Cardiovascular Division
Washington University
School of Medicine

Faculty Research Interests
2017-2018
Introduction

The Cardiovascular Division and related disciplines at the Washington University School of Medicine have a distinguished track record of research productivity in both the clinical and basic sciences. The objectives of this document are twofold:

1.) To provide an overview of current research activities of individual investigators within the Cardiovascular Division, as well as investigators in related fields of research; and

2.) To assist residents, fellows, graduate students, MSTPs and junior faculty members in identifying potential mentors with specific research interests.

The document is updated at least annually to reflect evolving research interests. Questions regarding ongoing or proposed research projects should be directed to individual investigators. General questions about the Mentorship Program should be addressed to members of the Mentorship Committee, comprising Drs. Barger, D. Brown, Kates, Mann, Davila, Peterson, and Rich.

Comments or suggestions about the utility of this document and how it could be improved should be addressed to Michael W Rich, MD, Professor of Medicine, at mrich@wustl.edu.

How to Use This Document

Residents, fellows, and others who wish to identify potential mentor(s) are encouraged to browse through the Index, which lists investigators according to their areas of interest. Names in the Table of Contents and in the Index are hyperlinked to the Investigator’s page within the document. Names on each Investigator’s page are hyperlinked to the Cardiology website (or Washington University faculty website for investigators outside the Cardiovascular Division). The website provides additional details about each investigator’s training, publications, and clinical activities. Key words at the bottom of each investigator’s page indicate terms listed in the Index.
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Nathan Stitziel, MD, PhD
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**Dana R. Abendschein, PhD**

 Associate Professor of Medicine, Cell Biology, and Physiology

**Current research interests**

- Inhibition of thrombosis during treatment of myocardial infarction in pigs with use of targeted antithrombotic agents to increase efficacy and decrease bleeding complications.

- Assessing effect of optimized antithrombotics on longer-term recovery of reperfused myocardium with use of MRI to detect residual fibrosis as an index of heart failure.

- Identification of unstable atherosclerotic plaque in rabbits with use of novel antithrombotic probes and optical imaging as well as treating the eroding plaque with targeted antithrombetics.

- Role of phospholipase A\(\gamma\) in myocardial reperfusion injury after infarction and during diabetes in mice.

**Representative Publications**


**Key words:** atherosclerosis, antithrombotics, imaging, reperfusion injury and heart failure, animal models, and calcium independent phospholipases
Amit Amin, MD

Assistant Professor of Medicine

Current Research Interests

- Improving outcomes of percutaneous coronary intervention (PCI)
- Reducing PCI complications, including bleeding and acute kidney injury
- Reducing costs of PCI and acute coronary syndromes
- Cost-effectiveness of adjunctive therapies in interventional cardiology
- Cost-effectiveness of radial access PCI

Representative Publications


Key words: cost-effectiveness analysis, interventional cardiology, outcomes research
Richard G. Bach, MD

Professor of Medicine

Current Research Interests

- Hypertrophic cardiomyopathy: physiology, treatment, and genetics
- Acute coronary syndromes
- Diabetes and CAD
- Coronary physiology and imaging

Representative Publications


Key words: coronary artery disease, diabetes, hypertrophic cardiomyopathy, imaging
Philip M. Barger, MD, MSc

Associate Professor of Medicine

Current research interests

- Molecular mechanisms of cardiac reverse remodeling and recovery
- Adult congenital heart disease

Representative Publications


Key words: reverse remodeling, congenital heart disease
Anita Bhandiwad, MD

Associate Professor of Medicine

Current Research Interests

- Cardiac magnetic resonance imaging
- Echocardiography
- Nuclear cardiology

Representative Publications


Key words: imaging, cardiac MRI, echocardiography
Joseph J. Billadello, MD

Associate Professor of Medicine

Current Research Interests

- Adult congenital heart disease

Representative Publications


Key words: congenital heart disease
Alan C. Braverman, MD

Alumni Endowed Professor in Cardiovascular Diseases, Department of Medicine

Current Research Interests

- Genetically triggered aneurysm syndromes (Marfan, Loeys-Dietz, Familial TAA disease)
- Aortic dissection
- Bicuspid aortic valve and aortopathy
- Aortic disease in pregnancy

