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DIVISION OF CARDIOLOGY

As part of the Department of Medicine and UPMC’s Heart and Vascular Institute (HVI), the Division of Cardiology serves as a resource for patients, families, students, and physicians. By pursuing excellence in clinical care, research, and education, Cardiology faculty are inspired to discover and deliver the innovations needed now and in the future.

The Division of Cardiology pursues clinical and academic excellence through superior patient care, groundbreaking scientific discoveries, and excellence in training positioning the Division and HVI as an international leader in the field of cardiovascular medicine. With more than 150 physicians and scientists located in facilities throughout Pennsylvania, HVI combines outstanding community-based care with the most advanced technology and treatments available. And, the Division’s training program graduates 8 general cardiology fellows per year, with additional subspecialty clinical fellowships available. Cardiology faculty also remain engaged in research, with total sponsored project funding for HVI research efforts exceeding $30 million this year.

Some highlights of the year include:

- **Purple Card Initiative with UPMC Health Plan** launched to provide patients care navigation for clinical and insurance-related questions and concerns
- **Developed interdisciplinary Cardiogenic Shock Team Protocol** for patients in cardiogenic shock
- **Launched system-wide quality/outcomes initiative** focused on LAA closure procedures
- **Expanded Inherited Heart Disease Program** focusing on Hypertrophic and dilated Cardiomyopathy, inherited arrhythmias, aortopathies, and familial hyperlipidemia
- **Mark Estes III** received the Heart Rhythm Society Outstanding Teacher Award for 2020
- **Katie Berlacher** received the 2020 DOM Outstanding Subspecialty Teaching Attending Award
- **Bill Follansbee** and his team was recognized with the Sheldon Adler Award for Innovation in Medical Education
- The division was also honored to have **Matthew Steinhauser, MD**, join the Cardiology faculty as an Associate Professor of Medicine.

This past year, Samir Saba, MD, settled into his role as new Division Chief and Co-Director of HVI.

Several other Cardiology faculty also undertook new leadership roles this year in key areas within the Division:

- **Lydia Davis, MD**: Director, Nuclear Cardiology, UPMC Passavant
- **Sandeep Jain, MD**: Section Chief, Cardiac Electrophysiology
- **Mary Keebler, MD**: Section Chief, Heart Failure
- **Jeff Krackow, MD**: Director, Echo Lab, UPMC Passavant
- **Michael Mathier, MD**: Clinical Director, HVI Cardiology and Director- Heart and Vascular Institute at UPMC Hamot
- **Suresh Mulukutla, MD**: Director of Analytics for the Heart and Vascular Institute - Cardiology

And, several faculty received academic promotions:

- **Stephen Chan, MD, PhD**: Professor of Medicine with tenure
- **Erik Schelbert, MD, MS**: Associate Professor of Medicine with tenure
- **Sandeep Jain, MD**: Professor of Medicine, non-tenure
Samir Saba, MD  
Chief, Division of Cardiology  
Professor of Medicine  
Co-Director, UPMC Heart and Vascular Institute  
Director, Cardiac Electrophysiology Section and Laboratory

Gur C. Adhar, MD  
Clinical Assistant Professor of Medicine

Saleem Ahmed, MD  
Clinical Assistant Professor of Medicine

Aryan N. Aiyer, MD  
Assistant Professor of Medicine

Imad Al Ghouleh, PhD  
Assistant Professor of Medicine  
Principal Investigator, Vascular Medicine Institute  
Director, Hypoxia Core

Christopher C. Allen, MD  
Clinical Associate Professor of Medicine

Carolyn J. Anderson, PhD  
Professor of Medicine

George J. Aromatorio, MD  
Clinical Assistant Professor of Medicine

Khaled Bachour, MD  
Clinical Assistant Professor of Medicine

William Barrington, MD  
Professor of Medicine  
Chief Medical Officer, UPMC Shadyside  
Chief of Cardiology, UPMC Shadyside

Robert A. Baumgartner, MD  
Clinical Assistant Professor of Medicine

Raveen R. Bazaz, MD  
Assistant Professor of Medicine

Jason R. Becker, MD  
Visiting Associate Professor of Medicine  
Director, HVI Center for Inherited Heart Disease  
Principal Investigator, Vascular Medicine Institute

Monica M. Benavides, MD  
Clinical Assistant Professor of Medicine

Kathryn L. Berlacher, MD, MS  
Assistant Professor of Medicine  
Director, Cardiology Fellowship Program  
Subspecialty Education Coordinator, Cardiology

Jennifer I. Berliner, MD  
Clinical Assistant Professor of Medicine

Aditya Bhonsale, MBBS, MD, MHS  
Assistant Professor of Medicine

Stephen Bowser, MD  
Clinical Assistant Professor of Medicine

Susan E. Brode, MD  
Instructor of Medicine

Sam A. Buffer, Jr., MD  
Assistant Professor of Medicine  
Chairman, Department of Cardiology, UPMC Passavant Hospital  
Director, Cardiac Rehab, UPMC Passavant Hospital  
Director, Echocardiography Lab, UPMC Passavant Hospital

Diana L. Cantellops, MD  
Clinical Assistant Professor of Medicine

Stephen Y. Chan, MD, PhD  
Professor of Medicine  
Director, Vascular Medicine Institute  
Director, Center for Pulmonary Vascular Biology and Disease  
Associate Program Director, Fellowship Research, Cardiovascular Fellowship Training Program

Xucai Chen, PhD  
Research Associate Professor of Medicine

Simon Chough, MD  
Clinical Instructor of Medicine

Jeffrey S. Cohen, MD  
Assistant Professor of Medicine

Paola Corti, PhD  
Assistant Professor of Medicine  
Vascular Medicine Institute

Chelcie L. Costabile, MD  
Clinical Instructor of Medicine  
Director, Nuclear Cardiology and Echocardiography, UPMC East

Peter J. Counihan, MD  
Associate Professor of Medicine

Michael J. Curren Jr., MD, MS  
Clinical Instructor of Medicine  
Chief of Cardiology, UPMC St. Margaret

Stephen J. D’Auria, MD  
Clinical Instructor of Medicine

Lydia S. Davis, MD  
Clinical Assistant Professor of Medicine

Eric J. Dueweke, MD  
Clinical Assistant Professor of Medicine

Partha Dutta, DVM, PhD  
Assistant Professor of Medicine  
Principal Investigator, Vascular Medicine Institute
FACULTY

Joon S. Lee, MD
Associate Professor of Medicine
Chief Medical Officer, UPMC
Insurance Division

Joshua E. Levenson, MD
Clinical Assistant Professor of Medicine
Associate Director, Cardiology Fellowship Program

Gang Li, PhD
Assistant Professor of Medicine
Principal Investigator, Aging Institute

Avinash Linganna, MD
Clinical Assistant Professor of Medicine

Jie Liu, PhD
Research Associate Professor of Medicine
Principal Investigator, Aging Institute

James P. Lynch, MD
Clinical Instructor of Medicine

Jared W. Magnani, MD, MSc
Associate Professor of Medicine

Janet R. Manning, PhD
Research Assistant Professor of Medicine
Vascular Medicine Institute

Oscar C. Marroquin, MD
Associate Professor of Medicine, Epidemiology, and Clinical and Translational Sciences
Chief Clinical Analytics Officer, UPMC Health Services Division

Michael A. Mathier, MD
Professor of Medicine
Director, Pulmonary Hypertension Program
Associate Director, Cardiovascular Fellowship Program

Dennis M. McNamara, MD
Professor of Medicine
Director, Center for Heart Failure Research
Co-Director, Peripartum Cardiomyopathy Network

Charles F. McTiernan, PhD
Research Associate Professor of Medicine
Vascular Medicine Institute

Lindsay D. Mehring, DO
Clinical Instructor of Medicine

Ure L. Mezu-Chukwu, MD
Clinical Instructor of Medicine

Matthew F. Muldoon, MD, MPH
Professor of Medicine

Suresh R. Mulukutla, MD
Associate Professor of Medicine

Oladipupo Olafiranye, MD, MS
Assistant Professor of Medicine and Emergency Medicine

John J. Pacella, MD, MS
Associate Professor of Medicine

Brittany A. Palmer, MD
Clinical Instructor of Medicine

Elizabeth A. Piccione, MD
Clinical Assistant Professor of Medicine
Director, Northern Tier, UPMC Heart and Vascular Institute
Vice President of Medical Affairs, UPMC Jameson

John A. Power, MD
Clinical Assistant Professor of Medicine

Martha A. (Bowman) Pullins, DO
Clinical Instructor of Medicine

Aref M. Rahman, MD
Clinical Assistant Professor of Medicine
Director, Peripheral Vascular Disease, VA Pittsburgh Healthcare System
Director, Cardiac Catheterization Lab, VA Pittsburgh Healthcare System

Ravi N. Ramani, MD
Assistant Professor of Medicine
Director, UPMC Integrated Heart Failure Program

Makum L. Ramesh, MD
Assistant Professor of Medicine

Boyanapalli V. Rao, MD
Clinical Assistant Professor of Medicine

Shivdev K. Rao, MD
Clinical Instructor of Medicine

P. S. Reddy, MD
Professor of Medicine

Steven Reis, MD
Associate Vice Chancellor for Clinical Research, Health Sciences
Director, University of Pittsburgh Clinical & Translational Institute
Professor of Medicine and Emergency Medicine
Director, LHAS Women’s Heart Center

Bryan J. Robertson, MD
Clinical Instructor of Medicine

Guy Salama, PhD
Professor of Medicine

Erik B. Schelbert, MD, MS
Associate Professor of Medicine
Director, UPMC Cardiovascular Magnetic Resonance
During FY2020, the cardiology program achieved continued success in the Heart and Vascular Institute (HVI).

The HVI is an integrated service line that provides patients with world-class cardiovascular services, including cardiology, cardiac surgery and vascular surgery. This collaboration solidifies the HVI as the strongest provider of heart and vascular services in western Pennsylvania. We offer unparalleled quality, service, and efficiency.

Some highlights of the year include:

“Purple Card” initiative. This program aims to improve healthcare outcomes by delivering concierge level access and care navigation services. Calls will be staffed by a live person, who then assigns the call as clinical (handled by dedicated cardiology providers) or non-clinical (handled by UPMC HealthPlan staff). Cardiology is piloting this program which will be rolled out to the entire UPMC system.

Expansion of Telehealth services. Cardiology has been providing video, phone, and eConsult services for years, but with the recent pandemic, providers and operational leaders rapidly deployed resources and revised clinical processes and guidelines to ramp up these modalities of care. In the year ending June 30, 2020 Cardiology provided over 16,000 Telehealth visits. Early results show positive patient experiences with these technological changes.

Developed a Cardiogenic Shock protocol for system use. In collaboration with other specialties and services, the HVI led the development of a system Cardiogenic Shock Team Protocol. It was established with the aim to provide a responsive, consistent and comprehensive service to deliver highest quality outcomes for patients with cardiogenic shock. The principles include rapid identification of cardiogenic shock, timely and consistent availability of all clinical resources and an interdisciplinary approach with identified responsible clinician. To date, the shock team has received 60 referrals from 28 sites (UPMC and non-UPMC facilities).

Continued Cardiology service line alignment. Clinical leaders partnered with colleagues to expand the Structural Heart Program (TAVR and Watchman) to UPMC Altoona, integrate cardiology groups in the UPMC Northern Region and hold a vendor summit with UPMC Central Region to review product selection and optimization.

Provided comprehensive Cardiology care. The division of cardiology provided over 110,000 visits to approximately 62,000 patients. In partnership with Clinical Analytics, several dashboards were created to analyze these patients in total and by provider. The use of these dashboards are more
fully reviewed in the Quality section.
QUALITY IMPROVEMENT INITIATIVES

The Division of Cardiology has been active this past year in clinical quality improvement. The desire to leverage data, technology, and clinical talent to improve patient outcomes in the competitive environment of healthcare economics has led to several impactful developments.

Provider and Practice Dashboards
With over 100 practicing physicians and several sub-specialties, it has, historically, proven challenging to develop and operationalize prescriptive clinical guidelines and metrics. To meet this challenge, HVI Analytics partnered with Clinical Analytics to develop provider and practice level dashboards. Providers can review data related to patient demographics (volumes, wait times, new patients, follow up intervals, etc.), utilization (testing, procedures, etc.), and outcomes (mortality, hospitalizations, etc.). This data is comparable to the individual provider over time and to peer specialty group. The information is shared with each provider and reviewed with section and division leadership. From a quality perspective, this initiative will allow every provider to be more cognizant of their practice and allow them to evaluate their practice patterns relative to their colleagues. We anticipate using these data to identify where we are doing consistently excellent work and to identify opportunities for continued improvement in the delivery of care.

AFib Center of Excellence
Atrial fibrillation is a complex disease often missed in routine exams. Many times, a diagnosis uncovers other heart-related problems. Although it usually isn’t a direct cause of death, atrial fibrillation should be taken seriously. It may cause serious life-altering illness, such as stroke. To meet the need of our patients, the AFib Center of Excellence was created to:

- Increase awareness of and screening for atrial fibrillation
- Reduce incidence of cardiac and cerebrovascular injury associated with this condition
- Educate patients about their health and options in the face of an atrial fibrillation diagnosis

One of the most significant quality outcomes related to the AFib Center of Excellence has been the ability to reduce the number of avoidable AF-related admissions from the ER. Whereas prior to the creation of the AF Center of Excellence, patients with AFib who presented to the ER often got admitted. The workflow has now changed and allowed the ER to rapidly schedule a visit with the AF center specialists resulting in a marked reduction in 30-day cardiology-related admissions in AF Center patients (further analyses are ongoing in this area also related to cost).

Another quality initiative related to AFib is the identification of patients who have elevated risk for stroke, as determined by their CHADS2VASc score. If patients are not on anticoagulation and should be, we have now begun pilot initiatives to help get those patients on anticoagulation, if appropriate, by using our clinical dashboards to identify such patients. In ad-
dition, if patients are not on anticoagulation due to risk of bleeding or if they are on anticoagulation and have a history of bleeding, we can identify those patients now to offer them alternatives to anticoagulation. This is all possible with our maturing relationship between our clinical dashboards and the delivery of care.

PHOCUS
PHOCUS (Population Health Optimization for Cardiovascular Health across the UPMC System) is a potentially high-impact, low-cost intervention that may improve outcomes in CVD. Already in use within the UPMC system for other chronic diseases such as chronic kidney disease, the overarching aim of this QI project is to use a multifaceted EHR-based population health management (PHM) intervention to improve evidence-based CVD care in high-risk patients. Specifically, the UPMC Heart and Vascular Institute aims to establish a quality initiative to help decrease variability in CVD care by identifying patients using the EHR who have significant CVD conditions but who may not be offered guideline directed care. This initiative only involves the identification of patients who may benefit from already established therapies to improve their overall CVD condition and/or quality of life.

Overall, we aim to develop a quality improvement process that enables us to identify high-risk patients through dashboards developed in collaboration with UPMC Clinical Analytics and then to provide guidance to the patients through their already established physicians. In so doing, we will be able to measure and increase the proportion of CVD patients who are receiving appropriate medical care for their cardiovascular conditions.

The PHOCUS project was recently approved by the UPMC QRC committee, and we hope to have data soon to demonstrate its effect. The goals are to increase provider and patient education about the benefits of cardiac management and timely referral, provide optimal clinical management and improve outcomes. In addition, we hope to evaluate cost of care. Finally, and very importantly, this may be a mechanism for us to understand, identify, and address race-related disparities in care.

One example of ongoing work is to identify the consequences of not treating patients with guideline-directed medical therapy with statins for primary prevention. The table to the right shows that the consequences of not adhering to a simple, low-cost guideline directed intervention with statins. Those not on statin therapy have higher risk for myocardial infarction and mortality. Notably, 30% of patients who are at intermediate or high risk for cardiovascular events are not treated with statins for primary prevention across the UPMC system. The PHOCUS initiative will help us address these gaps in care.

