A billion beats in a lifetime...

Stanford Cardiovascular Institute
Annual Report
Top: CT angiograph showing non-calcified atherosclerotic plaque in the right coronary artery. Right: Cardiac CT after bypass graft surgery.
Front Cover: Cardiac CT of a patient with stents in two coronary branches.
Koen Nieman

Top Left: Cross-section of the heart
Top Right: CT angiograph-based simulation of fractional flow reserve in patient with moderate narrowing of the LAD
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In 2018, we celebrated the 50th anniversary of Stanford Medicine performing the first adult human heart transplant in North America — a truly transformative moment for our university and people around the world. Today, we are advancing medicine in a similarly meaningful but more all-encompassing way. We are realizing Stanford Medicine’s Precision Health vision in which we use new technologies, machine learning, and genomics to not just treat disease but to predict it, prevent it, and cure it — precisely. Nowhere is this sea change more apparent than the Stanford Cardiovascular Institute.

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

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

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

Sincerely,

Lloyd B. Minor, MD

Llyod 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, this approach has yielded incredible biomedical advances, as evidenced by the over 1,000 manuscripts published by our members in 2018. In this report, we highlight some of the most significant research conducted by our Institute members, and how their work is changing the landscape of cardiovascular medicine.

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

The core strength of our Cardiovascular Institute comes from our talented students and postdoctoral and clinical fellows. We make their training and professional development a top priority to ensure that they pursue funding opportunities by offering grant writing support through courses like “Tackling your K” and “Rolling into your R,” as well as providing a junior faculty mentorship program. We are committed to building the best infrastructure to promote the growth and curiosity of all of our trainees, and to that end we appreciate the generous endowment of the Dorothy Dee and Marjorie Helene Boring Trust, which supports Stanford students dedicated to cardiovascular research. The late Dr. Lawrence Cohen has provided generous donations for the Lawrence H. and Roberta Cohen Lectureship, led by Y. Joseph Woo, MD, as a tribute to Dr. Norman Shumway’s pioneering work in cardiovascular medicine. In partnership with the Maternal and Child Health Research Institute and the Steven M. Gootter Foundation, the Institute awarded twelve seed grants this autumn to ignite inventive projects that are otherwise considered too risky by most funding agencies, but that are just right for Stanford’s innovative spirit.
At the heart of our mission is the integration and communication of top-level research. We have invested great effort into the Frontiers of Cardiovascular Science seminar series, which has been instrumental in disseminating groundbreaking cardiovascular biology from global leaders in the field. Our invited speakers for these seminars are extraordinary scientists who are transforming cardiovascular research and clinical practice. In 2018, we partnered with the Duke Cardiovascular Institute to explore the latest research during our two-day Stanford-Duke Cardiovascular Symposium in October. We also hosted the 3rd annual Stanford Drug Discovery Conference, featuring presentations from leading academic researchers, titans of the pharmaceutical industries, and federal and foundation policy makers. For 2019, we again look forward to bringing our community together for two outstanding conferences. In April, we will host the highly regarded Stanford Drug Discovery Conference, featuring an outstanding list of speakers from academia, industry, and federal institutions. Later in the year, we will partner with University of Pennsylvania Cardiovascular Institute in a joint Symposium. These events will generate unparalleled networking opportunities for our trainees, spur international collaborations, and accelerate scientific advances.

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

Sincerely,

Joseph C. Wu, MD, PhD
Leadership

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

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Chief, Division of Vascular Surgery

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Director, Children’s Heart Center

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Professor, Dept. of Radiology
Chief, Cardiovascular Imaging

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

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Vice Chair of Medicine
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Norman E. Shumway Professor
in Cardiothoracic Surgery
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Professor of Pulmonary and Critical
Care Medicine, Dept. of Medicine, Chief,
Pulmonary and Critical Care Medicine

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

Tom Quertermous, MD
William G. Irwin Professor of Medicine
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and Professor, by courtesy,
of Mechanical Engineering,
Director, Byers Center for Biodesign

Marlene Rabinovitch, MD
Dwight and Vera Dunlevie Professor
in Pediatric Cardiology
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

### Cardiothoracic Surgery
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### Cardiovascular Imaging
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### Clinical Research
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- Kenneth W. Mahaffey, MD

### Cardiovascular Medicine
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### 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  
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William Fearon, MD  
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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.

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

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Director, Grant Writing Academy

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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:**
Sarah Heilshorn, PhD  
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Yasuhiro Honda, MD
Jayakumar Rajadas, PhD
Daria Mochly-Rosen, PhD
Paul Yock, MD

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Thomas Quertermous, MD

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David J. Maron, MD
Doff McElhinney, MD
Jonathan Myers, PhD
Marcia L. Stefanick, PhD
Minang ‘Mintu’ Turakhia, MD, MAS

PULMONARY BIOLOGY:

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Mark A. Krasnow, MD, PhD
Mark R. Nicolls, MD
Marlene Rabinovitch, MD

STEM CELL BIOLOGY:

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WOMEN’S HEALTH:

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

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

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

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

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

Clinical Biomarker & Phenotyping Core Lab (BPCL)

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

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

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

CVI Clinical Trials Core

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

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

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

Cardiovascular Pharmacology (BioADD)

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

Contact: Jayakumar Rajadas, PhD jayraja@stanford.edu

3DQ Imaging Laboratory

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

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

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

Multi-Disciplinary Program in Cardiovascular Imaging

**PROGRAM DIRECTOR**  
Joseph C. Wu, MD, PhD  

**CO-DIRECTORS**  
John Pauly, PhD and Koen Nieman, MD, PhD

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

**ADAM BUSH, PHD**  
**Project:** Rosette MRI Trajectories for Motion Robust and Resolved Myocardial Iron and Blood Oxygenation Imaging

**GENNIFER SMITH, PHD**  
**Project:** Risk stratification of atherosclerotic plaques through DNA methylation profiling.

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

**PRIYANKA GARG, PHD**  
**Project:** Eludicating pathogenicity of a novel variant of unknown significance in LQTS using genome-editing and patient-specific iPSCs.
Education & Training Programs

Mechanisms and Innovation in Vascular Disease

PROGRAM DIRECTOR
Ronald Dalman, MD

CO-DIRECTOR
Philip Tsao, PhD

CO-DIRECTOR
Nicholas Leeper, MD

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

Education & Training Programs

ALEXANDER KAISER, PHD
Project: Personalized Virtual Surgery for Precision Treatment of Hypertrophic Cardiomyopathy.

SHEEVA RAJAEI, MD
Project: Lactation duration and women's cardiovascular disease.

STEPHANIE LINDSEY, PHD

XIAOMING OUYANG, PHD
Project: Modeling Tyrosine Kinase Inhibitor-Induced Vascular Dysfunction Using Human iPSCs.

IAN WILLIAMS, PHD
Project: Differentiation of human induced pluripotent stem cells to mature cardiac arterial and venous endothelium.
Research Training in Myocardial Biology

**PROGRAM DIRECTOR**
Daniel Bernstein, MD

**CO-DIRECTOR**
Tom Quertermous, MD

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

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

**WILLIAM GOODYER, MD**

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

**JACK O’SULLIVAN, PHD**

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

**SARA RANJBARVAZIRI, PHD**

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

**ROSHNI MADHVANI, PHD**

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

**ALISON SCHROER, PHD**

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

**SHARON PAIGE, MD, PHD**

*Project:* Human induced pluripotent stem cells for modeling congenital heart disease.
The Impact of Philanthropy

Sudden Cardiac Death

The support from the Steven M. Gootter Foundation supports 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 Bodesign New Arrhythmia Technologies Conference, 2017 and 2018 Seed Grant research projects, and other ongoing efforts.