Representative Publications

5. Braverman AC. Clinical Manifestations and Diagnosis of Bicuspid Aortic Valve. In UpToDate, Basow DS (Ed), UpToDate, Waltham, MA, September 1014.
6. Braverman AC. Treatment of Bicuspid Aortic Stenosis in Adults. In: UpToDate, Basow DS (Ed), UpToDate, Waltham, MA, August 2014.

Key Words: aorta and great vessels, aortic stenosis, valvular heart disease
Angela L. Brown, MD

Associate Professor of Medicine

Current Research Interests

- Hypertensive Heart Disease
- Resistant hypertension
- Tools/strategies for implementing community education on cardiovascular disease prevention

Representative Publications


Key words: hypertension, prevention, women and minorities
**David L. Brown, MD**

Professor of Medicine

**Current Research Interests**

- Use of Existing Public and Proprietary Databases to Answer Clinical Questions in Cardiovascular Disease
- Comparative effectiveness research of treatments for cardiovascular disease
- Health services/health policy research for cardiovascular disease
- Meta-analysis
- Machine learning and predictive analytics
- Ischemic Heart Disease including microvascular dysfunction and coronary spasm

**Representative Publications**


**Key Words:** outcomes research, comparative effectiveness research, meta-analysis, coronary artery disease, health services research, patient-centered care, ischemic heart disease, microvascular dysfunction, coronary spasm
George J. Broze, Jr., MD

Professor of Medicine and Cell Biology and Physiology

Current Research Interests

- Regulation of coagulation
- Thrombosis
- Atherosclerosis

Representative Publications


Key words: thrombosis, atherosclerosis, basic science
**Robert M. Carney, PhD**

Professor of Psychiatry

**Current Research Interests**

- The effects of psychiatric depression on the course and outcome of coronary heart Disease
- Potential mechanisms underlying the risk of depression on cardiac related morbidity and Mortality
- The effects of treating depression on course and outcome of coronary heart disease

**Representative Publications**


**Key words:** behavioral medicine, coronary artery disease, depression, sleep disorders
Murali M. Chakinala, MD

Professor of Medicine

Current Research Interests

- Therapeutics in pulmonary arterial hypertension
- Non-invasive evaluation in pulmonary hypertension

Representative Publications


Key words: pulmonary hypertension, pulmonary arterio-venous malformations, right heart failure
Sharon Cresci, MD

Associate Professor of Medicine and Genetics

Current Research Interests

- Association of genetic variation with clinical outcomes in individuals with both diabetes mellitus and coronary artery disease.
- Role of genetic variation in the variable response to pharmacologic treatment (i.e., pharmacogenomics).
- Determination of modifier genes that influence phenotypic expression in patients with hypertrophic cardiomyopathy.

Representative Publications


Key words: coronary artery disease, diabetes, echocardiography, genetics, hypertrophic cardiomyopathy, molecular cardiology, pharmacogenomics, risk factors, translational research
Phillip S. Cuculich, MD

Associate Professor of Medicine

Current Research Interests

- Noninvasive cardiac mapping and stereotactic radioablation
- Surgical/ablation techniques for atrial fibrillation and ventricular tachycardia
- Noninvasive electrophysiologic imaging of uterine contractions to study preterm birth

Representative Publications


2. Zhang J, Desouza KA, Cuculich PS, Cooper DH, Chen J, Rudy Y. Continuous ECGI mapping of spontaneous VT initiation, continuation, and termination with antitachycardia pacing. Heart Rhythm. 2012 Jan 2. PMID: 22222277; PubMed Central PMCID: PMC3376666.