**Other statistics/outcomes**

Rapid Access (referrals from Eds for specific cardiology: Approximately 500 referrals for CY19 with a median wait time of 4 days and avoided admission cost savings of $2.5M.

Expanding Structural Heart Program at Passavant to include TAVR.

Expanded the Center for Inherited Heart Disease with 3 distinct clinics (inherited arrhythmia syndromes, hypertrophic cardiomyopathy and genetic cardiomyopathies) and a dedicated genetics counselor.
RESEARCH

ACTIVITIES

HVI researchers continue to strive for the cutting edge, employing new technologies and treatments for the benefit of patients, and FY20 saw HVI researchers extending their strong tradition of procuring research funding from federal, industry, and foundation sources.

The major strengths of the research program center on translational genetics, heart failure, sudden death, molecular imaging, and outcomes research. In addition, there are robust and active cardiology clinical trials that include sponsor initiated drug trials and IDE trials.

HVI physicians continued to present at national and international cardiology meetings, including the American Heart Association, the American College of Cardiology, the Heart Rhythm Society, the American Society of Echocardiography, the American Society for Nuclear Cardiology, Heart Failure Society of America, Transcatheter Cardiovascular Therapeutics (TCT) and the International Society for Heart and Lung Transplantation. Additionally, HVI researchers and physicians published important manuscripts in top cardiovascular journals such as The New England Journal of Medicine, Circulation Research, Circulation, and the Journal of the American College of Cardiology. Representatives from the HVI continue to hold prominent roles in national and international cardiovascular organizations.

Research News and Awards include:

- VMI/HVI Fellows Research Retreat. This past February, the Division of Cardiology, in conjunction with the VMI, held its third annual fellows retreat, featuring a keynote presentation by Dr. Iris Jaffe of the Tufts Medical Center Molecular Cardiology Research Institute. With focused presentations by research faculty, new fellows were exposed to potential areas of research while also afforded the opportunity to develop burgeoning mentor-mentee relationships outside of an academic setting. New cardiology trainees had the opportunity to formally present their work and interests, as well as informally socialize with other trainees and faculty during dinner, bowling, and skiing. Spanning three days, the retreat aimed to build a congenial atmosphere between VMI and HVI fellows and faculty, highlighting the general collaborative spirit of the medical community at the University of Pittsburgh. The retreat was held at Seven Springs from February 5-7, 2020.

RESEARCH

BY THE NUMBERS

In FY20, the Division of Cardiology received over $30.4m in research funding from the Public Health Service and other federal agencies, industry, and various societies and foundations. Research expenditures exceeded $37.8m.
Division of Cardiology

RESEARCH EXPENDITURES
FY16-FY20

TRACTS AWARDED

93% Public Health Service
HVI Fellows Grant applications. In FY20, four new fellows were funded:

- Lindsey Cilia, MD, “Laboratory Developed Test Using Radiometer Hemoglobin Assay to Detect Plasma Free Hemoglobin in Patients on Mechanical Circulatory Support”, Mentor: Jeffrey Fowler, DO
- Daniel Shplisky, MD, “Persistent Postoperative Pulmonary Hypertension after Mitral Valve Surgery for Mitral Regurgitation as a Predictor for Cardiovascular Morbidity and Mortality”, Mentor: Stephen Chan, MD, PhD
- Adil Yunis, MD, “Impact of Enteral Microbiome Dysbiosis and Nitrate Metabolism on Biomarkers in Patients with Pulmonary Hypertension”, Mentors: Marc Simon, MD, MS, and Alison Morris, MD, MS
- Jonathan Pollock, MD, “Cardiovascular outcomes in patients with hypertrophic cardiomyopathy with elevated troponin and/or myocardial fibrosis on cardiovascular magnetic resonance”, Mentor: Timothy Wong, MD, MS

These fellows presented their research at the 2020 VMI/HVI Research Retreat.

New extramural funding for Cardiology researchers:

- Imad Al Ghouleh, PhD, was awarded his first R01 from NHLBI titled “Endothelial Reprogramming in Pulmonary Hypertension.”
- Stephen Chan, MD, PhD, successfully transitioned a UH2 grant to a UH3 from NCATS titled “Computational Repurposing of Chemotherapeutics for Pulmonary Hypertension.”
- Partha Dutta, PhD, DVM, received a second R01 from NHLBI “Mechanisms of myelopoiesis after myocardial infarction.” Dr. Dutta also received awards from the American Lung Association and the American Heart Association to support CX3CR1 research in pulmonary hypertension.
- Brett Kaufman, PhD, was awarded an R21 from NICHD as a part of a multi-PI team, titled “Purging Mutant mtDNA Using Mitochondrially-Targeted Gamma Peptide Nucleic Acids.”
- Kang Kim, PhD, was awarded an R01 from NHLBI “Prevent Unnecessary Carotid Intervention and Stroke using Noninvasive Transcutaneous Ultrasound Thermal Strain Imaging (US-TSI).”
- Jared Magnani, MD, MSc, transitioned his NHLBI R56 to an R01 “Mobile Health Intervention for Rural Atrial Fibrillation” and was awarded the R33 clinical trial phase from NHLBI titled “A Mobile Relational Agent to Enhance Atrial Fibrillation Self-care.”
- Guy Salama, PhD collaborated with start-up company Vivas Therapeutics to receive an STTR award titled “Targeted delivery of amiodarone to the heart for atrial fibrillation utilizing novel cardiac targeting peptides.”
- Iain Scott, PhD received his second R01 from NHLBI titled “Novel Strategies to Resolve Metabolic Defects in the Diabetic Heart.”
- Dharendra Thapa, PhD, mentored by Iain Scott, PhD, received a post-doctoral K99 award from NHLBI titled “Investigating the novel role of acetylation in cardiac mitochondrial bioenergetics and function in the aging heart.”
- Flordeliza Villanueva, MD, received a supplement to her NIBIB R01 titled “Biological and Physical Mechanisms of Ultrasound/Microbubble-Mediated Therapeutic Gene Delivery Across the Endothelial Barrier” to study Alzheimer’s Disease.
Faculty Research Interests and Activities

**Samir Saba, MD  Division Chief**
Dr. Saba's research interests include cardiac device therapy for heart failure and signal processing of intracardiac electrical signals for ischemia detection. The author of more than 250 manuscripts in peer-reviewed journals, he has been issued 3 patents for inventions in the field of cardiac electrophysiology. Dr. Saba has also received research grants from the National Institutes of Health, the American Heart Association, the American Heart Foundation, and the American College of Cardiology.

*Study Sections*
- Grants Reviewer, American Heart Association, 2009-present
- Ad Hoc Grant Reviewer, CICS Study Section, NIH, 2019-present

*Advisory Committee Memberships and Leadership Positions*
- Director, UPMC Cardiac Electrophysiology Laboratory, 2004-present
- Chief, Cardiac Electrophysiology Section, 2005-present
- Task Force Member, American Heart Association Fellows Research Day, 2014-present

*Professional Affiliations and Society Memberships*
- Member, Massachusetts Medical Society, 1993-present
- Fellow, American College of Cardiology, 1998-present
- Fellow, American Heart Association, 2000-present
- Fellow, Heart Rhythm Society, 2000-present

*Editorships*
- Editorial Board, *Heart Rhythm Journal*, 2010-present
- Editorial Board, *Circulation*, 2018-present
- Editorial Board, *Circulation, Arrhythmia and Electrophysiology*, 2019
- Editorial Board, *JACC, Arrhythmia and Electrophysiology*, 2020

*Honors and Awards*
- Honoree, Best Doctors, *Pittsburgh Magazine*, 2018-present

**Gur C. Adhar, MD**

*Honors and Awards*
- Awardee, Best Teacher Award, UPMC Mercy Department of Medicine, 2019-2020

**Aryan N. Aiyer, MD**
Dr. Aiyer’s academic interests focus on preventive cardiology with a special interest on novel cardiac risk factors and the use of coronary calcium scoring in the assessment of subclinical atherosclerosis. He is a co-investigator on the Heart SCORE study, an ongoing observational study involving an ambulatory biracial cohort of adults in Pittsburgh.

**Imad Al Ghouleh, PhD**
Dr. Al Ghouleh’s lab studies pulmonary hypertension, with a particular focus on defining the mechanisms that underlie right ventricular phenotypic changes in this disease. Current research is designed to test this pathway in the RV following pressure overload challenge and to delineate the upstream and downstream molecules involved. The long-term goal is to translate mechanistic insights into therapeutic strategies aimed at the RV.

*Professional Affiliations and Society Memberships*
- Member, Society for Free Radical Biology and Medicine, USA/International, 2010-present
- Member, American Heart Association, 2010-present
Carolyn J. Anderson, PhD
Dr. Anderson’s research interests include development of novel radiometal tracers for diagnostic imaging and targeted radiotherapy of cancer, pulmonary and cardiovascular diseases. Dr. Anderson pioneered the development of radiometal-labeled receptor-targeted PET imaging agents, leading the first human study of a 64Cu-labeled somatostatin analog in patients with neuroendocrine tumors. A current focus of her research lab is in the development of imaging agents for upregulated receptors on immune cells that are involved in inflammation related to lung diseases including tuberculosis, primary tumor growth, and cancer metastasis. Another area of interest is the development of targeted radionuclide therapy agents for prostate cancer and melanoma.

Study Sections
• Grant Reviewer, Cancer Prevention and Research Institute of Texas, 2010-present

Advisory Committee Memberships and Leadership Positions
• Sub-Chair for Programming, Society of Nuclear Medicine and Molecular Imaging Annual Meeting, 2017

Editorships
• Editorial Board, Cancer Biotherapy and Radiopharmaceuticals, 1999-present
• Editorial Board, American Journal of Nuclear Medicine and Molecular Imaging, 2011-present
• Associate Editor, Molecular Imaging and Biology, 2015-present
• Editorial Board, Molecular Imaging, 2017-present

George J. Aromatorio, MD
Professional Affiliations and Society Memberships
• Member, American Board of Internal Medicine, 1983-present
• Member, American Board Cardiovascular disease, 1985-present
• Fellow, American College of Cardiology, 1987-present
• Member, American Medical Association, 1987-present
• Member, American Board Interventional Cardiology, 1999-present

Khaled Bachour, MD
Advisory Committee Memberships and Leadership Positions
• Director of Echocardiography Lab, UPMC Horizon, 2011-present
• Director of Echocardiography, UPMC Jameson, 2017-present

Professional Affiliations and Society Memberships
• Member, American College of Cardiology, 2005-present
• Member, State of Pennsylvania Board of Medicine, 2007-present
• Member, American Society of Echocardiography, 2008-present
• Member, American Society of Nuclear Cardiology, 2017-present

William Barrington, MD
Dr. Barrington’s interests involve clinical cardiology and electrophysiology. He participates in a variety of clinical studies examining the role of new pharmacologic agents, devices, or therapies in the treatment of cardiac arrhythmias.
Advisory Committee Memberships and Leadership Positions

- Member, UPMC Cardiology Fellowship/Education Committee, 2001-present
- Member, Cardiology Cabinet (Leadership Committee), UPMC Shadyside, 2005-present
- Vice President, Medical Affairs, UPMC Shadyside, 2019-present

Honors and Awards

- Honoree, Best Doctors, Pittsburgh Magazine, 2019-present

Raveen R. Bazaz, MD

Dr. Bazaz is initiating innovative animal research with the goal of linking cardiac anatomy, histology, and pathology to function. His current research efforts focus on the atria, with the intention to expand his focus to the more complex ventricular chambers in the near future.

Advisory Committee Memberships and Leadership Positions

- Member, Association for Advancement of Medical Instrumentation, Development of International Standards for Lead Testing: Consortium of FDA, NIST, Biotronik, Boston Scientific, Medtronic, Sorin and St. Jude Medical: Primary Investigator, Human Use Condition Study, 2013-present

Jason R. Becker, MD

Dr. Becker’s research focuses on the molecular processes central to inherited and acquired cardiomyopathies. He is currently studying cell state specific modifiers of pathological cardiac remodeling and is the principal investigator in clinical trials to determine treatment for cardiomyopathy.

Advisory Committee Memberships and Leadership Positions

- Zebrafish Advisory Committee, 2012-present
- Cardiology Fellowship Interview Committee, 2015-present
- Graduate Student Qualifying Committee, Cell and Developmental Biology, 2015-present

Professional Affiliations and Society Memberships

- Member, American Heart Association, 2003-present
- Member, American College of Cardiology, 2006-present

Editorships

- Ad hoc Reviewer, Multiple journals (American Journal of Physiology – Heart and Circulatory Physiology, Genetics in Medicine), 2016-present

Monica M. Benavides, MD

Professional Affiliations and Society Memberships

- Member, American College of Physicians, 2008-present
- Member, American Medical Association, 2008-present

Kathryn L. Berlacher, MD, MS

Dr. Berlacher’s primary research interest revolves around medical education, specifically innovative curriculum development and outcome based program development. She is also involved in research pertaining to women’s cardiology and pregnancy in cardiology.

Advisory Committee Memberships and Leadership Positions

- Volunteer, UPMC COACH events, 2009-present
- Member, UPSOM Admissions Interviewing Committee, 2012-present
- Participant, ABIM Pilot Study, American College of Cardiology Foundation, 2012-present
- Participant, Medical Documentation Task Force, 2012-present
- Member, Women’s Health in Emergency Medicine, UPMC MWH, 2012-present
- Participant, Medical Documentation Technology Development, 2012-present
- Member, Faculty Development Task Force, American College of Cardiology Foundation,
2012-present
• Participant, ABIM Competency-Based Pilot Program, American College of Cardiology, 2013-present
• Co-Director, CardioTalk, 2013-present
• Member, Laennec/Postgraduate Education Committee, American Heart Association, June 2014-present
• Member, Task Force, Fellows’ Research Day, American Heart Association, 2014-present
• Milestones 2.0 Committee Member, Accreditation Council for Graduate Medical Education, 2018-present
• Member, Magee Medical Executive Committee, 2018-present
• Co-Leader, Future of CV Fellowship Training Committee, American College of Cardiology, 2018-present
• Course Director, Cardiovascular Program Directors Summit, American College of Cardiology, October 2019-present
• Chair, Lifelong Learning and Oversight Committee, American College of Cardiology, 2020
• Member of Board of Trustees Health Equity Task Force, American College of Cardiology, 2020-present
• Chair, COVID-19 Summer Education Series, American College of Cardiology, 2020-present

Professional Affiliations and Society Memberships
• Fellow, American College of Cardiology, 2008-present
• Member, American Heart Association, 2014-present

Major Lectureships and Seminars
• Invited Speaker, UPMC Update in Internal Medicine, Pittsburgh, PA, October 2019
• Invited Speaker, American College of Cardiology, Washington, DC, December 2019
• Invited Speaker, Cardiology Grand Rounds, University of Michigan, February 2020
• Invited Speaker, Grand Rounds, UPMC Office of Advanced Practice Providers Grand Rounds, July 2020

Honors and Awards
• Awardee, Outstanding Subspecialty Teaching Award, Department of Medicine, University of Pittsburgh, May 2020

Diana M. Cantellops, MD
Dr. Cantellops practices at the UPMC Heart and Vascular Institute—UPMC Horizon. The management of Congestive Heart Failure is an area of interest, with new drugs and research. The valvular and CAD disease is another field with new challenges.

