanford.edu/profiles/Brian-Feldman
WEB med.stanford.edu/feldmanlab.html

CURRENT RESEARCH

The overall goal of our research is to understand on both a molecular and systemic level how hormones regulate stem cell fate decisions and the role these pathways play in both physiology and disease. We use molecular biology and in vivo models to elucidate mechanisms of regulating cell fate determination by the endocrine system. Understanding these processes has profound and broad implications for both science and health.

In the middle of difficulty lies opportunity – Albert Einstein

SELECTED PUBLICATIONS


Michael Fischbein, MD, PhD
Associate Professor of Cardiothoracic Surgery (Adult Cardiac Surgery)
Director of Thoracic Aortic Surgery
Program Director, Department of Cardiothoracic Surgery

EMAIL mfischbe@stanford.edu
PROFILE med.stanford.edu/profiles/Michael-Fischbein

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)

MEMBER
- American Heart Association Society of Thoracic Surgeons
- San Francisco Surgical Society
- Western Thoracic Surgical Society
- Association for Academic Surgery
- American College of Surgeons
- Society of University Surgeons

CURRENT RESEARCH

Our group is interested in 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


Peter J. Fitzgerald, MD, PhD, FACC
Professor of Medicine (Cardiovascular Medicine) Emeritus
Director, Center for Cardiovascular Technology

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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


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

CURRENT RESEARCH

My technical research focuses on how to generate the best images to provide clinically important anatomic and functional information for cardiac and vascular diseases. This includes evaluation of new CT technology with improved temporal and spatial resolution, to enable and improve surgical and endovascular treatment planning of cardiac, valvular, and aortic diseases, and developing and optimizing clinical cardiac and vascular imaging strategies, and sophisticated 3D and 4D image post-processing. My clinical research focuses on acute aortic diseases, including aortic dissection. We are developing new stratification models for patients with uncomplicated type B aortic dissection based on imaging features and quantitation available in high-resolution CT datasets. I am the Director of CT, Stanford Hospital and Clinics and Medical Director at Stanford 3DQ Lab.

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

SELECTED PUBLICATIONS


CURRENT RESEARCH

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

SELECTED PUBLICATIONS


RESEARCHER PROFILES

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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PROGRAM mips.stanford.edu

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


Over the past 20 years I have been involved in more than a dozen human intervention trials involving more than 2,000 volunteer participants. These studies 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 for changing and improving human food behaviors can drastically limit the potential impact for change. This realization 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 in this area 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 the areas of obesity and diabetes that are directly related to our broken food systems. The target of 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 health and the health of the environment. The long-term goal of my research 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 (In Press)


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

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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 core 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


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

- Pulmonary Valve Repair for Patients With Acquired Pulmonary Valve Insufficiency.

- Surgical Repair of 115 Patients With Anomalous Aortic Origin of a Coronary Artery From a Single Institution.

- Exploring the Role of Polycythemia in Patients With Cyanosis After Palliative Congenital Heart Surgery.

- Mitral Stenosis and Aortic Ateies-A Risk Factor for Mortality After the Modified Norwood Operation in Hypoplastic Left Heart Syndrome.

- Critical Role of Coaptive Strain in Aortic Valve Leaflet Homeostasis: Use of a Novel Flow Culture Bioreactor to Explore Heart Valve Mechanobiology.
Robert A. Harrington, MD
Arthur L. Bloomfield Professor of Medicine
Chair, Department of Medicine

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DEPARTMENT medicine.stanford.edu

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


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


Sarah Heilshorn, PhD

William R. and Gretchen B. Kimball University Fellow in Undergraduate Associate Professor, Materials Science and Engineering Associate Professor (by courtesy), Chemical Engineering Associate Professor (by courtesy), Bioengineering

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LAB stanford.edu/group/heilshorn

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


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

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


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

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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 410 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


RESEARCHER PROFILES

Ngan F. Huang, PhD
Assistant Professor, Cardiothoracic Surgery - Adult Cardiac Surgery
Biomedical Engineer, VA Palo Alto Health Care System

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PROFILE med.stanford.edu/profiles/Ngan-Huang
LAB huanglab.stanford.edu

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 bioengineered devices that improve lymphangiogenesis and angiogenesis in preclinical studies.