2017 Award: Oscar J. Abilez, MD, PhD
"Early Detection of Arrhythmogenesis due to Cardiac Fibrosis via Correlation of In Vitro Modeling and Clinical Assessment"

2018 Award: Kristy Red-Horse, PhD
"Does enhancing coronary artery development promote recovery from cardiac injury?"

Visit the Gootter Foundation www.stevenmgootterfoundation.org

Education

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

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

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

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

Lawrence H. and Roberta Cohn Lecture Series

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

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

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

cvi.stanford.edu/waystogive
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 diagnose and treat cardiovascular diseases. Together with Stanford Maternal and Children’s Health Research Institute (MCHRI) and the Gootter Foundation, the CVI is excited to support research for nine outstanding projects in 2018.

### CVI Seed Grants 2018-2019 (FY 2019)

**PIs:** Helen Blau, PhD; Yu Xin Wang, PhD  
**Co-Investigators:** Mingxia Gu, MD, PhD; Marlene Rabinovich, MD

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

**PIs:** Michael Snyder, PhD; Mads Melbye, MD  
**Co-Investigators:** Liang Liang, PhD

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

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

**Influence of e-cigarette vapor on experimental aortic aneurysm**

**PI:** Erik Ingelsson, MD, PhD, FAHA  
**Co-Investigator:** Mark Mercola, PhD

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

**PI:** Detlef Obal, MD, PhD  
**Co-Investigator:** Ian Yang-Li Chen, MD, PhD

**Anesthetics induced myocardial depression through TRPA1 signaling pathway**

**PI:** Kristy Red-Horse, PhD  
**Co-Investigator:** Daniel Bernstein, MD

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

**PIs:** June-Wha Rhee, MD; Stanley Qi, MD, PhD  
**Co-Investigator:** Masataka Nishiga, MD, PhD

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

**PIs:** Michael Fowler, MB, FRCP; Petra Mamic, MD  
**Co-Investigators:** Michael Snyder, PhD; Thomas Quertermous, MD

**Characterization of the gut microbiome-host metabolism in heart failure-related insulin resistance**

**PIs:** Alison Marsden, PhD; Jack Boyd, MD  
**Co-Investigators:** Hanjay Wang, MD; Muhammad Owais Khan, PhD; Alexa Wnorowski, MS

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

**PIs:** Jeremy Dahl, PhD; Matthew Lungren, MD, MPH  
**Co-Investigators:** Arsenii Telichko, PhD; Carl Herickhoff, PhD

**Novel intervascular ultrasound array catheter for quantitative imaging of vulnerable plaque**

**PIs:** Charles KF Chan, MD; Irving Weissman, MD; Patricia K. Nguyen, MD  
**Co-Investigator:** Andrew Lee

**Functional characterization of distinct bone marrow sub-fractions for treatment of myocardial infarction**
2017-2018 (FY2018) Seed Grant Recipients

A Sensitized Genetic Association Study for Congenital Heart Disease
James Priest, MD, Assistant Professor of Pediatrics (cardiology).
Collaborator: Mads Melbye, MD, DMSc
This research was funded by MCHRI

Addressing the Obesity and Diabetes Epidemic Through Understanding Personalized Energy Expenditure
Christopher Gardner, PhD, Rehnborg Farquhar Professor of Medicine.
Collaborators: Michael Snyder, PhD (Genetics) & Francois Haddad, MD (Medicine/Cardiology)
This research was funded by MCHRI

Psychosocial, Cognitive, and Quality of Life Outcomes in Children and Adults with Repaired Tetrology of Fallot with Pulmonary Atesia and Major Aortopulmonary Collateral Arteries
Doff McElhinney, MD, Professor of Cardiothoracic Surgery (Pediatric Cardiac Surgery) and of Pediatrics (Cardiology).
This research was funded by MCHRI

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

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

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

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

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

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

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

Bridging the Gap: The Impact of a New Virtual Preventive Cardiology Clinic on Cardiovascular Risk Reduction in Two High Risk Ethnic Populations
Fatima Rodriguez, MD, MPH, Clinical Instructor, Medicine-Cardiovascular Medicine.
Collaborator: Rajesh Dash, MD, PhD (Medicine/Cardiology)

A Perfusion Bioreactor for Understanding Endocardial-Myocardial Interactions in Hypoplastic Left Heart Syndrome
Sean Wu, MD, PhD Associate Professor of Medicine (Cardiovascular Medicine) and (by courtesy) of Pediatrics.
Collaborator: Marlene Rabinovitch, MD (Pediatrics/Cardiology)

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

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

**DANNY HUANG**

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

**ANNIKA DRIES**

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

**MYRIAM AMSALLEM, MD**


**QING LIU, PHD**


**KEVIN CYR**

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

**KEVIN CYR**

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

**YUHEI KOBAYASHI, MD**


**MINGTAO ZHAO, PHD**


**Manuscript Awards 2018**

Each winter, CVI recognizes the authors of outstanding publications.

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

**MYRIAM AMSALLEM, MD**

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

**YUHEI KOBAYASHI, MD**


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

**QING LIU, PHD**


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

**MINGTAO ZHAO, PHD**

2017

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

MINGXIA GU, PhD


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

ELENA MATSA, PhD


Attenuated-Singal 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


2016

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

Alexandre J. S. Ribeiro, PhD


Epicardial FSTL1 Reconstitution Regenerates the Adult Mammalian Heart.

Ke Wei, PhD


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

Haodi Wu, PhD


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

Yuhei Kobayashi MD

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

**January 8, 2019**
MARK T. GLADWIN, MD
Jack D. Myers Professor and Chair
Department of Medicine Director
Pittsburgh Heart, Lung, and Blood Vascular Medicine Institute

**January 22, 2019**
TIMOTHY J. NELSON, MD, PHD
Associate Professor of Pharmacology,
Associate Professor of Medicine, and
Director of Research, NWWI, Mayo Clinic Health System in Eau Claire, Mayo Clinic Health System

**January 29, 2019**
DAVID J. PINSKY, MD
Professor
Division Chief of Cardiovascular Medicine,
University of Michigan
Director, Frankel Cardiovascular Center

**February 5, 2019**
DAN M. RODEN, MD
Professor of Medicine, Pharmacology, and
Biomedical Informatics
Sam L. Clark, MD, PhD Endowed Chair
Senior Vice President for Personalized Medicine, Vanderbilt University

**February 12, 2019**
STEPHEN MONTGOMERY, PHD
Associate Professor of Pathology and of Genetics, Stanford University

**February 26, 2019**
KENNETH B. MARGUILES, MD
Professor of Medicine, Hospital of the University of Pennsylvania Research Director, Heart Failure/Transplantation

**March 5, 2019**
PROF. DR. RER. NAT. VIACHESLAV NIKOLAEV
Director, Institute Center for Experimental Medicine
Universitatsklinikum Hamburg-Eppendorf

**March 12, 2019**
PAUL WANG, MD
Professor of Medicine (Cardiovascular Medicine), Stanford University Medical Center
SANJIV NARAYAN, MD
Professor of Medicine (Cardiovascular Medicine), Stanford University Medical Center

**March 26, 2019**
TODD MCDUVITT, PHD
Senior Investigator, Gladstone Institute of Cardiovascular Disease
Professor, Department of Bioengineering & Therapeutic Sciences, UC San Francisco
Investigator, Roddenberry Center for Stem Cell Biology & Regenerative Medicine at Gladstone

**April 9, 2019**
CHRISTOPHER NEWTON-CHEH, MD, PHD
Assistant Professor of Medicine, Harvard Medical School
Faculty Member, Massachusetts General Hospital

**April 16, 2019**
DOUG SAWYER, MD, PHD
Co-Director, Myocardial Biology & Heart Failure Research
Lab Chief, Cardiovascular Services, Maine Medical Center