Professional Affiliations and Society Memberships
• Member, American College of Internal Medicine, 1996-present
• Fellow, American College of Cardiology, 1998-present
• Member, American College of Physicians, 1998-present
• Member, American Medical Association, 2016-present

Stephen Y. Chan, MD, PhD
Dr. Chan leads a basic science and translational research group that is studying the molecular mechanisms of pulmonary vascular disease and pulmonary hypertension (PH)—an example of an enigmatic disease where reductionist studies have focused primarily on end-stage molecular effectors. To capitalize on the emerging discipline of network medicine, the group’s research uses a combination of network-based bioinformatics and unique experimental reagents derived from genetically altered rodent and human subjects to accelerate systems-wide discovery in PH. The group’s published findings were among the first to identify the systems-level functions of microRNAs (miRNAs), which are small, non-coding RNAs that negatively regulate gene expression, as a root cause of PH.
Dr. Chan's lab developed novel in silico approaches to analyzing gene network architecture coupled with in vivo experimentation. The results now offer methods to identify persons at risk for PH and to develop therapeutic RNA targets. This work is the cornerstone of the lab’s evolving applications of network theory to the discovery of RNA-based origins of human diseases, in general.

**Study Sections**
- Permanent Member, RIBT Study Section, NHLBI, NIH, 2018-2022

**Advisory Committee Memberships and Leadership Positions**
- Member, Advisory Board, Simpatica Medicine, 2016-present
- Member, 3CPR Early Career Committee, American Heart Association, 2016-present
- Professional Affiliations and Society Memberships
- Member, American Heart Association, 2008-present
- Member, American College of Cardiology, 2008-present
- Fellow, Pulmonary Vascular Research Institute, 2012-present
- Fellow, American Heart Association, 2012-present
- Member, Pulmonary Circulation, American Thoracic Society, 2019-present

**Editorships**
- Editorial Board Member, *microRNA Diagnostics and Therapeutics*, 2013-present
- Editorial Board Member, *Pulmonary Circulation*, 2015-present
- Consulting Editor, *JCI Insight*, 2015-present
- Editorial Board Member, *Scientific Reports*, 2016-present

**Major Lectureships and Seminars**
- Lecturer, Kellogg Seminar Series, Michigan State University, East Lansing, MI, 2020
- Speaker, 13th Annual Symposium on Neonatal and Childhood Pulmonary Vascular Disease, San Francisco, CA, 2020

**Honors and Awards**
- Fellow, American Society for Clinical Investigation, 2016-present
- Awardee, Medical Student/Resident Mentoring Merit Award, University of Pittsburgh School of Medicine, July 2019

**Xucai Chen, PhD**
Dr. Chen's research interests focus on three areas: ultrasound imaging, ultrasound mediated therapy, and ultra-high-speed digital microscopy. Within ultrasound imaging, he focuses on (1) Ultrasound molecular imaging of angiogenesis using vascular endothelial growth factor-conjugated microbubbles and ischemic memory imaging with targeted microbubbles; (2) Novel intravascular ultrasound system (IVUS) for contrast-enhanced imaging of coronary vasa vasorum for quantification of plaque neovascularization during atherosclerosis progression; and (3) Stem cell imaging with ultrasound to track the trafficking of mesenchymal stem cells by uptake of the microbubbles. Regarding ultrasound mediated therapy, Dr. Chen studies ultrasound-assisted gene and drug delivery and therapy for cancer and cardiovascular diseases, such as hypertrophic cardiomyopathy. He also investigates sonoreperfusion and microvascular reperfusion therapy by using ultrasound and microbubbles to resolve microvascular obstruction post-percutaneous coronary intervention of acute myocardial infarction (AMI). A High-Speed Digital Microscopy Laboratory has been developed to support the functions of the Pittsburgh Center for Ultrasound Molecular Imaging and Therapeutics. The center houses the fastest multi-frame digital microscopy laboratory (UPMC Cam, 25 million frames per second, 128 frames) in North America dedicated to biomedical research. When combined with the Acoustics Laboratory, researchers can observe microbubble oscillations when they are exposed to ultrasound energy as well as their interactions with biological cells at very high temporal resolutions. This system is used to investigate mechanisms of ultrasound mediated bioeffects, such as sonoporation for
drug delivery and gene transfection for cancer therapy, sonothrombolysis for reperfusion therapy for microvascular obstruction, and the phase transition phenomena for photoacoustic imaging and contrast ultrasound imaging.

**Professional Affiliations and Society Memberships**
- Member, Acoustical Society of America, 1987-present
- Member, Institute of Electronics and Electrical Engineering, 1988-present

**Jeffrey S. Cohen, MD**

**Professional Affiliations and Society Memberships**
- Member, American College of Physicians, 1994-present
- Member, American Medical Association, 1994-present
- Fellow, American College of Cardiology, 1997-present

**Paola Corti, PhD**

Dr. Corti is studying the role of the cellular globins and the nitrite signaling in vertebrate metabolism and cardiac signaling. She is investigating the description of the chemical biology, signaling, and biological function of the globins, as well as their interactions with nitrite during the embryonic development and during the regeneration of the heart after amputation.

**Chelcie L. Costabile, MD**

Dr. Costabile practices at the UPMC Heart and Vascular Institute at UPMC Monroeville at Oxford Drive. She focuses on Echocardiographic determinants of Pulmonary Arterial Hypertension.

**Professional Affiliations and Society Memberships**
- Member, American College of Cardiology, 2020-present

**Peter J. Counihan, MD**

Dr. Counihan investigates the efficacy and safety of erythropoetin and darbopoetin in animal models of ischemia and reperfusion. This research may lead to further therapies in humans to improve clinical outcomes.

**Michael J. Curren, Jr., MD, MS**

Dr. Curren focuses his non-clinical time optimizing utilization of the electronic medical record, specifically as it relates to provider documentation and utilization. Dr. Curren participates in the Interdisciplinary Informatics Council and eRecord Clinical Decision Support Group, where new clinical tools and initiatives are presented to the eRecord team for evaluation and integration into clinical practice at UPMC. Dr. Curren works with multiple individuals across the organization to evaluate, implement, and report on eRecord improvement efforts, encompassing clinical, financial, and operational aspects. Lastly, Dr. Curren communicates with third party vendors to discuss new eRecord products for possible integration into UPMC’s eRecord systems.

**Advisory Committee Memberships and Leadership Positions**
- eRecord Medical Director Provider Documentation and EMR Optimization, UPMC Information Services Division, 2014-present
- eRecord Medical Director, UPMC St. Margaret Hospital, 2017-present

**Professional Affiliations and Society Memberships**
- Member, American Heart Association, 2006-present

**Honors and Awards**
- Physician ACES Award, UPMC, 2019
Eric J. Dueweke, MD
Eric Dueweke’s academic interest focuses on care efficiency - analyzing processes, strategies, organizational data, and new technologies to determine the safest and most cost effective approaches to delivering high quality cardiac care. He is particularly interested in the insights that business analytics can offer physicians in areas of patient care. He currently sits on the Quality Review Committee for UPMC and advises on several initiatives within the HVI.

Advisory Committee Memberships and Leadership Positions
- Vice President, Medical Staff, UPMC Northwest, 2019
- Academic Consultant, UPMC Horizon, Cardiovascular Medicine, 2014-2019
- Committee Member, QI Review Committee, UPMC, 2014-present
- Chair, Rapid Response Committee, UPMC Northwest, 2015-2019
- Member, Medical Executive Committee, UPMC Northwest, 2015-2019
- Medical Director, UPMC Northwest, Cardiovascular Services, 2016-2019
- Member, HIM Committee, UPMC Northwest, 2017-2019
- Member, Clinical Operations Committee, UPMC Heart and Vascular Institute, 2019-present
- Member, Steering Committee for Clinical Affairs, UPMC Division of Cardiology, 2019-present

Professional Affiliations and Society Memberships
- Fellow, American College of Cardiology, 2015-present

Partha Dutta, DVM, PhD
Dr. Dutta researches cardiovascular disease, which is the leading cause of death in developed countries. Inflammation aggravates outcome of cardiovascular disease, including atherosclerosis and infarct healing after myocardial infarction (MI). During progression of atherosclerosis, myeloid cells destabilize lipid-rich plaques in the arterial wall and cause their rupture, thus triggering myocardial infarction and stroke. Survivors of acute coronary syndromes have a high risk of recurrent events for unknown reasons. Another area of research interest is the differentiation of hematopoietic stem and progenitor cells in cardiovascular disease. Hematopoietic stem cells get activated after acute or chronic inflammation and give rise to exaggerated myelopoiesis. However, most hematopoietic stem cells (HSC) are quiescent, and it is currently unknown whether they respond to ischemic organ injury. We identified a CCR2+HSC subset, which has a four-fold higher proliferative rate than CCR2-HSC, as the most upstream contributor to myelopoiesis after myocardial infarction. CCR2+HSC display bias toward the myeloid lineage and dominate the migratory HSC population after myocardial infarction and in steady-state. These data shed new light on the regulation of emergency hematopoiesis after ischemic injury and identify novel therapeutic targets to modulate leukocyte output after myocardial infarction. Another area of interest is the role Inflammatory macrophage expansion in pulmonary hypertension. Pulmonary inflammation, characterized by the presence of perivascular macrophages, has been proposed as a key pathogenic driver of pulmonary hypertension (PH), a vascular disease with increasing global significance. However, the mechanisms of expansion of lung macrophages and the role of blood-borne monocytes in PH are poorly understood. Using multicolor flow cytometric analysis of blood in mouse and rat models of PH and patients with PH, an increase in blood monocytes was observed. We found chemotaxis of blood monocytes and their subsequent recruitment into lung perivascular space leads to macrophage expansion and inflammation. This study defines a direct mechanism by which interstitial macrophages expand in PH. It also demonstrates a pathway for pulmonary vascular remodeling in PH that depends upon interstitial macrophage-dependent inflammation yet at least is partially dissociated from hemodynamic consequences, thus offering guidance on future anti-inflammatory therapeutic strategies in this disease.

Professional Affiliations and Society Memberships
- Member, American Heart Association, 2017-present

Major Lectureships and Seminars
- Invited Speaker, Sympathetic Neuronal Activation Triggers Myeloid Progenitor Proliferation
Yvonne S. Eisele, PhD
The Eisele lab focuses on age-related amyloid diseases, such as Alzheimer’s disease and cardiac transthyretin amyloidosis. Dr. Eisele's team is interested in characterizing the protein aggregates that cause these diseases and then delineating the molecular and cellular changes they elicit in affected tissue. The lab’s goal is to identify novel biomarkers and therapeutic targets. It collaborates closely with the clinical team at the recently founded Cardiac Amyloidosis Center at the University of Pittsburgh and UPMC.

Study Sections
• Grant reviewer, French National Research Agency (ANR), 2013-present
• Grant reviewer, Alzheimer’s Society UK, 2018

Professional Affiliations and Society Memberships
• Member, Society for Neuroscience (SfN), 2009-present
• Member, International Society to Advance Alzheimer’s Research and Treatment (ISTAART), 2018-present

Editorships
• Ad hoc reviewer, Multiple journals (Acta Neuropathologica, Neurobiology of Aging, EMBO Journal, American Journal of Respiratory and Critical Care Medicine, Alzheimer’s Research and Therapy), 2007-present

Major Lectureships and Seminars
• Invited Speaker, Symposium Frontiers in Molecular Imaging Symposium, University of Pittsburgh, November 2019
• Invited Speaker, Renal Research Seminar Series, University of Pittsburgh, April 2020

N. A. Mark Estes, MD
Dr. Estes's research interests are in prediction and prevention of sudden cardiac death, cardiovascular disease and arrhythmias in athletes, and prevention and treatment of atrial fibrillation.

Advisory Committee Memberships and Leadership Positions
• Member, Strategic Advisory Counsel, American Heart Association, 2017-present
• Member, Nomination Committee, Heart Rhythm Society, 2017-2019
• Chairman, American Heart Association Scientific Publishing Committee, 2017-2021

Editorships
• Editor in Chief, Cardiovascular Section, UpToDate, 2014-2019
• Senior Guest Editor, Circulation Arrhythmia and Electrophysiology, Journal of the American Heart Association, 2016-2019

Major Lectureships and Seminars
• Visiting Professor, Cardiology Grand Rounds, University of Rochester Mayo Clinic, Rochester, NY Virtual, December 2019-June 2020

Honors and Awards
• Heart Rhythm Society Distinguished Teacher Award, Heart Rhythm Society, Heart Rhythm Society Annual Meeting, Virtual, May 2020

Ning Feng, MD, PhD
Dr. Feng's research focuses on cardiac epigenetics in heart failure development. Specifically, he investigates the impact of dynamic DNA methylation and mRNA methylation in transcriptional genes reprogramming in heart failure using genetic mouse models.
Toren Finkel, MD, PhD
The Director of the UPMC-University of Pittsburgh Aging Institute and a Professor of Medicine in the Division of Cardiology, Dr. Finkel is a physician-scientist renowned for his research on the basic science of aging. For more than 20 years, his research group has focused on issues involved in mitochondrial function, cellular metabolism, oxidative stress, and aging. Due to the wide span of biological interests, his lab has developed expertise in mitochondrial assays, cell and molecular biology approaches, and the generation of mouse models along with whole-animal physiological measurements. A long-term goal is to uncover the molecular basis of mammalian aging and age-related diseases through the study of different cellular pathways, including stem cell self-renewal, reactive oxygen species, sirtuins, autophagy, mTOR signaling, and mitochondrial metabolism. A particular focus in the last several years has been the role that a decline in autophagy might phenocopy vascular aging. His lab has also developed novel strategies to measure mitophagy in vivo.

Advisory Committee Memberships and Leadership Positions
• Member, Steering Committee, NIH Bone Marrow Stromal Cell Transplant Center, 2010-present
• Member, Stromal Cell Transplantation Center, NHLBI iPS Oversight Committee, 2011-present
• Steering Committee, Immune Transplant and Therapy Center (ITTC), 2017-present
• Committee Member, Dickson Prize in Medicine, 2019-present

Professional Affiliations and Society Memberships
• Member, American Association of Physicians, 2009-present
• Fellow, American Association for the Advancement of Science, 2013-present
• Member, Association of American Physicians, 2016-present
• Alumni Association, Harvard Medical School, 2017-2020

Editorships
• Editorial Board, IUBMB Life, 2003-present
• Editorial Board, Antioxidants and Redox Signaling, 2003-present
• Editorial Board, Mechanisms of Ageing and Development, 2007-present
• Associate Editor, Aging Cell, 2008-present
• Editorial Board, Clinical & Translational Science, 2008-present
• Associate Editor, Molecular Aspects of Medicine, 2009-present
• Editorial Board, Science, 2015-present

Major Lectureships and Seminars
• Invited Speaker, Scleromerma Workshop, Cambridge, United Kingdom, August 2019
• Keynote speaker, TriMAD Symposium, Philadelphia, PA, September 2019
• Invited speaker, Molecular Biology of Aging, Groningen, Netherlands, October 2019
• Invited Speaker, University of Chicago, Committee on Molecular Metabolism (CMMN) Seminar, Chicago, IL, January 2020

William P. Follansbee, MD
Dr. Follansbee’s career focus has been as a clinician-educator, but he has also participated actively in research. Early in his career, his research focused on cardiac involvement in systemic diseases, particularly systemic sclerosis. His research interests in nuclear cardiology centered on the application of the technologies to study pathophysiology of diseases. In more recent years, his participation in research has been in facilitating projects of colleagues and particularly younger faculty members. The initiative in medical decision making has resulted in multiple national presentations by younger faculty members in the last couple years.