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

SELECTED PUBLICATIONS


Sharon Hunt, MD
Professor, Medicine - Cardiovascular Medicine
Medical Director, Post-Heart Transplant Programs

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PROFILE med.stanford.edu/profiles/Sharon-Hunt

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.


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

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


CURRENT RESEARCH

Dr Karakike's research focuses on delineating the molecular mechanisms underlying the pathogenesis of cardiomyopathies toward improving future treatment strategies. His group uses human induced pluripotent stem cells and genome editing technologies to attain a better understanding of the biological function of genes and the functional significance of genetic variants in human cardiovascular diseases.

SELECTED PUBLICATIONS


Kiran Kaur Khush, MD
Associate Professor, Medicine - Cardiovascular Medicine

EMAIL kiran@stanford.edu
PROFILE med.stanford.edu/profiles/Kiran-Khush

CURRENT RESEARCH

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 am the Associate Director of the International Society for Heart and Lung Transplantation Adult Heart Transplant Registry, and I serve 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.

I aim to use innovative research tools to achieve scientific advances in heart transplantation, with the ultimate goal of improving the quality and length of life of our heart transplant recipients.

SELECTED PUBLICATIONS


Joshua W. Knowles, MD, PhD
Assistant Professor, Medicine - Cardiovascular Medicine

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PROFILE med.stanford.edu/profiles/Joshua-Knowles
FOUNDATION thefhfoundation.org
WEB familyheart.stanford.edu

CURRENT RESEARCH

The theme of Dr. Knowles’ research has been the genetic basis of cardiovascular disease across the continuum from discovery, to the development of model systems, to the translation of these findings to the clinic, and most recently to the Public Health aspect of genetics. He completed his MD-PhD at UNC with Prof. Nobuyo Maeda and Nobel Laureate Oliver Smithies. He did Internal Medicine residency and Cardiology fellowship training at Stanford working with Dr. Tom Quertermous. Currently his discovery and basic translational efforts center on understanding the genetic basis of insulin resistance using GWAS studies coupled with exploration in model systems. His clinical translational focus is on Familial Hypercholesterolemia (FH) and he is the volunteer Chief Medical Advisor of the FH Foundation (FHF), which is a patient-led organization dedicated to increasing awareness of FH, identifying and treating patients with FH and screening family members to prevent deleterious outcomes. He helped lead the FHF efforts to establish a national patient registry (CASCADE FH) and apply for an ICD10 code for FH, and he is now using cutting-edge “big-data” approaches to identify previously undiagnosed FH patients in electronic medical records (FIND FH). He has published over 70 papers with research projects currently funded by the National Institutes of Health, the American Heart Association and the Doris Duke Charitable Foundation.

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

SELECTED PUBLICATIONS


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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LAB med.stanford.edu/kobilkalab

CURRENT RESEARCH
The goal of research in my lab is to characterize the structure and mechanism of activation of G protein coupled receptors (GPCRs). GPCRs represent the largest group of cellular receptors for hormones and neurotransmitters in the human 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 a spectrum of 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 new 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


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
Fredric Kraemer, MD
Stanford University Professor in Endocrinology

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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


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)
Special Emphasis Research Career Award, NIH (1982-1987)
Mark A. Krasnow, MD, PhD
Professor, Biochemistry
Investigator, Howard Hughes Medical Institute
Executive Director, Wall Center for Pulmonary Vascular Diseases

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LAB cmgm.stanford.edu/krasnow

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


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
Anson Lee, MD
Assistant Professor of Cardiothoracic Surgery (Adult Cardiac Surgery)

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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
David Lee, MD
Associate Professor of Medicine (Cardiovascular Medicine)

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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


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


Nicholas Leeper, MD
Associate Professor, Surgery - Vascular Surgery
Associate Professor, Medicine - Cardiovascular Medicine
Chief, Vascular Medicine
Director, Vascular Research

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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


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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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.