**April 30, 2019**
LESLIE LEINWAND, PHD
Professor, Department of Molecular, Cellular, and Developmental Biology
Chief Scientific Officer, BioFrontiers Institute, University of Colorado, Boulder

**May 7, 2019**
PETER J. SCHWARTZ, MD
Professor and Head, Center for Cardiac Arrhythmias of Genetic Origin IRCSS
Instituto, Auxologico Italiano

**May 14, 2019**
RALPH SHOHET, MD
Director, Center for Cardiovascular Research Professor of Medicine, University of Hawaii

**May 21, 2019**
NIPAVAN CHIAMVIMONVAT, MD
Professor, Department of Internal Medicine (Cardiology), School of Medicine, UC Davis

**May 28, 2019**
ADAM J. ENGLER, PHD
Professor and Vice Chair of Bioengineering, University of California, San Diego

**June 11, 2019**
JANE E. FREEDMAN, MD
Edward Budnitz Professor of Cardiovascular Medicine, Director of Translational Research, UMass Memorial Heart & Vascular Center, UMass Medical School
MED 223: Cardiovascular Research & Medicine

Winter 2019

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

Directors:

January 10, 2019
NATALIE LUI, MD
Associate Professor of Cardiothoracic Surgery (Thoracic Surgery)

January 17, 2019
PHILP C. YANG, MD
Associate Professor of Medicine (Cardiovascular Medicine)

January 24, 2019
DANIEL ENNIS, PHD
Associate Professor of Radiology (Veterans Affairs)

January 31, 2019
KOEN NIEMAN, MD, PHD
Associate Professor of Medicine (Cardiovascular Medicine) and of Radiology (CV Imaging)

February 7, 2019
ROBERT WIRKA, MD
Instructor, Medicine - Cardiovascular Medicine

February 14, 2019
MICHAEL S. KAPILOFF, PHD
Associate Professor (Research) of Ophthalmology and, by courtesy, of Medicine (Cardiovascular Medicine)

February 21, 2019
SEAN WU, MD, PHD, FACC
Associate Professor of Medicine (Cardiovascular Medicine) and, by courtesy, of Pediatrics

February 28, 2019
NAZISH SAYED, MD, PHD
Instructor, Cardiovascular Institute

March 7, 2019
DUNG NGUYEN, MD, PHARM.D
Clinical Associate Professor, Surgery - Plastic & Reconstructive Surgery

March 14, 2019
ELAN BURTON, MD
Clinical Assistant Professor, Cardiothoracic Surgery
Who We Are
An international leader in the field of pulmonary vascular disease with an established tradition of innovative research, exceptional teaching, and outstanding patient care. A pioneer of new and novel clinical therapies, the Vera Moulton Wall Center is uniquely positioned to lead the field translating research into effective pulmonary hypertension (PH) therapies.

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

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

What We Do
DISCOVER → DEVELOP → DISSEminate → DELIVER

Steering Committee

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

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

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

Roham Zamanian, MD, FCCP
Associate Professor, Pulmonary & Critical Care Medicine
Director, Adult Pulmonary Hypertension (PH) Program

Contact Us
Phone: 800.640.9255
Email: wallcenter@stanford.edu
Web: wallcenter.stanford.edu
Dr. Norman Shumway, a pioneering cardiothoracic surgeon at Stanford, performed the first successful heart transplant in the US in 1968.
Christopher Almond, MD
Associate Professor of Pediatrics (Cardiology) at the Lucile Salter Packard Children's Hospital
Director, Cardiac Anticoagulation Services, Stanford Children's Health

EMAIL calmond@stanford.edu
PROFILE med.stanford.edu/profiles/Christopher-Almond

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

**EMAIL** russ.altman@stanford.edu
**PROFILE** https://rbaltman.people.stanford.edu
**HELIx GROUP** http://helix.stanford.edu/

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

**SELECTED PUBLICATIONS**


CURRENT RESEARCH

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

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

SELECTED PUBLICATIONS


RESEARCHER PROFILES

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

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PROFILE med.stanford.edu/profiles/Themistocles-Assimes

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 Co-Director of the Thoracic Surgery Clinical Research Program and has independent grant funding with a VA Merit Award through the Veterans Affairs Administration Health Services Research & Development. Her current research interests are in imaging surveillance following treatment for lung cancer and cancer survivorship. Outside of Stanford, she is also a member of the National Lung Cancer Roundtable in conjunction with the American Cancer Society and serves as the Chair of the Women and Lung Cancer Task Group.

SELECTED PUBLICATIONS


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


CURRENT RESEARCH

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

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

SELECTED PUBLICATIONS


CURRENT RESEARCH

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

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

SELECTED PUBLICATIONS


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

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PROFILE med.stanford.edu/profiles/Carlos-Bustamante

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


CURRENT RESEARCH

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

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

SELECTED PUBLICATIONS


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


EDUCATION/TRAINING
MD Harvard Medical School
MPH Harvard School of Public Health
RESIDENCY Brigham and Women’s Hospital
FELLOWSHIP Brigham and Women’s Hospital
BOARD CERTIFICATION Internal Medicine (ABIM); Nephrology (ABIM)

CLINICAL FOCUS
Nephrology, Dialysis, Hypertension, Mineral metabolism

HONORS & AWARDS
Elected Member, American Society of Clinical Investigation (2004)
National Torchbearer Award, American Kidney Fund (2007)
Senior Mentor, Network of Minority Research Investigators, NIDDK (2008-)
Denise O’Leary Award for Clinical Excellence, Stanford Health Care (2014)
Elected Member, Association of American Physicians (2015)
Belding H. Scribner Award, American Society of Nephrology (2015)
Elected Member, National Academy of Medicine (2015)
David M. Hume Memorial Award, National Kidney Foundation (2018)
Gerald Crabtree, MD
Department of Pathology Professor in Experimental Pathology and Professor of Developmental Biology

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LAB crablab.stanford.edu/

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 electrically active 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


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


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

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

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

SELECTED PUBLICATIONS


RESEARCHER PROFILES

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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EDUCATION/TRAINING
BA Johns Hopkins
PHD Caltech

HONORS & AWARDS
Paul Ehrlich and Ludwig Darmstaedter Prize, Paul Ehrlich Institute, Germany
King Faisal Prize
Behring-Heidelberger Prize, American Association of Immunologists
Novartis Prize for Basic Immunology

ELECTED MEMBER
National Academy of Sciences, USA
Institute of Medicine, National Academy of Sciences
Royal Society of London, UK

SCIENTIFIC ADVISORY BOARDS
Amgen, Chugai Pharmabody, 3T, Janux, Pact Bio, TCR Cure

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

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

SELECTED PUBLICATIONS


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

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

**SELECTED PUBLICATIONS**


Anne Dubin, MD
Professor of Pediatrics (Pediatric Cardiology) at the Lucile Salter Packard Children’s Hospital
Director, Pediatric Arrhythmia

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

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

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


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


RESEARCHER PROFILES

Daniel B. Ennis, PhD
Associate Professor, Department of Radiology, Stanford University
Director, Radiology Research, VA Palo Alto Health Care System

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CURRENT RESEARCH

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

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

SELECTED PUBLICATIONS


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


Jeffrey A. Feinstein, MD, MPH
Dunlevie Family Professor of Pulmonary Vascular Disease, and Professor, by courtesy, of Bioengineering
Director, Vera Moulton Wall Center

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CURRENT RESEARCH

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

SELECTED PUBLICATIONS


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


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

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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


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

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

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

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

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

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

SELECTED PUBLICATIONS


RESEARCHER PROFILES

Victor Froelicher, MD
Professor Emeritus, Medicine - Cardiovascular Medicine
Professor (by courtesy), Orthopedics
Director, Stanford Sports Cardiology Clinic
VAPAHSC Cardiologist Consultant

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

SELECTED PUBLICATIONS


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


CURRENT RESEARCH

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

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

SELECTED PUBLICATIONS

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


RESEARCHER PROFILES

Francois 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 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


Frank Hanley MD
Lawrence Crowley, MD Endowed Professor in Child Health
Cardiothoracic Surgery

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

SELECTED PUBLICATIONS


Robert A. Harrington, MD
Arthur L. Bloomfield Professor of Medicine
Chair, Department of Medicine, Stanford University School of Medicine

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

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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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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 420 scientific articles published in peer-reviewed journals.