Key words: arrhythmias, atrial fibrillation, ventricular tachycardia, multimodality cardiac imaging, electrophysiology, translational research
Victor G. Davila-Roman, MD

Professor of Medicine, Anesthesiology, and Radiology

Current Research Interests

- Cardiovascular imaging: echocardiography, vascular ultrasound, nuclear cardiology, cardiac CT
- Cardiac metabolism, Hypertensive heart disease, Diastolic function
- Cardiovascular genetic epidemiology

Representative Publications


Key words: cardiac imaging, cardiac metabolism, hypertension, genetic epidemiology, translational research, diastolic function, echocardiography
Lisa de las Fuentes, MD

Associate Professor of Medicine and Biostatistics

Current Research Interests

- Genetic epidemiology of cardiovascular disease and drug response
- Hypertensive heart disease
- Metabolic and inflammatory cardiovascular risk factors

Representative Publications


Key words: hypertension, risk factors, genetic epidemiology, diastolic function, echocardiography
Abhinav Diwan, MD, MBBS

Associate Professor of Medicine, Cell Biology and Physiology

Current Research Interests

- Role of lysosomes in organelle quality control and cell survival under starvation stress
- Regulation of lysosome function in cardiac macrophages in heart failure
- Regulation of lysosomal machinery in Alzheimer’s disease and amyloid heart disease
- Role of autophagy in hypertrophic cardiomyopathy (Danon disease)

Representative Publications


Key words: autophagy, lysosome, amyloid, ischemia-reperfusion, heart failure, cell death
Gerald W. Dorn, II, MD

Philip and Sima K. Needleman Professor of Medicine

Current Research Interests

- Biology of mitochondria in the heart; metabolic remodeling
- Molecular and biochemical signaling for cardiac hypertrophy and heart failure
- Genetic diseases affecting mitochondrial dynamism and mitophagy

Representative Publications


Key words: mitophagy, heart failure, molecular cardiology
Gregory A. Ewald, MD

Professor of Medicine

Current Research Interests
- Mechanical circulatory support in advanced heart failure
- Medical therapy in patients with heart failure
- Device therapy in patient with heart failure
- Remote monitoring in management of heart failure
- Cardiac transplantation/donor evaluation and management
- Depression in heart failure

Representative Publications

Key words: heart failure, heart transplantation
Mitchell N. Faddis, MD, PhD

Professor of Medicine

Current Research Interests

- Catheter ablation techniques
- Treatment of atrial fibrillation
- Cardiac resynchronization therapy for advanced heart failure

Representative Publications

8. Marrus SB, Andrews CM, Cooper DH, Faddis MN, Rudy Y. Repolarization changes underlying long-term cardiac memory due to right ventricular pacing: noninvasive mapping with electrocardiographic imaging. Circ Arrhythm Electrophysiol 2012 August 1; 5(4):773-81

Key words: arrhythmias, atrial fibrillation, electrophysiology, heart failure, implantable devices
Kenneth E. Freedland, PhD, FAHA

Professor of Psychiatry

Current Research Interests

- Depression, anxiety, stress, and physical inactivity in patients with coronary heart disease or heart failure
- Roles of depression and inadequate self-care in heart failure rehospitalizations
- Interventions for depression and inadequate self-care in heart failure
- Clinical trials in behavioral medicine and behavior trial methodology
- Sleep apnea and other sleep problems in depressed cardiac patients

Representative Publications


Key words: behavioral medicine, coronary artery disease, depression, depressive disorders, heart failure, sleep disorders, heart failure self-care
Brian F. Gage, MD, MSc

Professor of Medicine

Current Research Interests

- Anticoagulants
- Atrial fibrillation
- Pharmacogenomics

Representative Publications


Key words: aging, atrial fibrillation, epidemiology, pharmacogenomics
Edward M. Geltman, MD

Professor of Medicine

Current Research Interests

- New pharmacologic agents for the management of systolic and diastolic heart failure
- Importance of biomarkers for predicting events for CHF