SELECTED PUBLICATIONS


Thrombin cleavage of osteopontin disrupts a pro-chemotactic sequence for dendritic cells, which is compensated by the release of its pro-chemotactic C-terminal fragment. Shao Z, Morser J, Leung LL. J Biol Chem.; 2014; Sep 26; 289 (39): 27146-58.

Craig Levin, PhD
Professor of Radiology and, by courtesy, of Physics, of Electrical Engineering, and of Bioengineering

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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


Ronglih Liao, PhD
Professor of Medicine, Cardiovascular Medicine

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CURRENT RESEARCH

Following tissue injury or genetic alteration, the heart undergoes a process of molecular and structural remodeling, ultimately resulting in cardiac dysfunction. The central focus of our laboratory’s research is to understand the molecular mechanisms that mediate the transition from a normal to failing heart. Our research approaches attempt to bridge the growing span between basic bench research and patient care, with a goal towards identifying novel therapeutic targets for rapid translation into clinical medicine. We tackle these scientific interests by utilizing an integrated approach combining molecular studies with intensive investigation of cardiovascular physiology from single cells, isolated hearts to intact animals and patients bio-specimen. Current ongoing projects are (1) to elucidate the molecular mechanisms regulating the development and progression of primary amyloid cardiomyopathy and (2) to reveal the mechanisms, metabolic regulation, and therapeutic potential of cardiac regeneration using stem/progenitor cells from extra-cardiac sources, such as bone marrow, iPS and resident cardiac stem cells.

SELECTED PUBLICATIONS


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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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


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

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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


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


Kenneth W. Mahaffey, MD
Professor, Medicine – Cardiovascular Medicine
Vice Chair of Clinical Research, Medicine

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 the study of anticoagulant and antiplatelet agents for the treatment of acute coronary syndromes, stable atherosclerotic vascular disease 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. A key focus is also the rigorous study of mobile and digital technologies to improve patient care and the conduct research. 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 and Director of the Stanford Center for Clinical Research.

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

SELECTED PUBLICATIONS


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. In the Preventive Cardiology Clinic we are testing an antisense oligonucleotide for the treatment of high levels of lipoprotein (a) and chelation therapy for patients with diabetes and a history of heart attack. I am working on Project Baseline to find new signals that indicate the onset or progression of coronary artery disease.

SELECTED PUBLICATIONS


Alison Marsden, PhD
Associate Professor of Pediatrics (Cardiology) and of Bioengineering
and (by courtesy) of Mechanical Engineering

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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 working with Prof. Parviz Moin. She was a postdoctoral fellow at Stanford University in Bioengineering and Pediatric Cardiology from 2005-07 working with Charles Taylor and Jeffrey Feinstein. She was the recipient of a Burroughs Wellcome Fund Career Award at the Scientific Interface in 2007, an NSF CAREER award in 2011, and is a member of an international Leducq Foundation Network of Excellence. She received the UCSD graduate student association faculty mentor award in 2014 and MAE department teaching award at UCSD in 2015. 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 stimulation, medical device design, application of 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


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**


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

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CURRENT RESEARCH

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

SELECTED PUBLICATIONS


Matthew Mell, MD
Associate Professor of Surgery (Vascular Surgery)

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CURRENT RESEARCH
Dr. Mell’s research interest focus on comparative effectiveness of health care delivery for complex surgical diseases, including optimizing outcomes and cost effectiveness.

Dr. Mell's clinical interests include all aspects of vascular surgery, with a special emphasis on surgery for complex aortic disease, including endovascular repair of abdominal aortic aneurysm.

SELECTED PUBLICATIONS


Our research is dedicated to discovering disease mechanisms that can be turned into therapeutic strategies. We use high throughput screening technology combined with stem cell based models of heart disease to discover therapeutic targets and evaluate small molecules and other potential drugs, with emphasis on maintaining contractility and preventing arrhythmia. Ultimately, our goal is to develop new drugs that will preserve or restore cardiac function, ameliorating the quality of life for patients with heart disease.