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

SELECTED PUBLICATIONS


CURRENT RESEARCH

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

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

SELECTED PUBLICATIONS

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


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

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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.


Erik Ingelsson, MD, PhD
Professor, Medicine - Cardiovascular Medicine
Professor (by Courtesy), Health Research and Policy - Epidemiology
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CURRENT RESEARCH

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

SELECTED PUBLICATIONS


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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CURRENT RESEARCH

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

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

SELECTED PUBLICATIONS


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

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


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

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

SELECTED PUBLICATIONS


CURRENT RESEARCH

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

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

SELECTED PUBLICATIONS


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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CURRENT RESEARCH

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

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

SELECTED PUBLICATIONS


Fredric Kraemer, MD
Stanford University Professor in Endocrinology

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


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

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


Calvin Kuo, MD, PhD

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

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CURRENT RESEARCH

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

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

SELECTED PUBLICATIONS


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
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


Jason T. Lee, MD
Professor, Surgery
Director, Endovascular Surgery
Program Director, Vascular Surgery Residency/Fellowship

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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


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’Ambrogi Professor of Medicine, Hematology
Senior Associate Dean for Veterans Affairs
Chief of Staff, VA Palo Alto Health Care System

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DIVISION hematology.stanford.edu

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


**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

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

SELECTED PUBLICATIONS


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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PROFILE med.stanford.edu/profiles/michael-longaker
WEB longakerlab.com

EDUCATION/TRAINING
MD Harvard Medical School
GENERAL SURGERY INTERNSHIP UCSF Medical Center
GENERAL SURGERY RESIDENCY UCSF Medical Center
PLASTIC & RECONSTRUCTIVE SURGERY RESIDENCY NYU Medical Center
CRANIOFACIAL SURGERY FELLOWSHIP UCLA Medical Center

BOARD CERTIFICATION
General Surgery (ABS), Plastic Surgery (ABPS)

CLINICAL FOCUS
Plastic Surgery

HONORS & AWARDS
National Academy Of Medicine (2007)
Association Of American Physicians (2008)
I. S. Ravdin Lecture In Basic Medical Sciences, American College Of Surgeons (2009)
Flance-Karl Award, American Surgical Association (2011)
Sheen Award, Bank Of America/ American College Of Surgeons (2012)
66Th. Volume Of The Surgical Forum Is Dedicated To Michael T. Longaker, Md, Mba, Facs (2015)
PSF Career Research Award, Plastic Surgery Foundation (2016)

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

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

SELECTED PUBLICATIONS


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

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PROFILE med.stanford.edu/profiles/george-lui

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

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

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

SELECTED PUBLICATIONS


David J. Maron, MD
Clinical Professor, Medicine - Cardiovascular Medicine
Director, Preventive Cardiology

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PROFILE med.stanford.edu/profiles/david-maron
WEB stanfordhealthcare.org/medical-clinics/preventive-cardiology.html

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

SELECTED PUBLICATIONS


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


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

Failure is closer to success than inaction
—Earl Bakken.

SELECTED PUBLICATIONS


CURRENT RESEARCH

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

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

SELECTED PUBLICATIONS


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

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

SELECTED PUBLICATIONS


CURRENT RESEARCH

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

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

SELECTED PUBLICATIONS


D. Craig Miller, MD
Thelma and Henry Doelger Professor in Cardiovascular Surgery
Department of Cardiothoracic Surgery

RESEARCHER PROFILES

EDUCATION/TRAINING
MD Stanford University School of Medicine CA
BA Stanford University, Basic Medical Sciences (1969)
Dartmouth College, Chemistry/Mathematics (1968)
RESIDENCY Stanford University School of Medicine CA (1975, 1977)
BOARD CERTIFICATION

HONORS & AWARDS
President, American Association for Thoracic Surgery, 2007-2008
President, Western Thoracic Surgical Association, 1994-1995
Eugene Braunwald Mentorship Award, American Heart Association, 2009
Distinguished Scientist of the American Heart Association, 2003
Antoine Marfan Award, National Marfan’s Foundation, 2001
Wilfred Bigelow Award, Canadian Cardiovascular Society, 2000
Distinguished Achievement Award, American Heart Assoc. Cardiovascular Surgery & Anesthesia Council, 2008
William W. L. Glenn lecturer, American Heart Association, 2002
David J. Dugan Distinguished Service Award (Western Thoracic Surgical Association) 2016

CURRENT RESEARCH
Cardiac and heart valve disease with experimental laboratory large animal projects focused on the investigation of left ventricular and cardiac mechanics, bioenergetics, and LV and mitral valve physiology and pathophysiology. Current thrust is aimed at understanding the mitral valve and subvalvular mitral apparatus and transmural LV wall strains, thickening, and myolaminar fiber-sheet mechanics.

Clinical research interests include thoracic aortic diseases (aortic dissection, aneurysm) and cardiac valvular disease, including surgical treatment, endovascular thoracic aortic stent-graft repair, mitral valve repair, and valve-sparing aortic root replacement.

Those who cannot remember the past are condemned to repeat it.
—George Santayana (1863-1952)

SELECTED PUBLICATIONS


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RESEARCHER PROFILES

Daria Mochly-Rosen, PhD

George D. Smith Professor of Translational Medicine
Professor, Chemical and Systems Biology
Co-director, SPARK - Stanford’s Translational Research Program
President and Founder, SPARK GLOBAL

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CURRENT RESEARCH

Our basic research focuses on elucidating molecular events that contribute to heart diseases, generating tools to interfere with these pathologies and the translation of them into drug leads. We have used both rationally designed peptides and small molecules to regulate key signaling events and metabolism in the myocardium. Our research has led to several clinical trials using drugs that were developed in our laboratory at Stanford. My passion for translational research led me to create and co-direct SPARK that helps scores of inventors at Stanford move their early research discoveries to clinical trials and/or to licensing for drug development. I am the Founder and Co-director of SPARK - Stanford’s Translational Research Program.

I believe that it is our social responsibility to ensure that basic and clinical discoveries are translated into products that benefit patients. By providing the knowhow and the tools, together with industry experts we are making it happen.