Representative Publications


Key words: diastolic function, heart failure, implantable devices
Marye J. Gleva, MD

Professor of Medicine

Current Research Interests

- Complications associated with cardiac implantable electronic devices
- Cardiac implantable electronic devices in congenital heart disease and left ventricular non-compaction cardiomyopathy
- Outcomes after atrial fibrillation ablation
- Increasing the participation of women in cardiovascular device trials

Representative Publications


http://www.jafib.com/published.php?type=full&id=1540&is=current_issue&f=full

Key words: atrial fibrillation, electrophysiology, implantable devices
John Gorcsan III, MD

Professor of Medicine

Current research interests:

- Quantifying cardiac mechanics with advanced echocardiographic technology
- Assessing effects of device therapy in heart failure patients
- Refining patient selection for cardiac resynchronization therapy
- Determining prognosis by right ventricular structure and function in patients with pulmonary hypertension

Representative Publications:


Key Words: echocardiography, heart failure, imaging, right heart failure
Jeffrey I. Gordon, MD
Dr. Robert J. Glaser Distinguished University Professor of Pathology and Immunology

Current Research Interests

• Genomic and metabolic foundations of the mutually beneficial relationship between gut microbes and humans

• Effects of diet, lifestyle, and biosphere on the human gut microbiome and the impact of these effects on human health and predisposition to disease

• Interventions designed to alter the gut microbial community to maximize health and reduce disease

Representative Publications


Key words: human microbiome; ecology; systems biology; metabolism; obesity; childhood undernutrition; immunology; global health; prebiotics/probiotics/synbiotics; anthropology of microbes
Robert J. Gropler, MD

Professor of Radiology, Medicine, and Biomedical Engineering

Current Research Interests

- Imaging of myocardial metabolic remodeling using PET, magnetic resonance spectroscopy, and other modalities
- Development of new cardiovascular molecular imaging agents

Representative Publications


Key words: molecular imaging, cardiac metabolism
Richard Gross, MD, PhD

Professor of Medicine, Chemistry, and Developmental Biology

Current Research Interests

- Metabolomics
- Diabetic Cardiomyopathy
- Heart Failure
- Phospholipases
- Signaling

Representative Publications


Key words: basic science, cardiac metabolism, diabetes, heart failure, lipid metabolism, molecular cardiology
Xuntian Jiang, PhD

Assistant Professor of Medicine

**Current Research Interests**

- Development and application of LC-MS/MS methods for metabolomics in biomarker screening and validation
- Development and application of LC-MS/MS methods for clinical diagnosis and clinical trial.
- Identification of unknown molecules from biological extracts by LC-MS/MS and interpretation of mass spectra
- Synthesis of heavy isotope-labeled small organic molecules as internal standards in quantification of target analytes

**Representative Publications**


**Key words:** biomarkers, diagnostics, lipid metabolism
Karen Joynt Maddox, MD

Assistant Professor of Medicine, Washington University School of Medicine
Assistant Professor, Washington University Brown School of Social Work

Current Research Interests

- Improving the measurement of the quality and efficiency of physicians, hospitals and health systems
- Understanding the impact of policy interventions on health care, with a focus on value-based and alternative payment models
- Reducing disparities in care, with a focus on vulnerable populations including racial and ethnic minorities, individuals living in poverty, individuals with disabilities, frail elders, and those in rural areas

Representative Publications


Key words: health policy, health services research, outcomes research, quality of care, hospital readmissions, women and minorities, disparities
**Attila Kovacs, MD**

Associate Professor of Medicine

**Current Research Interests**

- cardiovascular phenotyping in mice
- ultrasonic tissue characterization

**Representative Publications**


**Key words:** basic science, imaging, molecular cardiology, vascular biology
Sándor Kovács, Jr., MD, PhD

Professor of Medicine, Cell Biology and Physiology

Adjunct Professor of Physics and Biomedical Engineering

Current Research Interests

- Mathematical models of cardiac physiology and function/complexity theory
- Theoretical and applied cardiac physiology/pathophysiology
- Multimodal cardiac imaging: echo/magnetic resonance/catheterization/angiography

Representative Publications

5. Chung C, Shmuylovich L, Kovács SJ. "What global diastolic function is, what it is not, and how to measure it." Am J Physiol-Heart and Circ Physiol 2015; Invited Review Article, DOI:10.1152/ajpheart. 00436.