I am motivated to improve people’s lives by translating our lab research into therapies.
D. Craig Miller, MD
Thelma and Henry Doelger Professor in Cardiovascular Surgery
Department of Cardiothoracic Surgery

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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.

SELECTED PUBLICATIONS


Daria Mochly-Rosen, PhD
George D. Smith Professor of Translational Medicine
Professor, Chemical and Systems Biology
Professor (by courtesy), Neurosurgery
Co-director, SPARK - Stanford’s Translational Research Program

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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 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


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


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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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


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

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

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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


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

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CURRENT RESEARCH

Dr Nieman is a cardiologist and associate professor in the departments of cardiovascular medicine and radiology. He came to Stanford in September 2016. He investigates advanced cardiac imaging techniques, and current projects include the development and technical validation of functional CT applications for ischemic heart disease, and the clinical validation of cardiac CT in the form of clinical effectiveness trials.

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 joined the staff of the department of cardiology and radiology at the Erasmus University Medical Center in 2008, where he was scientific director of the cardiac CT and MRI group and supervised the intensive cardiac care unit until he joined the staff at Stanford University.

SELECTED PUBLICATIONS


Latha Palaniappan, MD, MS
Professor of Medicine - General Medical Disciplines

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CURRENT RESEARCH

Dr. Palaniappan’s research has focused on the study of diverse populations, chronic disease and prevention. She specifically seeks to address the gap in knowledge of health in Asian subgroups and other understudied racial/ethnic minorities (PACS SR01DK081371, CASPER R01HL126172, and CAUSES R01MD007012). During her time at Palo Alto Medical Foundation (PAMF), she led the organization-wide initiative to collect patient race/ethnicity and language information, enabling PAMF researchers to conduct disparities research using electronic health records. She was the co-founder of PRANA (along with Dr. Ronesh Sinha), a South Asian Wellness program. Her 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). She is currently working on implementation of evidence based genetic and pharmacogenetic testing in Primary Care Clinics as the Scientific Director of Precision Genomics and Pharmacogenomics in Primary Care (with Dr. Megan Mahoney). She also co-leads the Stanford GenePool (founded by Dr. Thomas Quertermous in 2014) at Stanford, a population based biobank designed to accelerate genetic and other -omics discovery.

SELECTED PUBLICATIONS


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 studies using new technology to detect 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. Dr. Perez receives funding from NIH/NHLBI (R01), the Weston Havens Foundation, Apple Inc., The Stanford Cardiovascular Division and the Stanford SPARK program.

SELECTED PUBLICATIONS


Ada Poon, PhD
Associate Professor, Electrical Engineering

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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
Beth L. Pruitt, PhD
Professor of Mechanical Engineering
and (by courtesy) of Molecular and Cellular Physiology

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CURRENT RESEARCH

My lab works on custom measurements and analysis systems for small-scale biomechanics and mechanotransduction. We are interested in the molecular biophysics and mechanisms of mechanobiology, i.e., the role of mechanical force in the evolution of structure and function in human pluripotent stem cell derived cardiomyocytes (hPSC-CMs) including related topics of cell adhesion, downstream signaling and mechanoresponse. My research interests have evolved from the development of improved microtechnologies for small-scale mechanical measurements to questions of how mechanics mediate biological signaling. Normal force sensing, remodeling and load bearing by cells are essential for basic life processes. My training and experience as an engineer have provided me with the skills and knowledge to perform quantitative mechanobiology research. When I started my laboratory, there was a dearth of portable force measurement techniques, which limited the integration of biophysical assays with direct analysis of neural networks (e.g., patch clamp electrophysiology) or simultaneous imaging of cellular processes (e.g., cardiomyocyte cytoskeleton dynamics). We have now bridged these technology gaps and enabled new bioengineering strategies to address complex mechanobiology problems in novel ways across large scales of force and anatomical size. Notably, we have integrated live cell mechanical and functional analyses (Ribeiro 2015 and Ribeiro 2017) to show a critical role for tension in developing more physiological hiPSC-CMs. Collectively, these studies have laid the foundation for ongoing work to combine tools for the study of mechanobiology of the cytoskeleton and cell adhesions under different mechanical states. I have enjoyed active collaborations for almost a decade with leading cardiac stem cell and myopathy researchers to study a range of mutations, including the labs of Euan Ashley, Sean Wu, Sean Palecek, Jim Spudich, Bruce Conklin, Deepak Srivastava, Helen Blau, and Joe Wu. These collaborative activities have advanced knowledge and propagated methods across our labs, facilitated the open exchange of materials and information and have resulted in several joint publications.