SELECTED PUBLICATIONS


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 databases 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


Sanjiv Narayan, MD, MSc
Professor of Medicine (Cardiovascular Medicine)

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PROFILE med.stanford.edu/profiles/sanjiv-narayan
LAB web.stanford.edu/group/narayanlab/cgi-bin/wordpress/contact/

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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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

RESEARCHER PROFILES

Mark R. Nicolls, MD
Professor, Medicine - Pulmonary and Critical Care and Immunology and Rheumatology
Chief, Division of Pulmonary and Critical Care Medicine
Director, Lung Immunology
Endowed Chair: The Stanford Professor of Pulmonary and Critical Care Medicine

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


EDUCATION/TRAINING

MD Stanford University
MEDICINE RESIDENCY & INTERNSHIP
Stanford University
PULMONARY AND CRITICAL CARE MEDICINE FELLOWSHIP
University of Colorado
BOARD CERTIFICATION
Pulmonary Disease, ABIM

CLINICAL FOCUS

Heart/Lung Transplantation
Lung Transplantation
Pulmonary Hypertension
Lymphedema

HONORS & AWARDS

ELECTED MEMBER
American Society for Clinical Investigation (ASCI)

DIRECTOR
Stanford Lung Immunology Program
Stanford University Remodeled Airways Tissue Bank
Stanford Center for Advanced Lung Disease (CALD)

CO-FOUNDER
Northern California Scleroderma Research Consortium

EXECUTIVE STEERING COMMITTEE
Vera Moulton Wall Center for Pulmonary Vascular Disease

CHAIRMAN OF THE BOARD
Palo Alto Veterans Institute for Research

EDITORIAL BOARD
European Respiratory Journal
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 investigates advanced cardiac imaging techniques, and current research interest include stress myocardial perfusion CT, CT-based fractional flow reserve, machine-learning approaches to disease differentiation, imaging-guided decision making and the clinical value of cardiac CT in ischemic heart disease.

Dr. Nieman was born in the Netherlands, obtained his medical degree at the Radboud University in Nijmegen (1998), and completed his cardiology training at the Erasmus University Medical Center in Rotterdam (2008). His research in cardiac CT at the Erasmus University resulted in a PhD degree in 2003. In 2004 he performed an imaging fellowship at the Massachusetts General Hospital (Harvard Medical School) in Boston, MA. Dr Nieman became faculty at Erasmus (cardiology/radiology) in 2008 and was scientific director of cardiac CT and MRI and clinical director of the intensive cardiac care unit until he joined Stanford in 2016.

SELECTED PUBLICATIONS


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

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PROFILE med.stanford.edu/profiles/latha-palaniappan

CURRENT RESEARCH

My work focuses on the study of diverse populations, chronic disease, and prevention. My group specifically seeks to address the gap in knowledge of health in Asian subgroups and other understudied racial/ethnic minorities (PACS 5R01DK081371, CASPER R01HL126172, and CAUSES R01MD007012). I co-founded (with Dr. Bryant Lin) the Center for Asian Health Research and Education (CARE) at Stanford in 2018. My current work examines the clinical effectiveness of structured physical activity programs for diabetes management (Initiate and Maintain Physical Activity in Clinics - IMPACT, 5R18DK096394), as well as best exercise regimens for normal-weight diabetics (Strength Training Regimen for Normal Weight Diabetics - STRONG-D, 2R01DK081371). I implement evidence based genetic and pharmacogenetic testing in Primary Care Clinics as the Scientific Director of Precision Genomics and Pharmacogenomics in Primary Care. I am the faculty lead of the Precision Health Biobank at Stanford, a population based biobank designed to accelerate genetic and other -omics discovery.

SELECTED PUBLICATIONS


CURRENT RESEARCH

Dr. Marco Perez's research goal is to better understand the fundamental causes of cardiovascular disease through the study of genetics and epidemiology. His group studies the genetic variations and environmental exposures that are associated with conditions such as atrial fibrillation and heart failure. He has led the studies of atrial fibrillation in Women's Health Initiative, one of the largest nation-wide population-based cohorts. He is currently conducting a large study monitoring for silent or asymptomatic atrial fibrillation in women from the WHI randomized to exercise intervention, and is co-PI in the Apple Heart Study, a clinical trial using the Apple Watch to screen for atrial fibrillation. He is interested in understanding the paradox that atrial fibrillation is less common in African Americans and Hispanics, despite a greater burden of risk factors such as hypertension. As director of the Stanford Inherited Arrhythmia Clinic, he evaluates families with rare inherited arrhythmias associated with sudden death such as Long QT and Brugada Syndromes and explores their links with novel genes. He is particularly interested in studying the genetic causes of very early onset atrial fibrillation. He also studies how best to use the electrocardiogram to identify patients at risk for atrial fibrillation and athletes at risk for life-threatening arrhythmias due to conditions such as hypertrophic cardiomyopathy. His genetic studies have led to the discovery of promising novel therapeutic targets that his group is now studying at a functional level.

SELECTED PUBLICATIONS

Incident Atrial Fibrillation is Associated with MYH7 Sarcomeric Gene Variation in Hypertrophic Cardiomyopathy. Seung-Pyo Lee, MD, PhD, Euan A. Ashley MRCP, DPhil, Colleen Caleshu, MS, Eric M. Green, MD, PhD, Daniel Jacoby, MD, Steve D. Colan, MD, Alexandre Pereira, MD, Sharlene M. Day, MD, Francesca Girolami, BSc, Iacopo Olivotto, MD, Michelle Michelis, MD, PhD, Carolyn Y. Ho, Marco V. Perez, MD, Circulation Heart Failure 2018: Sep;11(9).

Rationale and design of a large-scale app-based study to identify cardiac arrhythmias using a smartwatch: The Apple Heart Study. Mintu P. Turakhia MD MAS, Manisha Desai PhD, Haley Hedlin PhD, Amol Rajmane MD MBA, Nisha Talati MBA, Todd Ferris MD MS, Sumbul Desai MD, Divya Nag, Mithun Patel MD, Peter Kowey MD, John S. Rumsfeld MD PhD, Andrea M. Russo MD, Melanie True Hills1, Christopher B. Granger MD, Kenneth W. Mahaffey MD, Marco V. Perez MD. American Heart Journal 2019 Jan;207:66-75.

Large Q and S waves in Lead III on the Electrocardiogram Distinguish Patients with Hypertrophic Cardiomyopathy from Athletes. Alvin S. Chen, MD, Rachel E. Bent, BA, Matthew T. Wheeler, MD, PhD, Joshua W. Knowles, MD, PhD, Francois Haddad, MD, Victor Froelicher, MD, Euan Ashley, MRCP, DPhil, and Marco V. Perez, MD. Heart Nov;104(22):1871-1877.

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


CURRENT RESEARCH

Professor Quake’s interests lie at the nexus of physics, biology and biotechnology. His group pioneered the development of Microfluidic Large Scale Integration (mLSI), demonstrating the first integrated microfluidic devices with thousands of mechanical valves. This technology is helping to pave the way for large scale automation of biology at the nanoliter scale, and he and his students have been exploring applications of lab-on-a-chip technology in functional genomics, genetic analysis, and structural biology. Professor Quake is also active in the field of single molecule biophysics.

SELECTED PUBLICATIONS


My laboratory is interested in the molecular mechanisms that mediate vascular disease pathophysiology and the risk for these diseases. The approach is primarily genetic, using human cohorts and large scale genome wide studies to identify genes that associate with disease and risk, and molecular genetic studies to define the mechanisms of these associations. At the human level, we collaborate with a number of centers around the world through the CARDIoGRAM+ C4D consortium to further identify coronary heart disease loci, and our group serves as the organizing center searching for loci that associate with gold standard measures of insulin sensitivity, the GENESIS study. For loci identified through these studies, we work to identify mechanisms by which causal variation is responsible for altered gene structure or function, and employ cellular and genetic mouse models to identify how encoded factors participate in the disease process.

When not working on disease genes, I enjoy listening to blues music.