Key words: cardiac physiology, complexity theory, diastolic function, imaging, mathematical modeling
Ronald J. Krone, MD

Professor of Medicine

Current Research Interests

- Cardio-oncology (cardiac toxicity from cancer)
- Cardiac protection during doxorubicin therapy
- Cardiac imaging in cancer patients

Representative Publications

1. Krone RJ, Shaw RE, Klein LW, Blankenship JC, Weintraub WS on behalf of the American College of Cardiology - National Cardiovascular Data Registry. Ad Hoc Percutaneous Coronary Interventions (PCIs) in Patients with Stable Coronary Artery Disease – a study of prevalence, safety and variation in use from the American College of Cardiology National Cardiovascular Data Registry (ACC-NCDR). Cathet Cardiovasc Intervent 2006; 68:696-703.

Key words: cardio-oncology, coronary artery disease, cardiomyopathy
Gregory M. Lanza, MD, PhD

Oliver M. Langenberg Distinguished Professor of the Science and Practice of Medicine

Current Research Interests

- Nanomedicine
- Targeted Drug Delivery
- Molecular Imaging
- Magnetic Resonance Imaging
- Echocardiography
- Spectral CT
- Photoacoustic Tomography

Representative Publications


Key words: basic science, imaging, molecular cardiology, nanomedicine
John M. Lasala, MD, PhD

Professor of Medicine

Current Research Interests

- Interventional cardiology with complex coronary interventions
- Drug-eluting stents
- Percutaneous aortic valve replacement and mitral valve repair
- Structural heart/congenital heart defects

Representative Publications


Key words: coronary artery disease, interventional cardiology, valvular heart disease
Kory J. Lavine, MD, PhD

Assistant Professor in Medicine

Current Research Interests

- Immune mechanisms governing cardiac recovery and heart failure pathogenesis
- Precision Therapies for Dilated Cardiomyopathy
- Pathogenesis of primary graft dysfunction
- Role of macrophages in coronary development, collateral growth, and regeneration

Representative Publications


Key words: heart failure, macrophage, transplant vasculopathy, coronary development, collateral circulation, cardiac recovery
Steven J. Lavine, MD

Professor of Medicine

Current Research Interests

• Diastolic function in heart failure
• Noninvasive determinants of survival in aortic regurgitation
• Shape of the LV outflow tract and its relation to ventricular geometry
• Determinants of survival and readmission in community hospital based cohorts with heart failure

Representative Publications


Key words: aortic regurgitation, diastolic function, heart failure
Daniel J. Lenihan, MD

Professor of Medicine

Current Research Interests

- Biomarkers of disease process in Heart Failure, Amyloidosis, and Cardiotoxicity of Chemotherapy
- Optimal monitoring and treatment of cardiac disease in patients with cancer
- Best Practice for cardiac safety during cancer therapy
- Early phase clinical trials in Cardioprotection, Heart Failure, and Amyloidosis
- Fellowship training requirements for Cardio-Oncology

Representative Publications


Key words: cardio-oncology, biomarkers, amyloidosis, heart failure, practice improvement
Kathryn Lindley, MD
Assistant Professor of Medicine

Current Research Interests

- Women's Heart Disease
- Heart Disease in Pregnancy
- Peripartum cardiomyopathy
- Contraception in women with heart disease
- Cardiovascular sequelae of pre-eclampsia