Honors and Awards
• Honoree, America’s Top Doctors, Castle Connolly, 2000-present
• Honoree, Best Doctors, Pittsburgh Magazine, 2018-present
Jeffrey Fowler, DO

**Professional Affiliations and Society Memberships**
- Fellow, American College of Cardiology, 2017-present
- Fellow, Society of Coronary Angiography and Interventions, 2018-present

**Major Lectureships and Seminars**
- Invited Speaker, Department of Medicine Grand Rounds, University of Pittsburgh, Pittsburgh, PA, November 2019
- Invited Speaker, 6th Annual Advanced Transradial And Complex Cardiac Interventions Symposium, UPMC Heart and Vascular Institute, Pittsburgh, PA, March 2020 *Cancelled due to COVID-19*

Delphine A. H. Gomez, PhD

The Gomez lab is focused on studying the functional role of epigenetic and transcriptional mechanisms in controlling key properties of vascular cells including cell differentiation, lineage memory and plasticity in the context of major cardiovascular diseases including atherosclerosis and peripheral artery disease. We developed an integrated approach combining epigenetic and transcriptional profiling, epigenome editing and in vivo lineage tracing and fate mapping to decipher epigenetic and transcription mechanisms regulating SMC phenotype.

**Advisory Committee Memberships and Leadership Positions**
- Member, Council on Arteriosclerosis, Thrombosis, and Vascular Biology, American Heart Association, 2009-present
- Member, Awards and Membership Committee, Histochemical Society, 2014-present
- Member, ATVB Council Women Leadership Committee, University of Pittsburgh, 2020

**Professional Affiliations and Society Memberships**
- Member, American Heart Association, 2009-present
- Member, Histochemical Society, 2014-present
- Member, North American Vascular Biology Organization, 2015-present

**Major Lectureships and Seminars**
- Invited Lecturer, ATVB meeting, San Francisco, CA, 2018
- Invited Lecturer, International MADS Box Conference. Lake Placid, NY, 2018

**Honors and Awards**
- Award Finalist, Irvine Page Junior Faculty Award, American Heart Association, ATVB Council, 2020

Vijay K. Gulati, MD

**Professional Affiliations and Society Memberships**
- Fellow, American College of Cardiology, 2003-present

Matthew E. Harinstein, MD

Dr. Harinstein studies acute heart failure syndromes, transcatheter aortic valve replacement outcomes, assessment of right ventricular function in liver transplant candidates, cardiac risk assessment of solid organ transplant candidates, clinical trials studying new pharmacologic agents, and assessment of mechanical dyssynchrony with gated SPECT. He also is a reviewer and Editorial Board member of the *American Journal of Cardiology*.

**Advisory Committee Memberships and Leadership Positions**
- Member, Membership Committee, American Society of Nuclear Cardiology, 2015-present
- Medical Director, CCAC Cardiac Sonography Program, 2015-present
- Member, Education Committee, American Society of Nuclear Cardiology, 2016-present
- Co-Director, Noninvasive Imaging, UPMC Shadyside, 2016-present
• Member, Item Development Working Group, Certification Board of Nuclear Cardiology, 2016-present
• Member, Assessment Committee, Certification Board of Nuclear Cardiology, 2018-present

Professional Affiliations and Society Memberships
• Fellow, American College of Cardiology, 2013-present
• Fellow, American Society of Echocardiography, 2013-present
• Member, American Society of Echocardiography, 2019-present
• Member, American Society of Nuclear Cardiology, 2019-present

Editorships
• Reviewer, American Journal of Cardiology, 2012-present
• Editorial Board, American Journal of Cardiology, 2014-present

Honors and Awards
• Awardee, Beta Gamma Sigma Business Honor Society, University of Pittsburgh, 2019

Bradley T. Heppner, MD

Professional Affiliations and Society Memberships
• Fellow, American College of Cardiology, 1989-present
• Member, Allegheny County Medical Society, 1992-present

Gavin W. Hickey, MD
Dr. Hickey researches congestive heart failure/transplant, specifically among congenital heart disease patients. He is currently investigating outcomes (morbidity and mortality) of congenital heart disease patients evaluated for heart transplants as well as variables that predict candidacy for transplant and transplant outcomes. Additionally, he is investigating the underlying causes of heart failure readmission and patients at greatest risk, including patients with sleep disordered breathing.

Advisory Committee Memberships and Leadership Positions
• Member, HVI Education Committee, 2015-present
• Member, Fellows Research Day Task Force Committee, 2019-present
• Program Director, Advanced Heart Failure and Transplant Cardiology Fellowship Program, 2019-present

Professional Affiliations and Society Memberships
• Member, American College of Cardiology, 2015-present
• Member, Heart Failure Society of America, 2017-present
• Member, International Society of Heart and Lung Transplantation, 2019-present

Editorships
• Ad Hoc Reviewer, Multiple journals (Journal of American Heart Association, Annals of the American Thoracic Society), 2017-present

Major Lectureships and Seminars
• Presenter, American College of Cardiology National Conference, Recorded due to COVID-19, 2020

Sandeep K. Jain, MD
Dr. Jain's research interests comprise novel therapies for atrial fibrillation, such as newer mapping systems and ablation techniques, including the region's largest cryoballoon experience. He is the site PI for the NIH PCORI AF cohort within the PaTH network. He oversees an atrial fibrillation ablation database from which newer techniques and predictors of response and complications are continually being evaluated.

Major Lectureships and Seminars
Amber E. Johnson, MD, MBA, MS

Advisory Committee Memberships and Leadership Positions
• Faculty Co-Chair, Diversity Committee, Department of Medicine, University of Pittsburgh, 2019-2020
• Prevention Council Member, American Heart Association, 2019-2020
• Early Career Representative, American College of Cardiology – Pennsylvania Chapter, 2019-2021
• Appointed Member, OVAC/OCC Virtual Care Workgroup - Cardiology, Veterans Affairs Pittsburgh Health System, 2020
• Appointed Member, UPMC Health Disparity - Cardiovascular Subcommittee, University of Pittsburgh, 2020-2021
• Research Committee Member, Association of Black Cardiologists, June 2020-2021

Honors and Awards
• Selected Participant, Leadership Academy for Early Career Faculty, University of Pittsburgh, 2020
• Selected Participant, Program to Increase Diversity Among Individuals Engaged in Cardiovascular Health-Related Research (PRIDE) - Cardiovascular Disease Summer Institute, National Heart Lung and Blood Institute of the NIH, SUNY- Downstate, Brooklyn NY, June 2020-June 2021

Krishna Kancharla, MBBS

Advisory Committee Memberships and Leadership Positions
• Consultant, Data Safety Monitoring Board for Radiation Therapy for Ventricular Tachycardia, Varian Medical Systems, 2020

William E. Katz, MD

Dr. Katz participated in the research study titled Echocardiography to Predict Recurrent IMR after Surgical Mitral Valve Repair, an NIH grant with the University of Pennsylvania (2011-2015). He is currently involved in multiple research studies, including the following TAVR aortic valve trials: Cor-eValve US Pivotal Trial (2011-present), Medtronic SURTAVI Trial TAVR vs Surgical AVR for Moderate Risk Patients (2013-present), Reprise III Boston Scientific Lotus TAVR valve (2014-present), and the St. Jude Portico TAVR valve study (2014-present). Among his other studies are COAPT Trial Evaluating MitrClip for Functional Mitral Regurgitation (2014-present) and REATA Trial Mitochondrial Disease. Cardiologist subinvestigator reading echoes and EKGs (2015 to present).

Advisory Committee Memberships and Leadership Positions
• Clinical Director, Echocardiography Laboratory, 2004-present
• Co-Director, UPMC, Echocardiography Conference, Pittsburgh, PA, 2004-Present
• Fellowship Committee, UPMC, 2015-present
• Member, American Society of Echocardiography Guidelines Committee, American Society of Echocardiography, 2019-present
• Cardiology Fellow Applicant Interviewer, UPMC, 2020
• Internal Medicine Residency Applicant Interviewer, UPMC, 2020
• Co-Director, UPMC, UPMC Cardio-Oncology and Cardiac Imaging Symposium, Pittsburgh,
Brett A. Kaufman, PhD
Dr. Kaufman’s long-standing research interest is to understand the contribution of mtDNA metabolism to disease progression. For 20 years, he has been investigating the fundamental processes that underlie mitochondrial respiratory deficiency, with a focus on mtDNA stability and copy number control-processes essential for respiratory function and viability. Dr. Kaufman’s major research goals are 1) to define the biochemical events responsible for the maintenance of mtDNA content, 2) to understand how distinct pathways influence mtDNA maintenance, and 3) to understand mechanisms of mtDNA damage and resistance to damage in the context of disease.

Study Sections
- Grant Reviewer, Pilot Project Program in Hemostasis and Vascular Biology, Vascular Medicine Institute, 2016-present
- Grant Review Committee, United Mitochondrial Disease Foundation, 2016-2020
- Grant reviewer, AAAS Nebraska EPSCoR grant/NSF, 2020

Advisory Committee Memberships and Leadership Positions
- Session co-chair, Translational Research on Mitochondria, Metabolism, Aging, and Disease Symposium (Trimad), University of Pennsylvania, Philadelphia, PA, 2019

Professional Affiliations and Society Memberships
- Member, American Society for Cell Biology, 2003-present
- Member, Mitochondria Research Society, 2009-present
- Member, United Mitochondria Disease Foundation, 2009-present
- Member, Genetics Society of America, 2017-present

Editorships
- Review Editor, Frontiers in Genetics of Aging, 2011-present
- Editorial Board Member, Mitochondrion Journal, 2019-present

Major Lectureships and Seminars
- Invited Speaker, 4th International Conference on Molecular Biology & Nucleic Acids, Chicago, IL, October 2019

Kang Kim, PhD
Dr. Kim’s laboratory seeks to develop and translate state-of-the-art noninvasive imaging technologies to improve disease diagnosis, guide therapeutic strategies, and to evaluate therapeutic efficacy. Its research emphasis is on the development and application of hybrid ultrasound imaging systems that are based on a fundamental understanding of how sound and light interact with soft tissue, and that are capable of assessing their mechanical, compositional, and biological characteristics. Three independent, but related, imaging technologies are under active investigation: (1) Ultrasound elasticity imaging (UEI)/shear wave elasticity imaging (SWEI), which non-invasively assesses the global and regional mechanical properties of the soft tissues and organs; (2) Ultrasound Thermal Strain Imaging (TSI), which strongly contrasts lipids from the surrounding non-lipid tissues; and (3) Photoacoustic Imaging (PAI)/Photoacoustic molecular imaging (PMI), which combines laser and ultrasound technologies to detect optical contrast in tissues and to identify specific biomarkers that may enable early detection of disease and its treatment evaluation. These three imaging modalities may also be combined to provide a more complete characterization of disease. Noninvasive imaging technologies such as these will also be pivotal for preclinical animal studies, significantly reducing animal numbers, variation between subjects, and shortening the study period. Dr. Kim’s research team envisions a noninvasive hybrid imaging system, integrating all these technologies into a single

PA, January 2020

Editors
- Ad hoc Reviewer, Multiple journals (American Journal of Cardiology, European Heart Journal), 1999-present
bed-side ultrasound platform. This will provide a powerful, safe, and cost-effective adjunct to clinical practice by identifying patients at early stages of disease and improving treatment strategies.

**Study Sections**

- Study Section Reviewer, National Institute of Health, 2009-present
- Grant Reviewer, NIH CSR, Member of Medical Imaging, ZRG1 SBIB-T (10), 2011-present
- Grant Reviewer, Dutch Technology Foundation STW/NWO Domain Applied and Engineering Sciences, Netherlands, 2019
- Grant Reviewer, Swiss National Science Foundation, Switzerland, 2019
- Grant Reviewer, Medical Research Council, United Kingdom, 2019

**Advisory Committee Memberships and Leadership Positions**

- Reviewer and Interviewer, Doctoral Program, Department of Bioengineering, 2010-present
- Reviewer and Interviewer, Medical Scientist Training Program (MSTP, MD/PhD) and Physician Scientist Training Program (PSTP, MD), 2010-present

**Professional Affiliations and Society Memberships**

- Senior Member, IEEE Ultrasonics, Ferroelectrics and Frequency Control (UFFC), 2017-present

**Editorships**

- Editorial Board, *International Journal of Medical Engineering and Informatics*, 2008-present

**Ashley Lee, MD**

Dr. Ashley Lee’s primary focus is in the clinical care of patients with coronary artery disease. He has an extremely busy clinical practice at UPMC’s Comprehensive Heart Center, and his primary interest is in interventional cardiology and percutaneous coronary intervention.

**Professional Affiliations and Society Memberships**

- Fellow, American College of Cardiology, 2000-present

**Jenifer E. Lee, MD**

Dr. Lee sees patients with all types of cardiovascular disease in her outpatient practice at UPMC-Presbyterian Hospital, with a special emphasis on valvular disease and noninvasive imaging techniques. She is board certified internal medicine and cardiovascular diseases and is a Fellow of the American College of Cardiology. She is a diplomate of the Council of Nuclear Cardiology and has a Certificate of Special Competency in Comprehensive Adult Echocardiography from the American Society of Echocardiography. Dr. Lee is an active member of the echo and nuclear labs and rounds regularly in the Coronary Intensive Care Unit.

**Honors and Awards**

- Excellence in Education Award, Small Group Facilitator-Cardiovascular Block, University of Pittsburgh, 2019-2020
- Awardee, PittMed Professionalism Accolade, University of Pittsburgh, 2019-2020

**Joon S. Lee, MD**

Dr. Lee has a specific research interest in the role of gene therapy in cardiovascular disease and has been involved in organizing local and multicenter trials regarding the potential role of these novel therapies in the treatment of coronary disease. Dr. Lee has also been active in establishing the Transcatheter Aortic Valve Replacement (TAVR) program at UPMC in conjunction with the cardiac surgical colleagues, leading to one of the top TAVR programs in the country.

**Gang Li, PhD**

Dr. Gang Li’s lab is conducting post-GWAS functional studies by identifying and characterizing the disease-associated functional SNPs and the fSNP-bound regulatory proteins. His team will collect
all the functional data to build a disease-associated risk gene transcriptional regulation network for drug target identification.

**Major Lectureships and Seminars**
- Invited Speaker, Alzheimer’s Association International Conference, Los Angeles, CA, July 2019
- Invited Speaker, University of North Carolina, Chapel Hill, NC, 2020

**Jie Liu, PhD**
Dr. Liu is a research associate professor who studies the biology of aging and the aging-related diseases using various cell biology approaches and various mouse genetic models. Currently, she is focusing on the generation and characterization of BioID2 transgenic mice, which are important tools in the study of in vivo alterations in proteins secretion and chronic inflammation during aging.

**Jared W. Magnani, MD, MSc**
The Magnani Lab focuses on social determinants of health and cardiovascular disease and outcomes. There is tremendous evidence that social factors significantly influence health care access and outcomes. Identifying social determinants of health can provide avenues for community-based interventions and insight regarding the etiologies for disparities. To this end, our health services research uses a smartphone-based relational agent to improve health care utilization and medication adherence in patients with atrial fibrillation. We conduct this study in urban and rural settings with the aim of improving patient-centered outcomes in vulnerable patients with limited social resources and health literacy. We intend to expand these activities to heart failure and secondary prevention of cardiovascular disease. Second, we are using the electronic health record to examine social determinants of cardiovascular diseases, specifically atrial fibrillation and heart failure. These investigations leverage the extensive geography of UPMC and community-level data. Dr. Magnani has led investigations in the Framingham Heart Study, the ARIC Study, and Health ABC, and is supported by a Doris Duke Foundation Clinical Scientist Development Award. He chairs the American Heart Association (AHA) writing group statement on health literacy and cardiovascular disease and serves on the AHA Council Operations Committee.

**Janet R. Manning, PhD**
Nutritive status may drive posttranslational non-nuclear protein acetylation in the heart, and can alter the recovery of the myocardium from ischemic injury. Dr. Manning’s research is focused on the enzymatic acetylation of proteins localized to the mitochondria and endoplasmic reticulum, and the subsequent impact of these acetylated proteins on metabolism, calcium handling, and survival signaling in the heart.