SELECTED PUBLICATIONS


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


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.

SELECTED PUBLICATIONS


Marlene Rabinovitch, MD
Dwight and Vera Dunlevie Professor of Pediatric Cardiology
Professor (by courtesy), Developmental Biology

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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 (BMPR2) 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 PPARγ mediated gene regulation. We relate mutant BMPR2 to heightened GM-CSF mediated macrophage recruitment, and PPARγ 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


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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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


Kristen Red-Horse, PhD
Assistant Professor, Department of Biology

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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. Their long-term goal is to use this information to better understand and treat cardiovascular diseases.

SELECTED PUBLICATIONS


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.


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 Vascular Disorders, a specialized center for the diagnostic evaluation and focused therapy of lymphedema and allied diseases. I am Director of Stanford Center for Lymphatic and Venous Disorders.

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


RESEARCHER PROFILES

David Rosenthal, MD
Professor of Pediatrics (Pediatric Cardiology)

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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


**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

**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**


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


Michael Snyder, PhD
Stanford W. Ascherman, MD, FACS, Professor in Genetics
Chair, Department of Genetics
Director, Center for Genomics and Personalized Medicine

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

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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
We are presently in an omics revolution in which genomes and other omes can be readily characterized. My laboratory has both used and developed a variety of approaches to analyze genomes, proteomes and regulatory networks. Our research focuses on yeast, an ideal model organism ideally suited to genetic analysis, and humans. We discovered that much more of the human genome is transcribed and contains regulatory information that was previously appreciated, and a high diversity of transcription factor binding occurs both between and within species. We have also combined different state-of-the-art omics technologies to perform the first longitudinal detailed integrative personal omics profile (iPOP) of person and used this to assess disease risk and monitor disease states for personalized medicine. I am the Director of the Center for Genomics and Personalized Medicine and Chair Department of Genetics.

I'm a believer in the future—genomics will move medicine from 'diagnose and treat' to 'predict and prevent'.

SELECTED PUBLICATIONS


**Edda Speikerkoetter, MD**  
Assistant Professor of Medicine, Pulmonary and Critical Care Medicine

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**CURRENT RESEARCH**

My research focuses on the importance of the Bone Morphogenetic Protein Receptor 2 (BMPR2) signaling pathway in pulmonary, pulmonary-vascular as well as cardiac disease. 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 seems to be a feature of other sporadic or idiopathic forms of PAH.

Hypothesizing that increasing BMPR2 signaling might improve PAH, we have performed a High-Throughput Screen of FDA approved drugs to find BMPR2 activators and have identified the immuno-suppressive drug FK506 (Tacrolimus) as the main activator. We have subsequently shown that FK506 can 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).

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.

**EVERY TRIED. EVER FAILED. NO MATTER. TRY AGAIN. FAIL AGAIN. FAIL BETTER. — SAMUEL BECKETT**

**SELECTED PUBLICATIONS**


Our long-term goal is to understand how enzymes use specific structural elements to carry out their exquisite roles. We have focused on the myosin family of enzymes, which do much more than simply catalyze the conversion of a substrate to a product. The ATPase activity of myosin molecular motors must be precisely coupled with binding to and release from the actin filaments along which they move, as well as to a conformational change that provides force and directionality for movement. Understanding these structure-function relationships is a prerequisite to uncovering the effects of disease causing mutations in the genes encoding these molecular motors. My current research focuses on hypertrophic and dilated cardiomyopathies. These diseases, which affect 1 in 500 people, are debilitating and can lead to sudden death. Our focus is on the contractile machinery, studied at the molecular and single cardiomyocyte levels.