SELECTED PUBLICATIONS


Marlene Rabinovitch, MD
Endowed Chair, Dwight and Vera Dunlevie Professorship in Pediatric Cardiology Director, Basic Science and Engineering Initiative, Stanford Children’s Health Betty Irene Moore Children’s Heart Center

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LAB med.stanford.edu/labs/rabinovitchbland

CURRENT RESEARCH
We investigate mechanisms leading to pulmonary arterial hypertension (PAH) with the view that we might better treat this devastating condition that has no cure except for lung transplantation. We discovered relationships between degradation of elastin by an endogenous elastase, loss of pre-capillary vessels, and proliferation of vascular cells and showed that suppression of elastase activity could reverse experimentally-induced PAH; we are now embarking on a translational project to bring elastase inhibitors into the clinic. We focus on inflammation and autoimmunity in PAH. CyToF and multiple high throughput approaches are applied in immunophenotyping patients and experimental models of PAH. In addition, we investigate the use of induced pluripotent stem cells to understand the genetic and epigenetic factors that cause PAH. We recently discovered molecular pathways downstream of bone morphogenetic protein receptor (BMPR)2 explaining how activation of this receptor protects EC from apoptosis preventing obliteration and loss of pre-capillary arteries and attenuates proliferation of SMC and fibroblasts. Using human cells and genetically modified mice, we elucidate interactions between BMPR2 signaling and 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

EDUCATION/TRAINING
PHD Indian Institute of Technology

HONORS & AWARDS
YOUNG INVESTIGATOR AWARDS
Young Scientist Award in Chemistry, Council of Scientific and Industrial Research, India
TANSA Award, Government of Tamil Nadu, India

VISITING SCIENTIST
CNRS - National Centre for Scientific Research, France; ETH Zurich; National Institute on Aging (NIA), NIH

CONSULTING PROFESSOR
Department of Chemical Engineering, Stanford University

VISITING PROFESSOR (STANFORD UNIVERSITY)
Department of Biological Sciences; Department of Chemical Engineering; Department of Psychiatry

STEERING COMMITTEE MEMBER
Stanford Cardiovascular Institute

FORMER FOUNDING CHAIR (INDIA)
Bioorganic and Neurochemistry Laboratory, CLRI, Council of Scientific and Industrial Research

ADJUNCT FULL PROFESSOR (UCSF)
Department of Bioengineering and Therapeutic Sciences
School of Pharmacy, University of California San Francisco

CURRENT RESEARCH

My research oversees the application of various technologies in a research domain aimed at the development of novel formulations and therapeutics and inventing targeted drug delivery systems. For the past 20 years, I have been studying how protein aggregation in cardiomyocytes and neurons affects their functions. I have shown that misfolded protein accumulation is involved in the dysregulation of calcium homeostasis and cellular function. Recently, I discovered that the misfolding stress is initiated by phospho-Tau in the brain could affect the heart function with compromised brain perfusion. We have shown apelin therapy could recover the heart function significantly using the mutant human tau-expressing PS19 mouse model. In addition, I have used biophysical and pharmacological approaches to identify optimal microenvironments in which implanted cardiomyocytes to repair injured hearts.

Somewhere, something incredible is waiting to be known — Blaise Pascal

SELECTED PUBLICATIONS


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

CURRENT RESEARCH

My laboratory uses cardiovascular development as a model to study the signals that instruct cell fate and guide morphogenesis during organ formation in the mammalian embryo. Our current focus is to fate-map the different cellular sources that give rise to the coronary arteries of the heart and to identify the molecules that direct their migration and differentiation. Our long-term goal is to use this information to better understand and treat cardiovascular diseases.

SELECTED PUBLICATIONS


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.


EDUCATION/TRAINING

PHD University of California, San Francisco
POSTDOCTORAL TRAINING Genentech, Inc.
POSTDOCTORAL TRAINING Stanford University

HONORS & AWARDS

Searle Scholar 2013–2016
New York Stem Cell Foundation Robertson Investigator 2015-2020

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PROFILE med.stanford.edu/profiles/kristy-red-horse
LAB redhorselab.stanford.edu/
CURRENT RESEARCH

I have devoted the last fifteen years of my career to the clinical and translational investigation of lymphatic vascular disease. More specifically, my laboratory and clinical research team focus on: biomarker identification and validation in lymphatic vascular disease; applications of therapeutic lymphangiogenesis; drug therapies for acquired lymphedema; and pharmacologic prevention of cancer-induced lymphedema. Having studied and characterized lymphatic vascular disease in small animal models, we are increasingly attempting to apply these insights to the human clinical problem of lymphedema. In 1995, I co-founded, and currently direct, the Stanford Center for Lymphatic and Venous Disorders, a specialized center for the diagnostic evaluation and focused therapy of lymphedema and allied diseases.

I agree with Woody Allen: “I don’t want to achieve immortality through my work. I want to achieve it by not dying.”

SELECTED PUBLICATIONS


RESEARCHER PROFILES

David Rosenthal, MD
Professor of Pediatrics (Pediatric Cardiology)

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EDUCATION/TRAINING
MD Albert Einstein College of Medicine
INTERNSHIP Columbia Presbyterian Medical Center
RESIDENCY Columbia Presbyterian Medical Center
FELLOWSHIP Yale School of Medicine
BOARD CERTIFICATION
Pediatric Cardiology (ABP)

CLINICAL FOCUS
Pediatric Cardiology
Cardiology (Heart)
Pediatric Heart Failure
Heart Transplantation
Cardiomyopathies
Ventricular Assist Devices

CURRENT RESEARCH
As director of the PACT program for pediatric heart failure and transplantation at Lucile Packard Children’s Hospital and Stanford University, I am primarily interested in improving clinical care for children with heart failure and heart transplantation. This includes improving survival and functional outcomes of children treated with mechanical circulatory support; and improved utilization of heart donors. We are actively involved in the creation of a national learning network to share, develop and disseminate best practices in this field as a way of complementing traditional research activities.

SELECTED PUBLICATIONS
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


CURRENT RESEARCH

My main research continues to be in the field of echocardiography. Several areas of research are currently being pursued: 1) Coronary artery myocardial bridge; anatomic, physiologic and hemodynamic assessment. Clinical manifestations and treatment. 2) Exercise/stress echocardiography. 3) Echocardiographic evaluation of Cardiac structures and function.

Our team wants to spread the word, to educate the medical community that myocardial bridge is a real thing.

SELECTED PUBLICATIONS


CURRENT RESEARCH

Precision health relies on the ability to assess disease risk at an individual level, detect early preclinical conditions and initiate preventive strategies. We have used deep longitudinal omics profiling and wearable monitoring to better manage health and make health-related discoveries, to identify relevant molecular pathways associated with standard clinical measures, and to assess the impact of personalized longitudinal big data on a understanding health and early detection of disease. Altogether, we conclude that deep longitudinal profiling can lead to actionable health discoveries and provide important information relevant for precision health.

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

SELECTED PUBLICATIONS


My research focuses on the importance of the Bone Morphogenetic Protein Receptor 2 (BMPR2) signaling pathway in pulmonary-vascular, cardiac disease as well as hereditary hemorrhagic telangiectasia (HHT). In 2000, two independent groups discovered mutations in the BMPR2 pathway as the genetic basis for pulmonary arterial hypertension (PAH). Over the past years more mutations either directly involved in the BMPR2 pathway (Endoglin, ALk1, Smad9) or indirectly linked to the BMPR2 pathway (Caveolin-1) have been discovered, emphasizing the central role of BMPR2 signaling in familial PAH. It was subsequently found that reduced BMPR2 expression and signaling is a feature of other sporadic or idiopathic forms of PAH. Hypothesizing that increasing BMPR2 signaling might improve PAH, we performed a High-Throughput Screen of FDA approved drugs and identified the immuno-suppressive drug FK506 (Tacrolimus) as the main BMPR2 activator. We have subsequently shown that FK506 could rescue endothelial dysfunction in PAH, and prevent and reverse PAH in rodent models of experimental PAH (JCI 2013). This discovery has led to the compassionate use of the compound in end-stage PAH patients (AJRCCM 2015) and a phase II clinical trial to test the safety, tolerability and efficacy of low-dose FK506 in PAH at Stanford (ERJ 2017). We discovered a second drug, Enzastaurin, that increases the novel modifier gene of BMPR2, FHIT (Fragile HistidineTriad) and also is able to reverse experimental PAH.