**Oscar C. Marroquin, MD**
Dr. Marroquin focuses on turning real world data into real world evidence by applying analytics to derive insights that can be used to drive care delivery.

**Advisory Committee Memberships and Leadership Positions**
- Associate Director for Research, Cardiology Fellowship Program, University of Pittsburgh Medical Center, 2008-present
- Member, Quality Patient Care Committee, UPMC’s Center for Quality Improvement and Innovation, 2010-present
- Member, Data Governance Council, 2012-present

**Michael A. Mathier, MD**
Dr. Mathier’s research is directed at clinical studies of emerging therapies in heart failure and pulmonary hypertension patients.

**Study Sections**
RESEARCH

• Abstract Reviewer, ACC Scientific Sessions, 2000-present
• Abstract Reviewer, AHA Scientific Sessions, 2000-present

Advisory Committee Memberships and Leadership Positions
• Fellowship Committee, University of Pittsburgh, 2002-present
• Interviewer, Medical School Applicants, University of Pittsburgh, 2002-present
• Director, Pulmonary Hypertension Program, 2005-present
• Member, Six City Tour Steering Committee, Pulmonary Hypertension Association, 2006-present
• Member, Scientific Leadership Council, Pulmonary Hypertension Association, 2006-present
• Member, Graduate Medical Education Committee, 2006-present
• Founder and Director, Cardiology Free Clinic, subspecialty clinic of the Birmingham Free Clinic, Program for Healthcare to Underserved Populations, University of Pittsburgh, 2009-present
• Member, Board of Directors, Program for Healthcare to Underserved Populations, University of Pittsburgh, 2010-present
• Chairman, PHA Online University, 2011-present
• Medical Director, Community Outreach and Cardiovascular Health, 2011-present
• Section Head, Heart Failure and Pulmonary Hypertension, 2013-present
• Associate Director, Cardiovascular Fellowship Program, Heart and Vascular Institute, 2015-present
• Cardiology Medical Director, UPMC HVI Canterbury Post-Acute Care Facility, 2016-present
• Medical Director, Outpatient Cardiology Clinic, 2016-present
• Director, UPMC HVI Online Board Review Course, 2016-present
• Program Director, Advanced Heart Failure and Transplant Cardiology Fellowship Program, 2016-present
• Member, PUH Medical Executive Committee, 2018-present
• Member, PUH Collaborative Practice Committee, 2018-present
• Member, PUH Physician Unit Partner, 2018-present
• Member, HVI Executive Leadership Committee, 2018-present
• Member, Cardiology Quality Committee, 2018-present
• Member, HVI PUH Cardiology Operations Committee, 2018-present
• Organizer, HVI Workplace Harassment Training Program, 2018-present
• Chair, PHA Health Care Provider Education & Support Working Group, 2020

Professional Affiliations and Society Memberships
• Fellow, American College of Cardiology, 2003-present

Editorships
• Reviewer, Multiple journals (Annals of Internal Medicine, Journal of the American College of Cardiology, Circulation Research, Coronary Artery Disease, Journal of Cardiac Failure, Cardiovascular Research), 1997-present

Honors and Awards
• Honoree, Best Doctors, Pittsburgh Magazine, 2012-present

Dennis M. McNamara, MD
Dr. McNamara’s research interests center on the impact of genomics on clinical outcomes and the use of genetic variation for targeting therapeutic interventions. In addition, he is interested in the use of genetic background and biomarker assessment for predicting myocardial recovery in recent onset non-ischemic cardiomyopathy.

Study Sections
• Abstract Grader, American College of Cardiology and Heart Failure Society of America, 2008-present
Advisory Committee Memberships and Leadership Positions

- Program Committee, American College of Cardiology, 2010-present
- Co-Chair, National Institutes of Health Precision Medicine Initiative: Publication Board, 2017-present
- Member, American College of Obstetrics and Gynecology Maternal Mortality Working Group, 2018-present
- Co-Chair, Heart Failure Society of America Scientific Session 2019 Planning Committee, 2019

Professional Affiliations and Society Memberships

- Member, American Heart Association, 1996-present
- Fellow, American College of Cardiology, 1998-present
- Member, Heart Failure Society of America, 1998-present

Major Lectureships and Seminars

- Invited Speaker, Heart Failure Society of America, Heart Failure Society of America Scientific Session, September 2019

Honors and Awards

- Honoree, Best Doctors, *Pittsburgh Magazine*, 2012-present

Charles F. McTiernan, PhD

Dr. McTiernan's laboratory studies the molecular basis of cardiac remodeling in heart failure, as well as a the use of cardiac function, cellular, molecular biology, and microscopic techniques. The lab's publications have appeared in *Circulation Research*, *Circulation, Journal of the American College of Cardiology*, *Cardiovascular Research*, and *PNAS*, among others. One of the primary areas of Dr. McTiernan's research has focused on proinflammatory cytokines in heart failure. His lab demonstrated that transgenic overexpression of TNF generated a heart failure phenotype resembling that observed in human heart failure. Additional studies examined TNF effects on fibrosis and calcium handling. Dr. McTiernan is also interested in TIMPs and MMPs in cardiac remodeling. Dr. McTiernan's team reported that a) altered expression of TIMPs and MMPs occurs in failing human hearts, b) is responsive to mechanical unloading by ventricular assist devices, c) MMP-inhibition limits cardiac remodeling in a murine heart failure model, and d) the profile of TIMP and MMP expression varies with heart failure progression.

Study Sections

- Ad hoc Grant Reviewer, National Institutes of Health, 2004-present

Matthew F. Muldoon, MD, MPH

Dr. Muldoon conducts clinical research examining the interface of behavioral and biological risk factors for cardiovascular disease. Cardiovascular risk conveyed by hypertension, lipid disorders, insulin resistance and pre-clinical atherosclerosis are studied in relation to individual differences in health behaviors (diet and exercise), cognition (attention, working memory, executive function, and impulsivity), and in mood (depression and anxiety). In addition, Dr. Muldoon has tested interventions to treat or prevent hypertension, including prescribed pharmacotherapies and nutritional supplements. He has led or co-led investigations using randomized and double-blind trial design, physiologic and ambulatory recordings, biomarker assessment, genomics, and functional brain imaging. His most recent work leverages e-health technologies to aid patients in self-management of their hypertension through an automated and bidirectional short-messaging system.

Study Sections

- Grant reviewer, Center for Scientific Review Anonymization Study (EMNR IRG), NIH, 2019

Suresh R. Mulukutla, MD

Dr. Mulukutla has established himself as a well-recognized investigator in the field of cardiovas-
cular outcomes research. His early involvement with the Dynamic Registry has resulted in several high-impact publications. Over the last several years, Dr. Mulukutla has taken on an increased role in using system-wide data across the UPMC Health System to identify opportunities for operational improvements and efficiencies within the Heart and Vascular Institute while simultaneously providing high level care to our patients. He focuses on the evaluation of cardiovascular outcomes with focus on clinical end points, cost-effectiveness, patient preferences, and quality of life as well as issues surrounding the development, introduction, and use of medical technology. Currently, Dr. Mulukutla oversees the Heart and Vascular Institute (HVI) Analytics and directs the Center for Outcomes and Innovation for the HVI. This has been responsible for the foundation for several initiatives across the health system to improve care as well as academic and research activities in outcomes across the HVI. In this role, Dr. Mulukutla and his team in collaboration with UPMC Clinical Analytics help others within the HVI in the creation of dashboards to understand care processes and in developing datasets for analysis. These revolve around areas of clinical decision-making, readmissions in heart failure populations, treatment of complex coronary artery disease, among others.

Advisory Committee Memberships and Leadership Positions
- Governor, Western Chapter of the Pennsylvania ACC Chapter, 2016-2019

Oladipupo Olafiranye, MD, MS
Dr. Olafiranye is interested in understanding the mechanisms by which remote ischemic conditioning mitigate contrast-induced acute kidney injury in patients undergoing cardiac catheterization and percutaneous coronary intervention. He is also investigating ways to better characterize measures of vascular/endothelial function and emerging subclinical risk factors for cardiovascular disease, particularly in racial/ethnic minority populations.

Advisory Committee Memberships and Leadership Positions
- Member, STEMI Quality Improvement Committee, 2017-present

Editorships
- Ad hoc Reviewer, Multiple journals (Clinical Cardiology, Journal of Clinical Chemistry and Laboratory Medicine, Journal of Cardiovascular Disease Research, Cardiac Catheterization and Intervention, American Heart Journal), 2012-present

John J. Pacella, MD, MS
Dr. Pacella's research interests include the development of therapy to optimize microvascular perfusion. He has received NIH R01 funding to develop the technique of sonoreperfusion, which is the application of ultrasound to intravascular microbubbles to relieve microvascular obstruction and restore myocardial perfusion in the setting of percutaneous coronary intervention of acute myocardial infarction.

Advisory Committee Memberships and Leadership Positions
- Member, Fellows Research Day Task Force, American Heart Association Pennsylvania Affiliate, 2011-present

Professional Affiliations and Society Memberships
- Member, American Medical Association, 1994-present
- Fellow, American College of Cardiology, 2000-present
- Fellow, American Heart Association, 2006-present
- Fellow, Society for Coronary Angiography and Intervention, 2007-present
- Member, American Society of Echocardiography, 2009-present
- Member, International Contrast Ultrasound Society, 2009-present
- Member, Institute of Electrical and Electronics Engineers, 2017-present
• Member, Society of Cardiovascular Computed Tomography, 2020-present

**Major Lectureships and Seminars**
• Invited Speaker, 34th Annual Advances in Contrast Ultrasound International Bubble Conference, International Contrast Ultrasound Society, Chicago, IL, September 2019
• Speaker, 25th European Symposium on Ultrasound Contrast Imaging, International Contrast Ultrasound Society, Rotterdam, The Netherlands, January 2020

**Honors and Awards**
• Honoree, Best Doctors, *Pittsburgh Magazine*, 2018-present

**Brittany A. Palmer, MD**

**Professional Affiliations and Society Memberships**
• Member, American Medical Association, 2007-2019
• Member, American College of Cardiology, 2009-present
• Member, International Society for Heart and Lung Transplantation, 2013-present
• Member, Heart Failure Society of America, 2013-present

**John A. Power, MD**

Dr. Power practices cardiology at the Heart and Vascular Institute at UPMC Shadyside and UPMC St. Margaret with an interest in cardiac auscultation training.

**Professional Affiliations and Society Memberships**
• Fellow, American College of Cardiology, 1990-present

**Martha A. (Bowman) Pullins, DO**

Dr. Pullins practices Cardiology at the Heart and Vascular Institute at UPMC Passavant, where she is the Medical Director of Cardiac Rehabilitation.

**Professional Affiliations and Society Memberships**
• Fellow, American College of Cardiology, 2014-present
• Member, American College of Physicians, 2014-present
• Member, Women in Cardiology, American College of Cardiology, 2014-present

**Ravi N. Ramani, MD**

Dr. Ramani studies the mechanisms of myocardial recovery after development of heart failure through the use of mechanical circulatory support. It focuses on reversible and irreversible alterations in pathways of myocyte hypertrophy and fibrosis, with emphasis on microRNA signatures of recovery potential.

**Makum L. Ramesh, MD**

**Professional Affiliations and Society Memberships**
• Member, Allegheny County Medical Society, 1982-present
• Member, Pennsylvania Medical Society, 1982-present
• Member, North American Society of Pacing and Electrophysiology, 1982-present
• Fellow, American College of Cardiology, 1984-present
• Member, American Medical Association, 1984-present

**Steven Reis, MD**

Dr. Reis’s research interests include cardiovascular health and heart disease in women, racial disparities in cardiovascular disease, microvascular angina, endothelial function, and cardiovascular risk. Dr. Reis, who has experience as a volunteer firefighter, has also conducted cardiovascular research on firefighters, a group prone to cardiac arrest given firefighting’s combination of heat, exertion,
and dehydration. He and other researchers have explored methods and technologies to regulate body temperature and reduce inflammation and cardiovascular strain on active firefighters. He is the founding director of the Clinical and Translational Science Institute (CTSI), which improves efficiency and reduces the time it takes to translate biomedical advances into societal health practices. Pitt’s CTSI is part of a national consortium of research institutes funded by the National Institutes of Health. CTSI fosters collaborative research that advances new medical therapies and technologies in clinical care while training clinical scientists and ensuring greater access to clinical trials for patients and the public.

**Study Sections**
- Ad Hoc Grant Reviewer, NIH, 2005-present

**Advisory Committee Memberships and Leadership Positions**
- Member, Consortium Oversight Committee, Executive Committee, Consortium Steering Committee, 2006-present
- Member, NIH National Clinical and Translational Science Award Programs, 2008-present
- Member, Harvard Clinical and Translational Science Center, 2008-present
- Member, External Advisory Boards, Washington University Institute of Clinical and Translational Sciences, 2008-present
- Member, North Carolina Translational and Clinical Sciences Institute, 2008-present
- Member, National Clinical and Translational Science Award Steering Committee, 2013-present

**Editorships**
- Editorial Board, *Journal of Women’s Health and Gender-Based Medicine*, 1999-present
- Editorial Board, *Current Controlled Trials in Cardiovascular Medicine*, 1999-present
- Editor, Clinical and Translational Science Award, NIH, 2008-present

**Honors and Awards**
- Member, American Society for Clinical Investigation, 1999-present
- Honoree, Best Doctors, *Pittsburgh Magazine*, 2010-present

**Guy Salama, PhD**
A central goal of Dr. Salama's laboratory is to elucidate the mechanisms responsible for the initiation and termination of cardiac arrhythmias. To achieve this, they have developed the use of voltage-sensitive dyes and high temporal and spatial resolution optical techniques to map patterns of action potential (AP) propagation and repolarization. These novel methods are used to illuminate the mechanisms that generate spatial heterogeneities of AP durations and the interplay between dispersion of repolarization (DOR) and anisotropic conduction velocities (CV). Animal models for cardiac arrhythmias include: acute ischemia in the guinea pig heart and 2 rabbit models of the long QT syndrome (LQTS). A number of mechanisms are being investigated as factors that promote arrhythmias in the LQTS: elevation of extracellular K+, sympathetic stimulation, and the role of spontaneous Ca2+ oscillation from the sarcoplasmic reticulum. Mapping spatial heterogeneities of intracellular Ca2+ transients in mammalian hearts using Ca2+ indicator dyes and imaging techniques. Once the normal heterogeneities of Ca2+ are determined, changes in Ca2+ transients will be analyzed in a wide range of physiological conditions to determined parameter that modulate Ca2+ transients. This laboratory has been at the forefront of the investigation of the role of sulfhydryl oxidation-reduction as a mechanisms to regulate Ca2+ release from the sarcoplasmic reticulum (SR).

**Advisory Committee Memberships and Leadership Positions**
- Promotion Committee, Department of Medicine, University of Pittsburgh, 2013-present

**Professional Affiliations and Society Memberships**
- Member, Biophysical Society, 1977-present
- Member, Marine Biological Laboratory, 1980-present
- Member, Basic Science Council, American Heart Association, 1986-present
Erik B. Schelbert, MD, MS

Dr. Schelbert’s research interests focus on cardiovascular magnetic resonance (CMR), which is a versatile technology that permits robust characterization of cardiovascular disease. The accuracy of the diagnostic information facilitates matching the patient to the right treatment, thereby streamlining a patient’s care. The ability of CMR to establish the correct diagnosis, as well as quantify future risk, offers unique advantages compared to other modalities. A particularly useful application of CMR is its ability to detect and quantify disease related to the myocardium that is difficult to otherwise detect. For example, CMR can detect clinically unrecognized myocardial infarction, infiltrative disease related to excess iron, glycosphingolipid, or amyloid protein. Dr. Schelbert’s team has focused on myocardial fibrosis, which results from varying degrees of excess collagen. Myocardial fibrosis appears to be a reversible indicator of myocardial health that is prevalent and predicts adverse events (e.g., mortality or hospitalization for heart failure) in proportion to its severity. Dr. Schelbert is trying to understand its optimal measurement, its association with other conditions, its impact on prognosis, and its response to therapy.