SELECTED PUBLICATIONS


Marcia L. Stefanick, PhD
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Professor, Obstetrics and Gynecology

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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


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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CURRENT RESEARCH
My research focus is an amalgam of pediatric echocardiography, vascular health in children, and use of Internet to deliver care to children with acquired and congenital heart disease.

In our vascular research laboratory, we have various noninvasive modalities to easily acquire vascular health measures in children. Recently, we have focused on delivering telehealth interventions to 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. Branching off on the idea of using tele-health as a tool, we have also piloted a home tele-echo study where we taught parents of pediatric heart transplant patients to acquire echo images of their children's hearts. This study proved to be effective and showed that parents are able to acquire reliable images for evaluation by an experienced echocardiographer. We are now expanding this concept to tele-clinic visits in pediatric Marfan patients. 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 nationwide.

Healthy hearts for life.

SELECTED PUBLICATIONS


Jennifer A. Tremmel, MD, MS
Assistant Professor, Medicine - Cardiovascular Medicine
Clinical Director, Women’s Heart Health at Stanford

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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


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 are collaborating with the Stanford Department of Obstetrics to develop mobile health programs for women who either start pregnancy obese or gain too much weight during pregnancy. The aim of this study was to evaluate recent trends and the adoption of practice recommendations for menopausal hormone therapy (MHT) by formulation, dose, woman’s age, and characteristics of physicians reporting MHT visits. The IMS Health (Plymouth Meeting PA) National Disease and Therapeutic Index physician survey data from 2001 to 2009 were analyzed for visits in which MHT use was reported by US office-based physicians.

SELECTED PUBLICATIONS


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.
The primary interests of our basic science laboratory 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 for risk assessment. In addition, we are interested in the genetic underpinnings of cardiovascular disease and are involved with various studies with the VA’s Million Veterans Program.

The Stanford Cardiovascular Institute is a place where clinicians and basic scientists can seamlessly collaborate on important clinical issues.

**SELECTED PUBLICATIONS**


Minang ‘Mintu’ Turakhia, MD, MAS
Associate Professor, Medicine - Cardiovascular Medicine
Executive Director, Stanford Center for Digital Health
Director, Cardiac Electrophysiology at the VA Palo Alto Health Care System

CURRENT RESEARCH
I am a practicing cardiac electrophysiologist, outcomes researcher, and clinical trialist. The goals of my research are to improve the outcomes of the treatment of heart rhythm disorders, with a focus on atrial fibrillation (AF), and to design, test, and implement digital health solutions to improve health outcomes and value. I have developed a multidisciplinary research program that draws upon technical knowledge, principals, and methods from computer science, biostatistics, economics, health services research, epidemiology, behavior science, and cardiac electrophysiology. 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.

As the Executive Director of Stanford’s new Center for Digital Health, I lead a great team to help foster research collaborations with the tech world and develop resources and education programs for the Stanford community. I am the principal investigator of several multi-center trials to test digital health tools and wearable devices to screen and manage heart rhythm disorders. I am co-Principal Investigator, with Dr. Marco Perez, of the Apple Heart Study, launched in 2017. In my clinical role, I perform invasive procedures such as catheter ablation and device implantation to treat heart rhythm disorders.