Representative Publications


Key words: women and minorities, pregnancy, cardiomyopathy
Thomas M. Maddox, MD, MSc

Professor of Medicine
Director, Health Systems Innovation Lab, Washington University School of Medicine/BJC Healthcare

Current Research Interests

- Healthcare delivery innovation
- Cardiac and general health services research
- Cardiac and general quality of care and outcomes research

Representative Publications:


Key words: healthcare innovation, health services research, quality of care, outcomes research
Majesh Makan, MD

Professor of Medicine

Current Research Interests:

- 3-dimensional echo and transesophageal echo
- Echocardiographic assessment of right ventricular function
- 2-dimensional speckle Doppler and strain rate imaging
- Quantification of mitral regurgitation severity

Representative Publications:


Key Words: echocardiography, imaging, valvular heart disease
Douglas L. Mann, MD
Professor of Medicine, Cell Biology and Physiology
Lewin Chair and Chief, Cardiovascular Division

Current Research Interests

- Cardiac inflammation and innate immunity
- LV remodeling and reverse LV remodeling
- Heart failure, clinical trials, and circulatory assist devices
- Translational research (T1 or T2)

Representative Publications


Key words: basic science, heart failure, translational research
James G. Miller, PhD

Albert Gordon Hill Professor of Physics, Medicine, and Biomedical Engineering

Current Research Interests

• Echocardiography

• Myocardial tissue characterization with ultrasound

• Basic Science

Representative Publications


Key words: echocardiography, imaging
Jeanne M. Nerbonne, Ph.D.
Faculty of Medicine, Alumni Endowed Professor of Molecular Biology and Pharmacology in Developmental Biology and Medicine
Director, Center for Cardiovascular Research

Current Research Interests
- Molecular determinants of voltage-gated ion channel diversity, expression, distribution and functioning in cardiac and neuronal cells
- Inherited and acquired membrane excitability disorders in the cardiovascular and nervous systems
- Ion channels is the regulation of circadian rhythms
- Molecular mechanisms contributing to electrical remodeling in physiological and pathological cardiac hypertrophy

Representative Publications

Key words: Ion channels, electrophysiology, molecular genetics, proteomics, arrhythmias, hypertrophy, remodeling
Colin G. Nichols, PhD
Carl Cori Professor of Cell Biology and Physiology
Director of the Center for the Investigation of Membrane Excitability Diseases

Current Research Interests

- Ion channels and cardiac arrhythmias
- Ion channels and cardiovascular disease
- Ion channels and blood pressure control

Representative Publications


Key words: arrhythmias, basic science, cardiac development, electrophysiology, hypertension, ion channels
Amit Noheria, MBBS, SM

Assistant Professor of Medicine

Current Research Interests

- Catheter-based treatments of cardiac arrhythmias
- Arrhythmias in congenital heart disease
- Cardiac resynchronization therapy
- Non-invasive electrophysiologic mapping

Representative Publications


Key words: arrhythmias, atrial fibrillation, ventricular tachycardia, ventricular fibrillation, cardiac resynchronization therapy, cardioembolic stroke, adult congenital heart disease
Daniel S. Ory, M.D.
Alan A. and Edith L. Wolff Professor of Medicine, Cell Biology and Physiology

Current Research Interests

- Cholesterol biology
- Atherosclerosis and diabetes
- Niemann-Pick C disease
- Small RNA regulation of metabolism

Representative Publications


Key words: atherosclerosis, cholesterol, diabetes, lipid metabolism, RNA
Julio E. Pérez, MD

Professor of Medicine

Current Research Interests

- Echocardiographic assessment of ventricular function
- Applications of contrast echocardiography and myocardial perfusion imaging
- Applications of myocardial strain measurements

Representative Publications


Key words: echocardiography, imaging
Linda R. Peterson, MD

Professor of Medicine and Radiology

Current Research Interests

- Nutritional treatments for myocardial and skeletal muscle
- Lipidomics
- Effects of obesity and diabetes on cardiac metabolism, structure, and function
- Insulin resistance