The most current research in the lab focuses on the role of BMPR2 signaling in RV failure, using different mouse models with cell specific deficient BMPR2 signaling, deep tissue imaging as well as patient derived iPSC- Cardiomyocytes as well as modulation of the BMPR2 pathway in HHT.

**CURRENT RESEARCH**

**SELECTED PUBLICATIONS**


CURRENT RESEARCH

Our general research interest is the structure and function of molecular motors in vitro and in vivo, with emphasis on understanding the molecular basis of muscle contraction. Our major areas of specific interest are the molecular basis of energy transduction that leads to ATP-driven myosin movement on actin, the roles of the myosin family of molecular motors in eukaryotic cells, the regulation of actin and myosin interaction and their assembly states, and the biochemistry and regulation of the attachment of molecular motors to their corresponding cargo.

The detailed understanding we have developed of how myosin transduces the chemical energy of ATP hydrolysis into mechanical movement has led us to our current focus on human hypertrophic cardiomyopathy (HCM) caused by missense mutations in human β-cardiac myosin. Our goal is to elucidate the molecular basis of hyper-contractility seen clinically resulting from HCM mutations. We postulated that a majority of HCM mutations shift β-cardiac myosin heads from a sequestered off-state to an active on-state for interaction with actin, resulting in the hyper-contractility seen clinically. This is different from earlier prevailing views, and is the basis of all of our current research. We now have extensive evidence for this hypothesis using a combination of the various high-resolution technologies we have developed over the years as well as new approaches. Our work is now providing possible paths forward for therapeutic intervention for cardiomyopathy patients.

SELECTED PUBLICATIONS


Marcia L. Stefanick, PhD
Professor, Medicine - Stanford Prevention Research Center
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 the internet to deliver care to children with acquired and congenital heart disease. We have various noninvasive modalities to easily acquire vascular health measures in children. In the past year, we completed a study investigating telehealth interventions in pediatric heart transplant patients to improve their vascular health. We discovered that lifestyle interventions delivered via live-video conferencing is a feasible and maintainable method to manage long-term care in this patient population. We have also completed a pilot home tele-echo study where we taught parents of pediatric heart transplant patients to acquire echo images of their children’s hearts. This study showed that parents are able to acquire reliable images for evaluation by an experienced echocardiographer. Using the same idea of a home-echo, and incorporating other home acquisition of key clinical data such as height, weight, digital cardiac auscultation, and medical history, we hope to show that home tele-clinic visits delivered via live-video conferencing is reliable and clinically comparable to regular clinic visits. Emerging new tools makes the landscape for innovative long-term surveillance care exciting. It is a field with which we hope to explore further to be able to incorporate cost-effective, maintainable, accessible, and specialized care.

SELECTED PUBLICATIONS


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


Sandra Tsai, MD, MPH
Clinical Associate Professor, Medicine
Primary Care, Population Health, and Cardiovascular Institute

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CURRENT RESEARCH

My research focuses on the development of behavioral modification strategies to improve cardiovascular health in pregnant women at risk for blood pressure complications, such as preeclampsia. We are interested in understanding how improvements in cardiovascular risk factors during pregnancy may affect rates of pregnancy complications and future cardiovascular risk. We collaborate with the Stanford Department of Obstetrics to care for women who either start pregnancy obese or gain too much weight during pregnancy.

SELECTED PUBLICATIONS


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.


Philip S. Tsao, PhD
Professor, Medicine - Cardiovascular Medicine
Associate Chief of Staff for Research and Development, VAPAHCS
Director, VA Epidemiology Research and Information Center for Genomics at VAPAHCS

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CURRENT RESEARCH

My laboratory’s primary interests are in understanding the molecular underpinnings of vascular disease as well as assessing disease risk. We use a wide range of biochemical, molecular, and physiological techniques to make primary observations in cell systems as well as preclinical models. Furthermore, we continue to extend our findings to human subjects in order to confirm their clinical applicability. Current research projects include the role of microRNAs in regulating atherosclerosis and abdominal aortic aneurysm disease; elucidating the impact of insulin resistance and obesity in vascular disease; and identification of biomarkers (genetic and protein) for risk assessment. I am VA Palo Alto Epidemiology Research and Information Center (ERIC) for Genomics as well as Co-Principal Investigator of the VA’s national Million Veteran Program, currently the world’s largest biobank for genomic health research.

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

SELECTED PUBLICATIONS


Current Research

I am a cardiac electrophysiologist, outcomes researcher, and clinical trialist. The goal of my research is to improve the outcomes of the treatment of heart rhythm disorders, with a focus on atrial fibrillation (AF), which affects 5 million Americans and can cause stroke and heart failure. By using large administrative, medical record, registry, and implantable device data, my group takes a “Big Data” approach to fill evidence gaps in understanding quality of care, predicting AF-related complications, and comparing effectiveness of treatment strategies. This has led to important contributions in health services and outcomes research that have reshaped professional society guidelines and clinical practice. More recently, we have extended our work to answer questions regarding atrial fibrillation screening, medication adherence, and digitally-enabled treatment strategies. Dr. Marco Perez and I are co-PIs of the Apple Heart Study, a fully digital and virtual end-to-end study to evaluate whether smartwatches can effectively and accurately identify atrial fibrillation. This work has allowed a large team at Stanford to develop the infrastructure for pragmatic studies using smartphone applications and wearable sensors and devices.

Atrial fibrillation is one of the most commonly treated conditions in all of health care. Yet, it is astonishing how little we understand the disease, how to best treat it, and who is at highest risk for complications.

Selected Publications


CURRENT RESEARCH

My lab actively collaborates with many investigators on the Stanford campus, and across the world to disseminate and implement newly-invented technologies. We study autoimmune diseases, including systemic lupus erythematosus, rheumatoid arthritis, scleroderma, myositis, primary biliary cirrhosis, Sjögren’s disease, type I diabetes, vasculitis, multiple sclerosis, and mixed connective tissue disease. In addition to better understanding the pathogenic mechanisms involved in autoimmunity, we are developing bench-to-bedside technologies for immune diseases. Our group made several breakthrough inventions, such as protein arrays, peptide arrays, HIT, lysate arrays, Intel arrays, and EpiTOF. Additionally, I am the Director of Stanford’s Autoimmunity Center of Excellence and have extensive expertise in coordinating program project grants over the last 12 years, including Program Director of Francis Collins’ $41M Accelerating Medicines Partnership in RA/SLE initiative.

I am Founder and Program Director for the Stanford Institutes of Medicine Research (SIMR) Program for high school students, which has hosted ~800 students in labs over 20 years. I also developed the Stanford EXPLORE Lecture Series. This program covers the basic science fundamentals represented by various research areas at Stanford Medicine. In 2018, I was appointed Stanford Associate Dean for Medical Student Research to promote physician investigator development across the physician-scientist career continuum. I will continue to provide high-level oversight of SIMR and the MSTP while focusing on new efforts to create programs for MD students to build careers as investigators and leaders.

SELECTED PUBLICATIONS


The page contains a profile of Paul J. Wang, MD, Professor, Medicine (Cardiovascular Medicine), Director, Cardiac Arrhythmia Service and Cardiac Electrophysiology Laboratory. The profile includes sections on Current Research, Selected Publications, Education/Training, Honors & Awards, and Contact Information. The text discusses Wang’s research focus on innovative approaches to the treatment of arrhythmias, including catheter ablation techniques, implantable devices, and less invasive treatments. His clinical research includes atrial fibrillation, ventricular tachycardia, supraventricular arrhythmias, and implantable devices. He has collaborations with Bioengineering, Mechanical Engineering, and Electrical Engineering. He is the Center Director for the AHA Strategically Focused Research Network Joe and Linda Chlapty DECIDE Grant for Shared Decision Making in Atrial Fibrillation Stroke Prevention. Some goals of his research program are to create: 1) more effective methods of catheter ablation, 2) more reliable implantable pacemakers and leads, 3) a combined surgical-catheter approach to ablation, 4) noninvasive methods of ablation, 5) new solutions to prevent sudden cardiac death.