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


Paul J. Utz, MD
Professor, Medicine - Immunology and Rheumatology
Program Director, Medical Scientist Training Program (MSTP)

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CURRENT RESEARCH

While earning my MD degree at Stanford, I co-discovered the transcription factor Nuclear Factor of Activated T Cells (NFAT) with JP Shaw in Dr. Gerald Crabtree’s laboratory. I am an expert in the study of human and murine autoantibodies and autoantigens, apoptosis signaling pathways, animal models of autoimmunity, proteomics and multiplexed assay development for biomarker discovery. Members of my laboratory are developing several cutting-edge proteomics technologies for immunological applications, including multiplex planar-based autoantigen microarrays for studying lupus, multiple sclerosis, and other diseases such as diabetes. I am Program Director of Medical Scientist Training Program (MSTP).

We are working to develop antigen-specific tolerizing therapies for common autoimmune diseases.

SELECTED PUBLICATIONS


Paul J. Wang, MD
Professor, Medicine (Cardiovascular Medicine), and (by courtesy), Bioengineering
Director, Cardiac Arrhythmia Service and Cardiac Electrophysiology Laboratory

CURRENT RESEARCH
My research centers on the development of innovative approaches to the treatment of arrhythmias, including more effective catheter ablation techniques, more reliable implantable devices, and less invasive treatments. My clinical research interests include atrial fibrillation, ventricular tachycardia, supraventricular arrhythmias and implantable devices. I have active collaborations with Bioengineering, Mechanical Engineering, and Electrical Engineering Departments at Stanford. Some of the goals of my research program are: 1) to create a more effective methods of catheter ablation, 2) to create implantable pacemakers and leads that are more reliable, 3) to create a combined surgical-catheter approach to ablation, 4) to create noninvasive methods of ablation, 5) to make defibrillation painless. I am the Director of Cardiac Arrhythmia Service and Cardiac Electrophysiology Laboratory.

Advances of the past 2 decades in engineering, biology and genetics, computer science, material science, chemistry and physics will result in major new developments in arrhythmia therapy and device innovation. We are poised to make significant contributions in this area.

SELECTED PUBLICATIONS


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

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 it’s 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


My research program is focused on defining and characterizing pathogenic immune responses in humans with emphasis on two 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.

### Inhibition of JAK-STAT Signaling Suppresses Pathogenic Immune Responses in Medium and Large Vessel Vasculitis

### The microvascular niche instructs T cells in large vessel vasculitis via the VEGF-Jagged1-Notch pathway

### Pyruvate controls the checkpoint inhibitor PD-L1 and suppresses T cell immunity

### Immunoinhibitory checkpoint deficiency in medium and large vessel vasculitis

### Metabolic control of the scaffold protein TKSS in tissue-invasive, proinflammatory T cells

### Deficient Activity of the Nuclease MRE11A Induces T Cell Aging and Promotes Arthritogenic Effector Functions in Patients with Rheumatoid Arthritis
CURRENT RESEARCH

My research focuses on two primary areas: amyloidosis and cardiac complications of cancer therapy. 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.

My career goal is to pursue excellence in and integration of the three cornerstones of academic medicine—clinical care, scholarship, and education.

SELECTED PUBLICATIONS


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


Joseph C. Wu, MD, PhD
Director, Stanford Cardiovascular Institute
Simon H. Stertzer Professor of Cardiovascular Medicine & Radiology

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CURRENT RESEARCH

My lab works 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 "clinical trial in a dish" concept, and (iv) implement precision cardiovascular medicine for prevention and treatment of patients. His lab uses a combination of 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 lead to better care for our patients.

SELECTED PUBLICATIONS


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.

Given the difficult research funding climate, I hope in 20 years we can be proud of our efforts today to train the next generation of cardiovascular physician scientists.

SELECTED PUBLICATIONS


Fan Yang, PhD
Associate Professor of Orthopedic Surgery and of Bioengineering

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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 disease 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
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/NHLIB-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


The Promise and Challenge of Induced Pluripotent Stem Cells (iPSCs) for Cardiovascular Applications. Youssef AA, Ross EG, Bolli R, Pepine CJ, Leeper NJ, Yang PC. JACC: Basic to Translational Science 31 October 2016.


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


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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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


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

Richard Zare, PhD
Marguerite Blake Wilbur Professor in Natural Science and Professor (by courtesy) of Physics

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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