Representative Publications


Key words: cardiac metabolism, inorganic nitrate, lipidomics, diabetes, obesity, skeletal and cardiac muscle performance, heart failure
Nishath Quader, MD
Assistant Professor of Medicine

Current Research Interests

- Valvular heart disease: Aortic valve, Mitral valve, Tricuspid valve
- Structural heart disease
- 3D echocardiography
- Echocardiographic assessment of left and right ventricular function and strain analysis

Representative Publications


Key words: Valvular and structural heart disease, 3D echocardiography
Babak Razani, MD, PhD

Assistant Professor of Medicine and Pathology/Immunology

Current Research Interests

- Mechanisms of atherosclerosis and risk factors for cardiovascular disease (particularly obesity and insulin resistance) - emphasis on the role of macrophages
- Focus on emerging cellular pathways critical for cardiometabolic disease and atherosclerotic progression
  - dysfunction in autophagy
  - lysosomal dysfunction
  - activation of inflammasomes
  - inclusion body formation
- Disorders of cardiac metabolism in heart failure (with emphasis on De novo Lipogenesis)
- Novel therapeutics in cardiovascular disease (emphasis on nanoparticles)

Representative Publications


Key words: atherosclerosis, cardiac metabolism, insulin resistance, macrophage, autophagy, lysosomes, basic science, translational research, lipid metabolism, obesity, vascular biology
Katherine M. Reeder, PhD, RN

Adjunct Assistant Professor of Medicine (voluntary),
Research Associate Professor at Goldfarb School of Nursing, Barnes-Jewish College

Current Research Interests

- Self-management of Chronic Cardiovascular Disease
- Symptom Management in Chronic Heart Failure
- Transitory Care for Re-hospitalization Prevention
- Post-hospital Discharge Environment
- Social Networks in Symptom Management & Decision-making
- Treatment-seeking Behavior

Representative Publications


Key words: heart failure, self-management, health care seeking behavior, hospital readmission, community-based Interventions
Stacey L. Rentschler, MD, PhD

Assistant Professor of Medicine, Developmental Biology, and Biomedical Engineering

Current Research Interests

- Transcriptional and epigenetic basis of arrhythmias
- Development of the cardiac conduction system
- Reprogramming cardiomyocytes to pacemaker-like cells
- Notch and Wnt signaling
- Human organotypic slice culture as a translational platform

Representative publications


Key words: basic science, cardiac development, molecular cardiology, electrophysiology, arrhythmias, conduction system, reprogramming, epigenetics, translational research
Michael W. Rich, MD
Professor of Medicine

Current Research Interests

- Cardiovascular disease in the elderly, esp. heart failure, atrial fibrillation, coronary artery disease, valvular heart disease, hypertension, epidemiology, and prevention
- Cardiovascular aging, including interventions designed to slow the aging process
- Heart failure disease management

Representative Publications


Key words: aging, atrial fibrillation, epidemiology, heart failure, prevention
Yoram Rudy, PhD

Fred Saigh Distinguished Professor of Engineering; Professor of Biomedical Engineering, Medicine, Cell Biology & Physiology, Radiology, and Pediatrics
Director, Cardiac Bioelectricity and Arrhythmia Center (CBAC)

Current Research Interests

- Mechanisms of cardiac arrhythmias
- Noninvasive imaging (ECGI) of cardiac arrhythmias in patients

Representative Publications


Key words: basic science, electrocardiography, electrophysiology
Jean E. Schaffer, MD

Virginia Minnich Distinguished Professor of Medicine

Current Research Interests

• Role of small non-coding RNAs in metabolic (lipotoxic and oxidative) stress
• Pathophysiological responses of the heart to the diabetic environment
• Metabolomic biomarkers for heart disease
• Lipids as a therapeutic target for cardiovascular disease in diabetics