**Current Research**

My research centers on the development of innovative approaches to the treatment of arrhythmias, including catheter ablation techniques, implantable devices, and less invasive treatments. My clinical research includes atrial fibrillation, ventricular tachycardia, supraventricular arrhythmias and implantable devices. I have collaborations with Bioengineering, Mechanical Engineering, and Electrical Engineering. I am the Center Director for the AHA Strategically Focused Research Network Joe and Linda Chlapty DECIDE Grant for Shared Decision Making in Atrial Fibrillation Stroke Prevention. Some goals of my research program are to create: 1) more effective methods of catheter ablation, 2) more reliable implantable pacemakers and leads, 3) a combined surgical-catheter approach to ablation, 4) noninvasive methods of ablation, 5) new solutions to prevent sudden cardiac death.

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

**Selected Publications**

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

EDUCATION/TRAINING
MD Stanford University

HONORS & AWARDS
NATIONAL ACADEMY OF SCIENCE COUNCIL National Academy of Science
Max Delbruck Medal, University of Berlin
Jessie Stevenson Kovalenko Medal, National Academy of Sciences Council
California Scientist of the Year
Robert Koch Award, Koch Foundation, Berlin, Germany
Lewis S. Rosenstiel Award for Distinguished Work in Basic Medical Science
FELLOW
American Association for the Advancement of Science
ELECTED MEMBER
Institute of Medicine, National Academy of Sciences; American Philosophical Society
BOARD OF SCIENTIFIC ADVISORS
National Cancer Institute
BOARD OF DIRECTORS
Institute for Systems Biology; International Society for Stem Cell Research (ISSCR)
SCIENTIFIC ADVISORY BOARD
Gladstone Institutes; Institute of Medical Biology, A*STAR, Singapore
BOARD OF SCIENTIFIC COUNSELORS
Memorial Sloan Kettering Cancer Center

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.

SELECTED PUBLICATIONS
RESEARCHER PROFILES

Cornelia M. Weyand, MD, PhD
Professor, Medicine - Immunology and Rheumatology
Chief, Division of Immunology and Rheumatology

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CURRENT RESEARCH

My research is focused on defining and characterizing pathogenic immune responses in humans with emphasis on 2 disease models; inflammatory blood vessel disease and rheumatoid arthritis. In large vessel vasculitis, we have defined disease-relevant T cells, discerned mechanisms of T cell-antigen recognition, connected different T cell lineages to early and late disease and discovered microenvironmental signals that shape pathogenic immunity in the walls of human arteries. We were the first to describe the role of arterial wall dendritic cells in sensing danger-associated molecular patterns and initiating vasculitis and have implicated NOTCH-NOTCH ligand interactions in directing the tissue tropism of large vessel vasculitis. We build patient-relevant experimental models by engrafting human blood vessels, human atherosclerotic plaque and human immune cells into mice. Work in rheumatoid arthritis has identified premature immune aging as a typifying defect in this autoimmune syndrome. We are examining the contribution of DNA instability, telomeric damage and metabolic abnormalities in accelerated immune cell aging and inflammatory disease.

The immune system is everywhere. All diseases have their roots in the immune system.

SELECTED PUBLICATIONS


Ronald Witteles, MD
Associate Professor, Medicine - Cardiovascular Medicine
Co-Director, Stanford Amyloid Center
Program Director, Internal Medicine Residency Training Program

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AMYLOID CENTER stanfordhospital.org/cardiovascularhealth/amyloid
RESIDENCY PROGRAM medicine.stanford.edu/education/residency.html

CURRENT RESEARCH

My research focuses on three primary areas: amyloidosis, cardiac complications of cancer therapy, and cardiac sarcoidosis. As Co-Director of one of the nation’s largest Amyloid Centers, I collaborate with partners throughout the campus on clinical trials, epidemiologic research, and laboratory-based research dedicated to a better understanding of and better treatments for cardiac amyloidosis. In the area of cardiac complications of cancer therapy (“Cardio-Oncology”), I collaborate with partners in the Divisions of Hematology and Medical Oncology to investigate optimal screening and treatment of cancer-therapy associated cardiac disease. In the area of cardiac sarcoidosis, I collaborate with colleagues in Nuclear Imaging and Immunology to better image and treat the disease.

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

SELECTED PUBLICATIONS


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


My lab focuses on biological mechanisms of patient-specific and disease-specific induced pluripotent stem cells (iPSCs). The main goals are to (i) understand basic cardiovascular disease mechanisms, (ii) accelerate drug discovery and screening, (iii) develop the "clinical trial in a dish" concept, and (iv) implement precision cardiovascular medicine for disease prevention and treatment of patients. My lab uses a combination of advanced genomics, stem cells, cellular & molecular biology, physiological testing, and molecular imaging technologies to better understand molecular and pathophysiological processes.

The missions of the Stanford CVI are to deliver excellence in clinical care, world-class education, and cutting-edge research that will improve the medical care and quality of life of our patients.

SELECTED PUBLICATIONS


My research laboratory seeks to identify mechanisms responsible for human congenital heart disease, the most common cause of still-births in the U.S. and one of the major contributors to morbidity and mortality in infants and toddlers. We believe that by understanding the mechanisms regulating growth and differentiation of heart precursor cells during early embryonic development we can then apply these principles to understand the pathogenesis of adult onset heart diseases such as heart failure and arrhythmia where re-activation of early embryonic developmental program plays a central role. We currently use both genetically-modified mice as our living model to understand the biology of heart development as well as embryonic stem cells as a test-tube model to study the process of heart cell formation.

SELECTED PUBLICATIONS

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 diseases sites and their ability to enhance tissue regeneration via paracrine signaling. We further modulate the paracrine signaling of stem cells using biodegradable polymeric nanoparticle-mediated non-viral gene delivery, which is safer than conventional viral vectors. Using relevant animal models, we have demonstrated the potential applications of such stem cell- and biomaterials-based strategies for treating musculoskeletal diseases, cardiovascular diseases, and cancer.

### SELECTED PUBLICATIONS


- **Sliding hydrogels with mobile molecular ligands and crosslinks as 3D stem cell niche.** Tong X, Yang F. *Advanced Materials*, 2016 Sep;28(33):7257-63.
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

Induced Pluripotent Stem Cell (iPSC)-Derived Exosomes for Precision Medicine in Heart Failure. Yang PC. Circ Res. 2018 Mar 2;122(5):661-663


Alan C. Yeung, MD
Li Ka Shing Professor of Medicine (Cardiology)
Medical Director, Cardiovascular Health, Stanford Medicine
Chief (Clinical), Division of Cardiovascular Medicine
Former Director, Interventional Cardiology

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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LAB web.stanford.edu/group/Zarelab/

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


EDUCATION/TRAINING
PHD Harvard University

HONORS & AWARDS
National Medal of Science, National Science Foundation (1983)
Wolf Prize in Chemistry (2005)
Presidential Award for Excellence in Science, Mathematics, and Engineering Mentoring (PAESMEM), U.S. Office of Science and Technology Policy (2009)
Priestley Medal of the American Chemical Society (2010)
BBVA Foundation Frontiers of Knowledge Award in the Basic Sciences category (2010)
King Faisal International Prize in Science, King Faisal Foundation (2011)
Othmer Gold Medal from the Chemical Heritage Foundation (2017)