Study Sections
- Scientific Peer Reviewer, HVI IRB submissions, CTSI, 2010-present
- Reviewer, Emerging Imaging Technologies and Applications (EITA), NIH, 2020

Advisory Committee Memberships and Leadership Positions
- Member, Cardiology Fellowship Evaluation Committee, 2010-present

Professional Affiliations and Society Memberships
- Member, American College of Cardiology, 2010-present
- Member, Society for Cardiovascular Magnetic Resonance, 2010-present
- Member, American Heart Association, 2009-present
- Member, Society for Cardiovascular Computed Tomography, 2020

Editorships
- Ad hoc Reviewer, Multiple journals (Circulation, Circulation: Cardiovascular Imaging), 2012-present
- Appointed Senior Associate Editor, Journal of the American Heart Association, 2014-present
- Editorial Board, Circulation: Cardiovascular Imaging, 2015-present
- Editorial Board, Journal of Cardiovascular Magnetic Resonance, 2016-present
- Editorial Board, JACC: Cardiovascular Imaging, 2017-present

Major Lectureships and Seminars
- Invited Speaker, Pittsburgh Heart Summit, St. Clair Hospital Foundation, Pittsburgh, PA, August 2019
- Invited Speaker, SCMR Scientific Sessions, Society for Cardiovascular Magnetic Resonance, Orlando, FL, February 2020

John T. Schindler, MD

Dr. Schindler has participated in multiple national and international clinical trials focused on the ideal treatment of patients with complex cardiovascular conditions. In this role, he has been published in peer-reviewed journals and presented clinical findings at national cardiovascular meetings. His current clinical focus mainly centers around the individualized treatment of patients with valvular heart disease and which minimally invasive therapies are most effective.

Major Lectureships and Seminars
- Invited Speaker, Advances in Cardiovascular Care Symposium, UPMC Passavant, Pittsburgh, PA, October 2019
- Invited Speaker, UPMC System-Wide HVI Collaborative Care Teleconference, Pittsburgh, PA, November 2019
Mark Schmidhofer, MD
Dr. Schmidhofer’s research focuses on nuclear cardiology including myocardial perfusion stress testing, gated blood pool imaging, technetium scanning for cardiac amyloidosis, and cardiac positron emission tomography.

Advisory Committee Memberships and Leadership Positions
- Director, Quality Improvement, Division of Cardiology, University of Pittsburgh Medical Center, 2006-present
- Associate Director, Cardiovascular Fellowship, University of Pittsburgh Medical Center, 2009-present
- Chair, System Pharmacy and Therapeutics Committee, UPMC Health System, 2013-present

Iain Scott, PhD
Dr. Scott’s research focuses on the intrinsic mechanisms that regulate mitochondrial protein acetylation and how this fundamental alteration affects organelle function at the cellular and tissue level. Mitochondria are ubiquitous organelles, playing a vital role in bioenergetics, metabolite biosynthesis, and overall cellular homeostasis. Their activity needs to be tightly regulated, as evidenced by the growing number of pathologies in which mitochondrial dysfunction is a causative factor. Mitochondria are highly susceptible to environmental stresses, with overnutrition being a particular problem in the developed world. A high caloric intake leads to a surge in available acetyl-CoA (the final breakdown product of fats, carbohydrates, and proteins in the mitochondria), which cannot be used for energetic or synthetic purposes. In particular, Dr. Scott’s lab is interested in the coordination between acetylation levels and mitophagy, a quality control mechanism that mediates the removal of dysfunctional mitochondrial organelles. Researchers recently discovered that GCN5L1, a mitochondrial protein that promotes lysine acetylation, regulates the transcriptional machinery of mitophagy. Dr. Scott and his team’s future work will aim to elucidate the pathways that link nutritional inputs, GCN5L1-mediated lysine acetylation, and mitochondrial quality control systems. These findings will then be translated into studies involving metabolically-relevant disease models, such as heart failure and diabetes, to achieve a better understanding of the role played by dysfunctional mitochondria in these processes.

Study Sections
- Reviewer, P3HVB Award Study Section, University of Pittsburgh, 2017-present
- Reviewer, VMI/HVI Innovator Award Study Section, University of Pittsburgh, 2017-present
- Abstract Reviewer, Scientific Sessions, American Heart Association, Dallas, TX, 2020

Advisory Committee Memberships and Leadership Positions
- Symposium Chair, Scientific Sessions, American Heart Association, Dallas, TX, 2020

Professional Affiliations and Society Memberships
- Member, United Mitochondrial Disease Foundation, 2011-present
- Member, American Physiological Society, 2014-present
- Member, American Heart Association, 2014-present
- Member, Society for Redox Biology and Medicine, 2015-present
- Member, International Society for Heart Research, 2015-present
- Member, American Diabetes Association, 2016-present

Editorships
- Ad hoc Reviewer, Multiple journals (Journal of Molecular and Cellular Cardiology, Cell Research, Infectious Diseases-Drug Target, Mitochondrion, American Journal of Physiology-Heart and Circulatory Physiology, British Journal of Pharmacology, American Journal of Physiology), 2008-present

Shiori Sekine, PhD
Mitochondria dysfunction is associated with various diseases and aging. To maintain a healthy mito-
Mitochondria are equipped with several systems that can evoke stress-signaling pathways. Dr. Sekine's lab studies the stress-sensing mechanisms of mitochondrial proteins and, in particular, the stress-dependent regulation of mitochondrial proteases and mitochondrial import machineries. Her research goal is to provide therapeutic targets for mitochondria dysfunction-related diseases through the manipulation of stress-signaling in mitochondria.

**Professional Affiliations and Society Memberships**
- Member, The Molecular Biology Society of Japan, 2006-present
- Member, The Japanese Biochemical Society, 2006-present

**Alaa A. Shalaby, MD**
Dr. Shalaby's research interests include the utilization of implantable devices and biomarkers of risk for sudden cardiac death, as well as utilization of devices for assessment and treatment of congestive heart failure and sleep-related breathing disorders.

**Professional Affiliations and Society Memberships**
- Member, North American Society for Pacing and Electrophysiology, 1999-present

**Honors and Awards**
- Fellow, American College of Cardiology, 1999-present

**Marc A. Simon, MD, MS**
As a translational scientist, Dr. Simon's research focus is understanding right ventricular (RV) adaptation and eventual failure in heart failure and pulmonary hypertension (PH). His labs focus on 1) advanced analysis of clinical hemodynamics, 2) integration of imaging and hemodynamics to better assess right ventricular function, and 3) early phase clinical trials in pulmonary hypertension and heart failure. His recent projects include a phase II study of inhaled nitrite for pulmonary hypertension (ClinicalTrials.gov NCT01431313), assessment of right ventricular-pulmonary arterial coupling in pulmonary hypertension patients and its relation to outcomes, right ventricular strain analysis by echocardiographic speckle tracking to screen a variety of patients for right ventricular dysfunction, assessment of right ventricular myocardial biaxial biomechanics in a murine model of pressure overload, and phenotyping a nonhuman primate model of HIV-associated pulmonary hypertension.

He is involved with multiple clinical trials in pulmonary hypertension and heart failure and he holds several leadership roles, including 1) PI for the clinical core of a translational program project grant in pulmonary vascular disease (PI: Gladwin), 2) overseeing the Advanced Heart Failure and Cardiac Transplantation section's clinical research portfolio of over 30 protocols with three full time clinical research coordinators, and 3) director of the Montefiore University Hospital Clinical & Translational Research Center, a core lab in the University of Pittsburgh's Clinical Translational Science Institute that supports over 120 clinical research protocols for investigators. Dr. Simon has received research support from NIH, AHA, the Clinical Translational Science Institute of the University of Pittsburgh, and The Pittsburgh Foundation.

**Study Sections**
- Member, Review Panel for Bioengineering, Bioeng BSc 4, AHA, 2012-present
- Study Section Member, American Heart Association Scientific Sessions, 2016-2019
- Study Sections Member, Pulmonary Hypertension, International Society for Heart and Lung Transplantation Annual Meeting, 2016-2019
- Application Reviewer, AHA Summer Undergraduate Research Program (SURP) in Cardiovascular Sciences, 2019
- Grant Reviewer, CTSI REAL (REsearch Across the Lifespan) Pilot Awards, 2019

**Advisory Committee Memberships and Leadership Positions**
- Member, Committee for Oversight of Research Involving the Dead, 2006-present
- Member, Cardiovascular Institute Research Committee, 2007-present
- Task Force, Judge, AHA Fellows Research Day, 2012-present
• Appointed Co-Chair, Task Force, American Heart Association (AHA) Fellows Research Day, 2014-present
• International Society for Heart and Lung Transplantation Annual Meeting, 2018-2019
• Member, Program Committee, Heart Failure Society of America Annual Scientific Meeting, 2018-2020
• Panelist, PRIME trial investigators meeting, 2019
• Member, UPMC Heart, Lung, and Blood Program Project Review Committee, 2020
• Member, Symposium Planning Committee and Liaison for the Pulmonary Hypertension Council,

Editorships
• Senior Associate Editor, *Journal of the American Heart Association*, 2019

Major Lectureships and Seminars
• Invited speaker, National Institute on Aging Workshop, Baltimore, MD, 2019
• Invited speaker, On-Demand Medical Education Series, Pulmonary Hypertension Association, San Francisco, CA, 2019
• Invited speaker, University of Maryland, Baltimore, MD, 2019
• Invited speaker, American Heart Association Scientific Sessions, Philadelphia, PA, 2019
• Invited speaker, Heart Failure Society of America Annual Scientific Meeting, Philadelphia, PA, 2019

A. J. Conrad Smith, MD
Dr. Smith's research interests are primarily in the area of analysis of outcomes after percutaneous coronary intervention. As the Director of the Cardiac Catheterization Laboratory, he oversees the development of the cath lab database system which will provide a wealth of research potential to evaluate various aspects in interventional cardiology. He has worked with Dr. Dennis McNamara in developing a database of coronary intervention patients with which they are currently evaluating the potential genetic basis of cardiac disease. Dr. Smith has also served as the Governor of the Western Pennsylvania Chapter of the American College of Cardiology where he had the unique opportunity to directly impact the practice of cardiology in this region.

Advisory Committee Memberships and Leadership Positions
• Member, UPMC HVI Educational Committee, 2018-present
• Member, UPMC Diversity and Inclusion Committee, 2018-present

Major Lectureships and Seminars
• Invited Speaker, Pittsburgh Heart Team Summit: A Symposium on Cardiovascular Alliances, Pittsburgh, PA, August 2019
• Invited Speaker, Transcatheter Cardiovascular Therapeutics, San Francisco, CA, September 2019
• Invited Speaker, HVI ECHO Symposium, UPMC, Pittsburgh, PA, January 2020
• Invited Speaker, Cardiovascular Innovations Foundation, Philadelphia, PA, January 2020

Honors and Awards
• Honoree, Best Doctors, *Pittsburgh Magazine*, 2015-present

Prem Soman, MD, PhD
Dr. Soman's research focuses on the use of radionuclide-based imaging techniques in cardiac diseases, particularly heart failure. Current interests include the use of myocardial SPECT imaging for left ventricular dyssynchrony assessment, an area in which his group has contributed seminal work (Mati Friehling, Young Investigator Award, ASNC 2010; Saurabh Malhotra, Young Investigator Award, ASNC 2013).

Advisory Committee Memberships and Leadership Positions
• Member, Board of Directors, Intersocietal Commission for the Accreditation of Nuclear
Division of Cardiology

Medicine Laboratories, 2010-present

- Member, Board of Directors, American Society of Nuclear Cardiology, 2010-present
- Member, Board of Directors, Society of Nuclear Medicine, Cardiovascular Council, 2010-present
- Member, American College of Cardiology Annual Scientific Program Committee, 2010-present
- Chair, Leadership Development Program, 2015-present
- President, American Society of Nuclear Cardiology, 2018-2019

Professional Affiliations and Society Memberships

- Fellow, American College of Cardiology, 2006-present
- Fellow, American Society of Nuclear Cardiology, 2007-present
- Fellow, Royal College of Physicians (UK), 2008-present
- Master, American Society of Nuclear Cardiology, 2018-present

Editorships

- Editorial Board and Section Editor, Journal of Nuclear Cardiology, 2009-present
- Associate Editor, Circulation CV Imaging, 2014-Present
- Editorial Board, Journal of the American College of Cardiology: Cardiovascular Imaging, 2014-present

Honors and Awards

- Honoree, Best Doctors, Pittsburgh Magazine, 2016-present

Matthew Steinhauer, MD

Director of the Center for Human Integrative Physiology at the Aging Institute, Dr. Steinhauer studies how metabolism is altered by aging and caloric excess and in turn contributes to metabolic diseases. One area of focus is on discovering the cellular and molecular defects in fat tissue that underpin an age dependent decline in the capacity to adapt to periods of excess calorie intake. Another area of focus is on understanding how human fasting may improve aging-related metabolic dysfunction.

Advisory Committee Memberships and Leadership Positions

- Member, Membership and Communication Committee, Council on Genomic and Precision Medicine, 2017-present

Professional Affiliations and Society Memberships

- Member, American Heart Association, 2010-present
- Member, Endocrine Society, 2013-present
- Member, American Diabetes Association, 2017-present

Editorships


Major Lectureships and Seminars

- Invited Speaker, Internal Medicine Innovation Grand Rounds, Brigham and Women’s Hospital, 2019
- Invited Speaker, Renal Division Research Seminar Series, Brigham and Women’s Hospital, 2019
- Invited Speaker, Models of Disease Bootcamp Invited Lecture, Harvard Medical School, 2019
Cynthia L. St. Hilaire, PhD
The St. Hilaire lab research program stems from the previous discovery of the genetic disease Calcification due to Deficiency of CD73 (ACDC), which identified a novel role for the enzyme CD73, and its substrate adenosine, in vascular calcification and vascular remodeling. Moving forward, research in the St. Hilaire lab will explore the role of CD73 and adenosine signaling in more complex vascular pathologies, such as atherosclerosis, calcific aortic valve disease, and aneurysms using in vitro (primary human and mouse cells and patient-specific induced-pluripotent stem cells) and in vivo (genetically defined murine models and surgical manipulations), with the goal of translating findings in ACDC to more common vascular diseases and pathologies.

Advisory Committee Memberships and Leadership Positions
- Member, Early Career Committee, Council on Arteriosclerosis, Thrombosis, and Vascular Biology, American Heart Association, 2014-present
- Member, Federal Advisory Committee, Department of Veterans Affairs Scientific Review Group, Subcommittee for Cardiology, 2019

Professional Affiliations and Society Memberships
- Member, Women in Bio, Pittsburgh Chapter, 2015-present
- Member, International Society for Applied Cardiovascular Biology, 2016-present
- American Physiological Society, 2017-present

Matthew S. Suffoletto, MD
Dr. Suffoletto practices at the UPMC Heart and Vascular Institute (HVI) at UPMC Mercy and at the HVI location at University Center in Oakland. He is interested in the association between glycated hemoglobin and the risk of congestive heart failure in diabetes mellitus.