Representative Publications


Key words: basic science, cardiac metabolism, diabetes, heart failure, lipid metabolism, RNA
Joel D. Schilling, MD, PhD

Assistant Professor of Medicine

Current Research Interests

- Macrophage biology in post-MI remodeling and heart failure
- Macrophage dysfunction in diabetes and obesity
- The interplay between macrophage metabolism and effector function
- Diabetic cardiovascular disease

Representative Publications


Key words: basic science, cardiac metabolism, macrophage, diabetes, heart failure
Clay F. Semenkovich, MD

Professor of Medicine, Cell Biology and Physiology

Current Research Interests

- Lipid metabolism
- Atherosclerosis
- Diabetes

Representative Publications


Key words: atherosclerosis, basic science, diabetes, lipid metabolism
Jasvindar Singh, MD

Associate Professor of Medicine

Current Research Interests

- Interventional cardiology, especially complex interventions
- Outcomes from intervention procedures
- Stent design
- Coronary Physiology
- FFR/IVUS

Representative Publications


Key words: coronary artery disease, interventional cardiology
Timothy W. Smith, MD, DPhil

Associate Professor of Medicine

Current Research Interests

- Techniques of ICD/pacemaker implantation
- New approaches to therapy (especially ablation) of ventricular tachycardia
- Prevention of sudden death and ICD utilization
- Electrocardiography and ECG education
- Cardiac Resynchronization

Representative Publications


Key words: arrhythmias, electrocardiography, electrophysiology
Phyllis K. Stein, PhD
Associate Professor of Medicine

Current Research Interests

- Heart rate variability (HRV) and outcomes in different populations and in association with genetic disorders in humans and animals
- Application of novel non-linear HRV methods (e.g., multiscale entropy) to detect patterns of neurocardiac integration not detectable using standard HRV measures
- Detection of sleep-disordered breathing, circadian rhythm disorders, and sinoatrial node dysfunction from ambulatory ECG recordings
- Clinical applications of HRV from bedside monitoring in the NICU and PICU

Representative Publications


Key words: aging, ambulatory ECG, autonomic function assessment, cardio-oncology, cardiovascular epidemiology, circadian rhythms, dementia, depression, depression and trauma, diabetes, epidemiology, heart failure, heart rate variability, hypertension, risk factors, sleep disorders, women and minorities
**Nathan Stitziel, MD, PhD**

Assistant Professor of Medicine and Genetics

**Current Research Interests**

- Genetics of Mendelian cardiovascular disease
- Genetics of complex cardiovascular disease
- Clinical application of genetics

**Representative Publications**


**Key words:** atherosclerosis, basic science, genetics, translational research
Carla J. Weinheimer, MS

Associate Professor of Medicine

Current Research Interests

- Mouse cardiovascular phenotyping through surgery, hemodynamic evaluations, imaging, and histology
- Models of ischemic disease and heart failure in mice

Representative Publications


Key words: cardiovascular phenotyping, novel surgical models, heart failure, ischemia, imaging, molecular cardiology
**Pamela K. Woodard, MD**

Professor of Radiology and Biomedical Engineering

**Current Research Interests**

- Molecular Imaging of atherosclerosis
- Cardiac MRI
- Cardiac CT – coronary CT angiography

**Representative Publications**


**Key words:** atherosclerosis, cardiac MRI, cardiac CT, molecular imaging
Alan Zajarias, MD

Associate Professor of Medicine
Associate Professor in Surgery (Cardiothoracic)

Current Research Interests

- Transcatheter aortic valve implantation (TAVI)
- Use of CT for procedural planning of TAVI
- Echocardiographic assessment of RV function in patients with pulmonary hypertension undergoing TAVI for aortic stenosis
- Racial differences in aortic stenosis
- Mitral regurgitation and outcomes in patients with cardiomyopathy
- Patient selection and procedural outcomes in patients undergoing TAVI

Representative Publications


Key words: aortic stenosis, interventional cardiology, valvular heart disease