Advisory Committee Memberships and Leadership Positions
- Member-at-Large, Medical Executive Committee, UPMC Mercy, 2018-2019
- Medical Director, UPMC Mercy Echocardiography Laboratory, 2012-present
- Committee Member, Credentials Committee, UPMC Mercy, 2017-present

Professional Affiliations and Society Memberships
- Member, American College of Cardiology, 2010-present

Editorships
- Ad hoc Reviewer, Multiple journals (Journal of the American College of Cardiology, European Heart Journal, International Journal of Cardiovascular Imaging, Circulation: Cardiovascular Imaging), 2020

Honors and Awards
- Awardee, Edward I. Curtiss Memorial Annual Outstanding Teacher Award, University of Pittsburgh Medical Center, June 2020
Catalin Toma, MD
Dr. Toma's investigates cell therapy for cardiac applications, bioabsorbable vascular scaffolds, intra-coronary imaging, and pulmonary embolism.

Study Sections
• Ad hoc Grant Reviewer, NIH, 2008-present

Advisory Committee Memberships and Leadership Positions
• Director, Interventional Cardiology Research, 2013-present
• Director, Intervention Cardiology Fellowship Program, 2014-present
• Director, Interventional Cardiology, HVI, 2016-present

Major Lectureships and Seminars
• Invited Speaker, University of Alabama at Birmingham, August 2019
• Invited Speaker, Transcatheter Cardiovascular Therapeutics 2019, San Francisco, CA, September 2019
• Invited Speaker, HVI Collaborative Care Teleconference, UPMC, Pittsburgh, PA, December 2019 and February 2020

Flordeliza S. Villanueva, MD
Dr. Villanueva's research focuses on the development of medical diagnostic and therapeutic strategies based on ultrasound and ultrasound contrast agents (gas-filled microspheres, or microbubbles). Her work has consistently bridged fundamental imaging sciences with translational biomedical research. As an Established Investigator of the American Heart Association, she has been a leader in the development of microbubbles for the assessment of myocardial perfusion, and ultrasound molecular imaging with targeted microbubbles for the detection of inflammatory and angiogenic endothelial markers in pre-clinical models of heart disease. Dr. Villanueva's lab has pioneered the development and application of microbubbles as molecular probes and acoustic detection strategies for optimizing imaging sensitivity. Her lab group has applied fundamental principles of ultrasound and the physics of microbubble acoustic behaviors to develop novel targeted molecular therapeutics, whereby nucleic acid loaded microbubbles (siRNA, miRNA, plasmid), in the presence of precisely tuned ultrasound, selectively enhance membrane permeability and deliver payloads to the target site. These studies are conducted at the Center for Ultrasound Molecular Imaging and Therapeutics, a translational multidisciplinary research facility which epitomizes the reciprocal relationship between imaging sciences and biomedical translational research.

Study Sections
• Standing Member, Imaging Technology Development (ITD) Study Section (formerly BMIT-B), NIH, 2017-present

Advisory Committee Memberships and Leadership Positions
• Member, Executive Leadership Group, Heart and Vascular Institute, University of Pittsburgh Medical Center, 2015-present
• Leader, Grant Writing Workshop (K grants), 2015-present
• Member, Swanson School of Engineering Translational Bioengineering Faculty Search Committee, University of Pittsburgh, 2019
• Member, Vascular Medicine Institute Director Search Committee, University of Pittsburgh, 2019
• Elected Member, Scientific Publishing Committee, American Heart Association, 2019-2021
• Course Co-Director, Cardio-oncology and Cardiac Imaging Symposium, UPMC, 2020
• Member, R38 Subcommittee for Curriculum and Career Development, 2020
• Elected Member, Open Science Committee, American Heart Association, 2020-2022

Professional Affiliations and Society Memberships
• Member, American Society of Echocardiography, 1992-present
• Fellow, American College of Cardiology, 1994-present
Andrew H. Voigt, MD
Dr. Voigt's research interests include cryoablation for atrial fibrillation and patterns of cardiovascular implantable electronic device utilization. He was one of the earliest physicians in the United States to implant a leadless pacemaker during a first in human multicenter trial.

Professional Affiliations and Society Memberships
- Fellow, American College of Cardiology, 2007-present
- Fellow, Heart Rhythm Society, 2011-present

Norman C. Wang, MD, MS
Dr. Wang's research interest focuses on the epidemiology of cardiovascular disease, with an emphasis on the interaction between heart rhythm disorders and heart failure. He has a MS in epidemiology from the University of Pittsburgh Graduate School of Public Health.

Honors and Awards
- Fellow, American College of Cardiology, 2012-present
- Fellow, Heart Rhythm Society, 2013-present

Timothy C. Wong, MD, MS
Dr. Wong's research interests include the comparative effectiveness of cardiovascular imaging modalities, as well as the role of a novel cardiac MRI biomarker of diffuse myocardial fibrosis in cardiovascular diseases, including hypertrophic cardiomyopathy. His work has been published in major scientific journals, including Circulation and the European Heart Journal. He also participates as a site investigator in several multi-center research protocols, while serving as a scientific reviewer for numerous journals. Additionally, Dr. Wong is a member of an American Heart Association grant review committee and several imaging society working groups.

Study Sections
- Member, Radiology and Imaging-Clinical Grant Review Committee, American Heart Association (National), 2014-present

Advisory Committee Memberships and Leadership Positions
- Member, Fellow's Research Day Task Force, American Heart Association (Three Rivers Affiliate), 2015-present
- Member, Imaging Council, American College of Cardiology, 2020
- Member, Publications Committee, Society for Cardiovascular Magnetic Resonance, 2019-2020
- Member, COVID-19 Registry task force, Society for Cardiovascular Magnetic Resonance,
2019-2020

**Professional Affiliations and Society Memberships**
- Fellow, American Heart Association, 2017-2020

**Editorships**
- Guest Editor, *Journal of the American Heart Association*, 2019-2020

**Major Lectureships and Seminars**
- Invited Speaker, Westchester Cardiovascular Symposium, Westchester Medical Center, New York, NY, October 2019
- Invited Speaker, Asia Pacific Heart Failure Forum, Chinese University of Hong Kong, Macau, China, December 2019

**Honors and Awards**
- Honoree, Best Doctors, *Pittsburgh Magazine*, 2019

**Manling Zhang, MD, MS**
Dr. Zhang’s research focuses on the role of mitochondria protein acetylation in heart failure development.

**Professional Affiliations and Society Memberships**
- Member, American Heart Association, 2007-present
### GRANTS AND CONTRACTS AWARDED

**July 1, 2019 to June 30, 2020**

### PUBLIC HEALTH SERVICE

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<tr>
<th>INVESTIGATOR</th>
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## GRANTS

### PUBLIC HEALTH SERVICE

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**TOTAL PUBLIC HEALTH SERVICE** $28,314,702 $12,008,529

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**TOTAL OTHER FEDERAL** $135,813 $61,353

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<td>Vasamsetti, Satish</td>
<td>Loss of Visceral adipose tissue resident macrophages in heart failure-induced insulin resistance: Role of adipocytokines</td>
<td>American Heart Association</td>
<td>$68,418</td>
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<td>Villanueva, Flordeliza S.</td>
<td>Glycocalyx Pathways Linking Pregnancy Profile with Microvascular Dysfunction Postpartum</td>
<td>American Heart Association</td>
<td>$19,241</td>
<td>$1,924</td>
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<tr>
<td>Villanueva, Flordeliza S.</td>
<td>Electrophysiologically-Activated Intravenous Ultrasound Contrast Agent for Imaging the Heart</td>
<td>Coulter-Drexel Translational Research Partnership</td>
<td>$74,501</td>
<td>$0</td>
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<td>Villanueva, Flordeliza S.</td>
<td>Acoustic Cluster Therapy (ACT) for Improved Treatment of Cancer and Brain Diseases</td>
<td>Norwegian Univ. of Science and Technology</td>
<td>$15,164</td>
<td>$4,549</td>
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<td>Zhang, Manling</td>
<td>The Impact of GCN5L1 on Cardiac Energetics in Heart Failure Development</td>
<td>Samuel and Emma Winters Foundation</td>
<td>$10,842</td>
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**TOTAL SOCIETY AND FOUNDATIONS** $1,092,017 $113,448
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<tr>
<th>INVESTIGATOR</th>
<th>TITLE</th>
<th>AGENCY</th>
<th>ANNUAL DIRECT COSTS</th>
<th>ANNUAL INDIRECT COSTS</th>
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<td>Al Ghouleh, Imad</td>
<td>Molecular Mechanisms of Right Ventricle Adaptation and Maladaptation to Pulmonary Arterial Hypertension</td>
<td>Gilead Sciences, Inc</td>
<td>$60,166</td>
<td>$4,814</td>
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<td>Anderson, Carolyn</td>
<td>Assess stability of CTT1402</td>
<td>Cancer Targeted Technology, LLC</td>
<td>$3,148</td>
<td>$1,938</td>
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<td>Anderson, Carolyn</td>
<td>Evaluation of novel Lu-177 and Zr-89 labeled chelators and chelator-biomolecule agents for imaging and therapy of cancer</td>
<td>Lumiphore</td>
<td>$62,093</td>
<td>$18,628</td>
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<tr>
<td>Chan, Stephen Y.</td>
<td>Single cell RNA Sequencing and Network Analysis to Identify the Pleiotropic Effects of Macitentan on Scleroderma PAH Patient-Derived Pro-Inflammatory Monocytes</td>
<td>Actelion Clinical Operations</td>
<td>$43,544</td>
<td>$10,886</td>
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<tr>
<td>Chan, Stephen Y.</td>
<td>Collection of Plasma Samples from Pulmonary Arterial Hypertension (PAH) Patients</td>
<td>Pfizer Inc.</td>
<td>$51,558</td>
<td>$27,841</td>
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<td>Chan, Stephen Y.</td>
<td>Evaluate Plasma Metabolites in Samples from Pulmonary Hypertension and Heart Failure with Preserved Ejection Fraction (HFpEF) Patient Cohorts</td>
<td>Pfizer Inc.</td>
<td>$2,543</td>
<td>$1,564</td>
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<td>Chan, Stephen Y.</td>
<td>Palbociclib in Su/HY Rats</td>
<td>Pfizer Inc.</td>
<td>$145,804</td>
<td>$89,670</td>
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<tr>
<td>Chan, Stephen Y.</td>
<td>Evaluate Plasma Metabolites in Samples from Pulmonary Hypertension and Heart Failure with Preserved Ejection Fraction (HFpEF) Patient Cohorts</td>
<td>Pfizer Inc.</td>
<td>$71,721</td>
<td>$44,109</td>
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<td>Kaufman, Brett A.</td>
<td>Novel Mechanisms and Biomarkers of COPD/Emphysema</td>
<td>Glaxo, Inc.</td>
<td>$182,737</td>
<td>$45,685</td>
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<td>Magnani, Jared</td>
<td>Heart Real World Clinical Data Study</td>
<td>Bayer Corporation</td>
<td>$16,002</td>
<td>$6,387</td>
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<tr>
<td>Saba, Samir</td>
<td>Influencing Referral Patterns for Primary Prevention of Sudden Cardiac Death: The Effect of Automated Best Practice Messages on Patients Referral Patterns to Electrophysiologists and Rates of Defibrillator Implantations</td>
<td>Boston Scientific Corp.</td>
<td>$27,642</td>
<td>$6,910</td>
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<tr>
<td>Simon, Marc</td>
<td>Phase 1 Clinical Trial of ABI-009, an mTOR Inhibitor for Patients with Severe Arterial Hypertension</td>
<td>AADI, LLC</td>
<td>$84,267</td>
<td>$21,067</td>
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<tr>
<td>Simon, Marc</td>
<td>Phase 1 Clinical Trial of ABI-009, an mTOR Inhibitor for Patients with Severe Arterial Hypertension</td>
<td>AADI, LLC</td>
<td>$88,303</td>
<td>$22,076</td>
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<tr>
<td>Simon, Marc</td>
<td>Patient Reported Outcomes Investigation following Initiation of Drug Therapy with Entresto (Sacubitril/Valsartan) in Heart Failure</td>
<td>Novartis Pharm/ Johns Hopkins University</td>
<td>$25,846</td>
<td>$7,754</td>
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<tr>
<td>Simon, Marc</td>
<td>Patient Reported Outcomes Investigation following Initiation of Drug Therapy with Entresto (Sacubitril/Valsartan) in Heart Failure</td>
<td>Novartis Pharm/ Johns Hopkins University</td>
<td>$3,772</td>
<td>$1,132</td>
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<td>Soman, Prem</td>
<td>The Simultaneous Assessment of Invasive Fractional Flow Reserve and SPECT Myocardial Ischemia Using Regadenoson in the Catheterization Laboratory</td>
<td>Astellas Pharma US</td>
<td>$46,254</td>
<td>$11,563</td>
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TOTAL INDUSTRY $915,400 $322,022

PUBLIC HEALTH SERVICE $28,314,702 $12,008,529
OTHER FEDERAL $135,813 $61,353
SOCIETY AND FOUNDATIONS $1,092,017 $113,448
INDUSTRY $915,400 $322,022
TOTAL $30,457,932 $12,505,352
The UPMC Cardiovascular Fellowship is one of the nation’s most innovative fellowships, and it is an integral part of the HVI.

Fellows from across the country and throughout the world pursue training in state-of-the-art cardiovascular care, including the latest advances in imaging, interventional procedures and electrophysiological techniques. Accomplished faculty, who are valued for their clinical acumen as well as their teaching skills, oversee the fellows as they train across the breadth of cardiovascular care. Simultaneously, all fellows take a leadership role in their own individual research projects with close mentorship from faculty across the institution. These projects span a range of areas, including clinical, basic, translational, educational and health information technology. The HVI strives to train the future leaders of cardiac care. We focus not only on the traditional spaces within cardiology—such as heart failure, electrophysiology, interventional and imaging—but also we pave the path for the evolving areas of cardiology as the specialty integrates with critical care, obstetrics, palliative care, quality improvement, medical education and information technology. The HVI has created a dynamic, diverse and academically challenging environment for its fellows who will serve as the thought leaders for the next generation of cardiac care. Katie Berlacher, MD, MS, serves as the fellowship program director, with Mark Schmidhofer, MD; Michael Mathier, MD; Josh Levenson, MD; and Stephen Chan, MD, PhD, serving as associate program directors. The HVI also provides training, mentorship, and oversight for the University of Pittsburgh School of Medicine medical students as well as the UPMC Internal Medicine, Emergency, and Vascular Surgery residents. The second-year medical school cardiovascular course continues to be one of the top-rated sections, led by Jenifer Lee, MD. The HVI Cardiac Intensive Care Unit, Telemetry service, and Consult rotations are favorites among many residents who report being inspired by the fellows and faculty—and who cite this as a factor in their decisions to become cardiologists themselves. The fellows and faculty together serve the community not only in their care at the UPMC hospitals, but also through volunteering at our Community Outreach And Cardiovascular Health (COACH) screening events as well as a cardiology Free Clinic located at the Internal Medicine Birmingham Clinic on the Southside, and local speaking and mentoring sessions with high school students in the area. We are proud of our fellowship and are excited to see how our fellows lead the field in the future.
Clinical Fellows
* Indicates departing fellow

*Laith Alkukhun, MBBS
Medical School: Jordan University of Science and Technology Faculty of Medicine
Residency: Cleveland Clinic
Current Position: Cardiologist, Mercy Health, Poland, OH

*Amr F. Barakat, MBBCh
Medical School: Ain Shams University Faculty of Medicine
Residency: Cleveland Clinic
Current Position: Electrophysiology Fellowship, UPMC

Michael J. Bashline, MD
Medical School: Temple University
Residency: UPMC

Stephen T. Broughton, MD
Medical School: University of Arkansas
Residency: Wake Forest School of Medicine

Abdallah A. Bukari, MD
Medical School: Perelman School of Medicine at the University of Pennsylvania
Residency: University of Chicago

Ann Canterbury, MD
Medical School: University of Toledo
Residency: UPMC
Lindsey Cilia, MD  
*Medical School: Albany Medical College  
Residency: Brown University/Rhode Island Hospital  
Current Position: Interventional Fellow, University of Michigan

Michael W. Gardner, MD  
*Medical School: University of Arkansas  
Residency: Oregon Health and Science University

Emily N. Guhl, MD  
*Medical School: University of Chicago  
Residency: UPMC  
Current Position: T32 Research Fellow

Allexa A. Hammond, MD  
*Medical School: Baylor College of Medicine  
Residency: University of Texas Southwestern Medical Center

Arun M. Iyer, MD  
*Medical School: Medical University of South Carolina College of Medicine  
Residency: Case Western University Hospitals  
Current Position: Advanced Cardiac Imaging Fellow, UPMC

Agnes Koczo, MD  
*Medical School: Virginia Commonwealth  
Residency: UPMC

Rebecca F. Lolley, MD  
*Medical School: Sidney Kimmel Medical College at Thomas Jefferson University  
Residency: University of Maryland

*Amber Makani, MD  
*Medical School: West Virginia University  
Residency: Case Western Reserve University Hospitals  
Current Position: Interventional Cardiology Fellow, UPMC

Amy L. Marino, MD  
*Medical School: George Washington University  
Residency: UPMC  
Current Position: Clinical Assistant Professor of Medicine, University of Pittsburgh

Ivan N. Mugisha, MD  
*Medical School: University of Illinois, MD  
Residency: Washington University

Vinaya C. Mulkareddy, MD  
*Medical School: St. Louis University  
Residency: Barnes Jewish Hospital-Washington University in St. Louis

Ricardo A. Nieves, MD  
*Medical School: University of Pittsburgh
**Division of Cardiology**

**Residency:** UPMC

**Jonathan P. Pollock, MD**  
*Medical School:* Pennsylvania State University  
*Residency:* Wright State University

**Anum Saeed, MBBS**  
*Medical School:* Ziauddin Medical College  
*Residency:* Baylor College of Medicine

**Daniel L. Shpilsky, MD**  
*Medical School:* Lewis Katz School of Medicine Temple University  
*Residency:* UPMC

**Natalie R. Stokes, MD**  
*Medical School:* University of Pennsylvania  
*Residency:* University of Pennsylvania

**Daniel G. Wann, MD**  
*Medical School:* East Tennessee State University  
*Residency:* Beth Israel Deaconess Medical Center

**Adil A. Yunis, MD**  
*Medical School:* Boston University  
*Residency:* Boston University

**Advanced Fellowships**

**Charles Nicolais, MD**  
*Interventional Cardiology*  
*Medical School:* George Washington School of Medicine  
*Residency:* Temple University

**Stephen J. D’Auria, MD**  
*Advanced Interventional Cardiology*  
*Medical School:* University of Pittsburgh  
*Residency:* UPMC  
*Current Position:* Cardiologist, Heritage Valley Health System, Beaver, PA

**Rami Kafa, MD**  
*Advanced Interventional Cardiology*  
*Medical School:* University of Tishreen Faculty of Medicine  
*Residency:* Cleveland Clinic Foundation  
*Current Position:* Interventional cardiologist, Bon Secours-Mercy Health, Youngstown, OH

**Jack Z. Li, MD, MBA**  
*Electrophysiology*  
*Medical School:* University of Michigan  
*Residency:* University of Michigan  
*Current Position:* Electrophysiologist, ProMedica, Toledo, OH

**Ashritha Penagaluri, MBBS**  
*Electrophysiology*  
*Medical School:* KVG Medical College  
*Residency:* Greater Baltimore Medical Center
*Bassel Sayegh, MD  
**Electrophysiology**  
*Medical School: University of Damascus*  
*Residency: Loyola University Medical Center/Allegheny Health Network*  
*Current Position: Electrophysiologist, Excella West Moreland*

## Clinical Fellow Activities

### Laith Alkukhun, MD

**Publications**


### Amr F. Barakat, MBBCh

**Publications**


**Presentations and Abstracts**

- Causes and predictors of 30 and 90 days readmission after cardiac arrest: insights from the nationwide readmission database, European Society of Cardiology (ESC) Congress, Paris, France, August 2020
- Documentation of shared decision making around primary prevention defibrillator
implantations, American Heart Association (AHA) Scientific Sessions, Philadelphia, PA, November 2019


- Comparative Outcomes of Direct Oral Anticoagulants versus Warfarin in Morbidly Obese Patients With Non-valvular Atrial Fibrillation, American Heart Association (AHA) Scientific Sessions, Philadelphia, PA, November 2019

- Development of a Convolution Neural Network for Shockable Arrhythmia Classification Within a Next Generation Automated External Defibrillator, American College of Cardiology (ACC)/ World Congress of Cardiology (WCC) – Virtual Scientific Sessions, Virtual, March 2020

- Wild-Type Transthyretin Amyloid Cardiomyopathy Predicts Thromboembolic Risk In Atrial Fibrillation, American College of Cardiology (ACC)/ World Congress of Cardiology (WCC) – Virtual Scientific Sessions, Virtual, March 2020

- Faster Progression of Left Ventricular Thickness in Men Compared to Women in Wild-Type Transthyretin Cardiac Amyloidosis, American College of Cardiology (ACC)/ World Congress of Cardiology (WCC) – Virtual Scientific Sessions, Virtual, March 2020

- Long Term Efficacy for Cryoballoon Pulmonary Vein Isolation in Atrial Fibrillation, American College of Cardiology (ACC)/ World Congress of Cardiology (WCC) – Virtual Scientific Sessions, Virtual, March 2020

Honors and Awards

- James A. Shaver Memorial Award, June 2020
- Excellence in Research Award, June 2020

Stephen Broughton, MD

Presentations and Abstracts

- Subclinical Myocardial Injury and Cardiovascular Mortality: Racial Differences in Prevalence and Risk (from the Third National Health and Nutrition Examination Survey), the American Heart Association Scientific Sessions, Philadelphia, PA, November 2019
- Subclinical Myocardial Injury and Cardiovascular Mortality: Racial Differences in Prevalence and Risk (from the Third National Health and Nutrition Examination Survey), Pittsburgh American Heart Association Fellows Research Day, Pittsburgh, PA, January 2020

Ann Canterbury, MD

Publications


Lindsey Cilia, MD

Publications


Michael Gardner, MD

Publications


Emily Guhl, MD

Publications


Honors and Awards

• Chief Fellow Award, June 2020

Arun Iyer, MD

Presentations and Abstracts

• Despite High Prevalence Pulmonary Hypertension is Infrequently Coded in HER, Heart Failure Society of American, Philadelphia, PA, September 2019
• Cardiac rehabilitation has important benefits for both HFrEF and HFpEF patients, Heart Failure Society of America, Philadelphia, PA, January 2020

Agnes Koczo, MD

Publications

• Presentations and Abstracts

Jack Li, MD

Publications


Amber Makani, MD

Publications

Amy Marino, MD

Publications

Vinaya Mulkareddy, MD

Publications

Presentations and Abstracts
- Residency Training: What is the Impact on Mental and Physical Health?, Alliance for Academic Internal Medicine, Denver, CO, October 2019.

Charles Nicolais, MD

Publications

Daniel Shpilsky, MD

Publications

Presentations and Abstracts
- Percutaneous intervention of aortocoronary graft aneurysm: a vision for the future, American College of Cardiology Annual Scientific Sessions, Virtual, March 2020.
Roy Sriwattanakomen, MD  
**Honors and Awards**  
- Wiernga Award for Heart Failure, June 2020  
- Brian R. Pierce Cardiac Critical Care Award, June 2020  

Natalie Stokes, MD  
**Presentations and Abstracts**  
- “I'm gonna have the baby and it's gonna go away:” Communicating cardiovascular risk after a pregnancy complicated by preeclampsia, Quality of Care and Outcomes Research American Heart Association Scientific Sessions, Philadelphia, PA, November 2019  

Adil Yunis, MD  
**Publications**  

**Presentations and Abstracts**  
- Patient with giant cell myocarditis on ECMO receives hepatitis C positive transplant just in time, American College of Cardiology Scientific Sessions, Virtual, March 2020  
- Direct oral anticoagulants are effective therapy in treating left ventricular thrombi, American College of Cardiology Scientific Sessions, Virtual, March 2020  

**Postdoctoral Fellows and Activities**  

John Cormack, PhD  
**T32 Scholar**  
**Mentor: Kang Kim, PhD**  
Dr. Cormack uses ultrasonic imaging to measure the elastic properties of cardiac tissue and determine fiber orientation as a function of thickness through the ventricle wall.  

Malamo Countouris, MD  
**T32 Scholar**  
**Mentors: Janet Catov, PhD, and Flordeliza Villanueva, MD**  
Dr. Countouris studies the cardiac structural changes in women with a history of preeclampsia.  

**Publications**  
Presentations and Abstracts

- **Countouris ME**, Jeyabalan A, Caldwell JC, Lee JE, Hickey GW. Primary Presentation of Pulmonary Hypertension in the Peripartum Preparing for Patients with Eisenmenger Physiology. JACC: Case Reports. 2020;2(1).
- Placental Vascular Lesions and Maternal Coronary Microvascular Function 8-10 years after Delivery, ACC 2020 (Virtual), 2020.
- Pregnancy and Hypertension: Management in the peripartum and across the lifespan, Invited AHA presentation for Regional SNPhA Conference, Pittsburgh, PA, February 2020.
- Bridging Postpartum Hypertension Care: Introduction of a Multi-Disciplinary Clinic, UPMC Obstetrics and Gynecology Grand Rounds, March 2020.
- Spontaneous Coronary Artery Dissection (SCAD) panelist, ACC 69th Annual Scientific Session, Chicago, IL, March 2020. *Invited and scheduled, however cancelled secondary to the COVID19 Pandemic.*
- Risk Factors for Heart Disease among Women, Pittsburgh Urban League WORDOUT invited grant funded lecture, Pittsburgh, PA, May 2020.

**Rolando Cuevas, PhD**  
*Mentor: Cynthia St. Hilaire, PhD*

Dr. Cuevas is focused on dysregulation of Foxo1 and its effects on calcification in arterial calcification.

**Publications**


**Maria Cristina Espinosa Diez, PhD**  
*Mentor: Delphine Gomez, PhD*

Dr. Espinosa Diez is focused on studying the functional role of epigenetic and transcriptional mechanisms in controlling key properties of vascular cells including cell differentiation, lineage memory and plasticity in the context of major cardiovascular diseases including atherosclerosis and peripheral artery disease.

**Publications**

Jonathan Florentin, PhD  T32 Scholar  
Mentors: Partha Dutta, DVM, PhD, and Stephen Y. Chan, MD, PhD 
Dr. Florentin is researching how innate immune myeloid cells are involved in the development of cardiovascular diseases.

Publications 

Luca Giordano, PhD  
Mentor: Brett A. Kaufman, PhD
Dr. Giordano’s research focuses on mtDNA analysis and mitochondrial bioenergetics in the context of the oxidative stress induced by cigarette smoke exposure in cells and tissue.

Soumojit Pal, PhD  
Mentor: Jason Becker, MD
Dr. Pal is focused on genetic and acquired cardiomyopathies in an effort to identify novel methods to prevent and treat hypertrophic cardiomyopathy and heart failure.

Publications 

Anurag Paranjape, PhD  
Mentor: Flordeliza Villaneuva, MD

Lydia Perkins, PhD  T32 Scholar  
Mentors: Carolyn J. Anderson, PhD, and Enrico M. Novelli, MD, MS
Dr. Perkins investigated VLA-4 as a PET imaging biomarker of vaso-occlusive crisis in sickle cell disease.

Publications 

Jairo Andrés Pulgarin Rocha, PhD  
Mentor: Imad Al Ghouleh, PhD
Dr. Pulgarin Rocha is studying L1 (long interspersed element-1 (L1) retrotransposons), an abundant class of DNA transposable elements, and their role in pulmonary artery hypertension (PAH).

Cody A. Rutledge, MD, PhD T32 Scholar  
Mentor: Brett A. Kaufman, PhD
Dr. Rutledge’s research focuses on the regulation of mitochondrial DNA and its role in cardiovascular disease.

Publications

Presentations and Abstracts
• Mitochondrial DNA Preservation Protects Cardiac Function Following Sudden Cardiac Arrest, AHA Basic Cardiovascular Sciences Scientific Sessions, July 2019.
• Mitochondrial DNA Preservation as a Target for Cardioprotection after Sudden Cardiac Arrest, Vascular Medicine Institute, University of Pittsburgh, Pittsburgh, PA, February 2020.

Mourad Senussi, MD T32 Scholar  
Mentors: Derek C. Angus, MD, MPH, and Christopher W. Seymour, MD, MSc
Dr. Senussi’s research focuses on epidemiology and outcomes of critically ill patients with cardiac dysfunction.

Publications

Honors and Awards
• Physician Excellence Award--New Clinician of Excellence, Loren Roth Quality and Safety Patient Award, UPMC 2020.
• Master of Science in Clinical Research, June 2020.

Wei Sun, MD, PhD T32 Scholar  
Mentors: Stephen Y. Chan, MD, PhD, and Gang Li, PhD
Dr. Sun is investigating the role of SCUBE1 in endothelial angiogenesis.

Publications

Presentations and Abstracts
• Downregulation of SCUBE1 Controls BMPR2-Dependent Pulmonary Endothelial Function: Implications for Diagnostic Marker Development in Pulmonary Arterial Hypertension, Northwestern Cardiovascular Young Investigator Forum, 2019
• SCUBE1: A Novel BMPR2-related Pathogenic Effector in Pulmonary Endothelium and Potential Clinical Marker in Pulmonary Arterial Hypertension, AHA 2019

Honors and Awards
• 1st place, Cardiovascular Medicine Update Conference Poster Award, AHN, ACC PA Chapter, 2019
• 3rd place, Award for Excellence in Basic Science (Fellows), Northwestern Cardiovascular Young Investigator Forum, 2019

Dharendra Thapa, PhD K99 Scholar
Mentor: Iain Scott, PhD
Dr. Thapa studies the role of mitochondrial acetyltransferase GCN5L1 in regulating fatty acid oxidation proteins via acetylation in diabetic cardiomyopathy and heart failure.

Publications

Sathish B. Vasamsetti, PhD
Mentor: Partha Dutta, DVM, PhD
Dr. Vasamsetti is investigating the role of adipocytokines on the loss of visceral adipose tissue resident macrophages during heart failure-induced insulin resistance.

Publications

Chen-Shan “Julia” Woodcock, PhD T32 Scholar
Mentor: Stephen Y. Chan, MD, PhD
Dr. Woodcock seeks to determine the role of adenosine-to-inosine RNA editing in PH to provide insight into a significant new aspect of post-transcriptional modifications in the pathogenesis of PH.

Publications
Jimin Yang, PhD
Mentor: Stephen Y. Chan, MD, PhD
Dr. Yang is researching the regulatory mechanism involving m6A RNA methylation in PAH.

Publications
BIBLIOGRAPHY

ONE-YEAR

Non-original research publications are in italics. Cardiology faculty are in bold.


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Xenogiannis I, Karmaliotis D, Alaswad K, Jaffer FA, Yeh RW, Patel M, Mahmud...


ACKNOWLEDGMENTS
AND PHOTO CREDITS

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Assistant Vice Chancellor for Special Projects in the Health Sciences
Executive Vice Chair for Academic Affairs, Department of Medicine
Professor of Medicine, Division of Pulmonary, Allergy and Critical Care Medicine

Nichole Radulovich, MEd, CRA
Executive Administrator

SENIOR EDITOR AND GRAPHIC DESIGN
Katie Nauman

PROJECT COORDINATOR
Kristen Bagwell

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Nemanja Tomic

GRANTS AND RESEARCH EXPENDITURES
Jim Jarvis and Ed Hughes

CARDIOLOGY CONTENT MANAGERS
Brenda Smith, Anne McGinnis, Jodi Masse, and Andy Stephany

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