

# Emory+Children's Pediatric Research Center

A newsletter from the Children's Heart Research and Outcomes Center (HeRO)



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September 2015

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## Center Update: Mike Davis, PhD

Another 6 months have passed and the Children's Heart Research and Outcomes Center continues to grow. We have added one of the nation's top outcomes researchers in Dr. Lazaros Kochilas, and continue to recruit collaborators from within. Several high profile papers have been published from within the center, and grants continue to be funded on exciting, innovative projects. Two of our researchers were named as Healthcare Heroes by the Atlanta Business Chronicle.

Philanthropy also continues to be a strong point with several donors funding projects that directly impact patients' lives. While we are thankful for all our donors, we especially want to thank Brian and Jade Betkowski for establishing the Betkowski Family Pediatric Cardiology Research Fund. Only through the support of others are we able to bring new treatments for children with heart disease. The next 6 months will see more growth as we are currently recruiting new faculty and building on the gains made in last year.



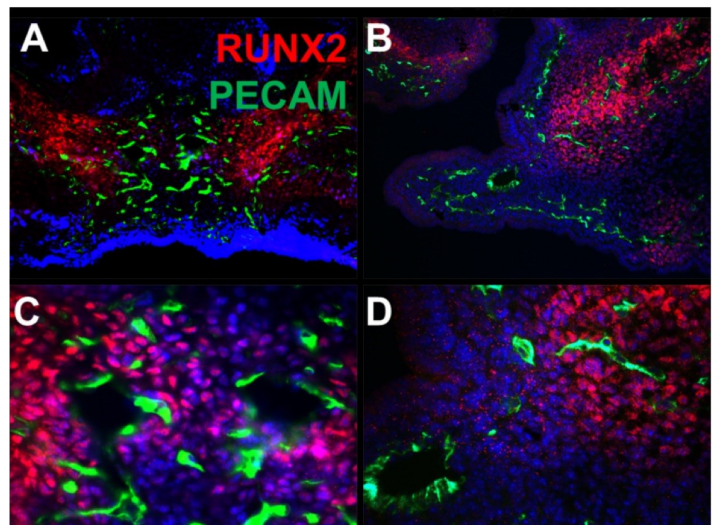
## Welcome New Faculty: Steven Goudy, MD

Associate Professor Otolaryngology—Head and Neck Surgery  
Director, Division of Pediatric Otolaryngology

Dr. Steven Goudy joined Emory University/CHOA after spending 10 years at Vanderbilt University. The Kentucky native settled in Nashville, TN after completing a fellowship in pediatric otolaryngology at the University of Iowa. During his fellowship, he spent time researching the basic biologic mechanisms necessary for normal palate development. Dr. Goudy spends time clinically caring for patients with a wide variety of head and neck disorders, including cleft palate.

Currently his lab is exploring the role and requirement of Jagged1, a member of the Notch gene family, and its role during maxillary bone formation. Many of the patients that Dr. Goudy treats surgically to correct cleft palate formation will end up requiring secondary surgery in the future due to deficient bone growth. Using in vitro assays, his teams is probing the molecular mechanisms controlling mesenchymal stem cell commitment to form bone.

Additionally, the lab is exploring the contribution that the adjacent vascular system plays on bone development, and how the developing bone informs vascular development.





## Life After Congenital Heart Disease Repair

### Welcome New Faculty: Lazaros Kochilas, MD, MSCR Pediatric Cardiologist and Associate Professor

Being born with heart disease presents significant challenges for both babies and their families. And those challenges can last a lifetime. Because of recent surgical advances and other treatments, most kids who have congenital heart diseases live to adulthood. Even so, questions about the durability of surgical fixes and these children's quality of life remain because, for some, other health issues can stem from the disease. Lazaros Kochilas, M.D., a pediatric cardiologist who recently joined the Sibley Heart Center and Children's Health Care of Atlanta from the University of Minnesota Children's Hospital, hopes to get a better picture of what the future may entail for children surviving congenital heart surgery.

Dr. Kochilas completed medical school at the University of Athens Greece followed by pediatric residency at the University of Heidelberg Germany and the University of Texas Medical Center in Houston. He was trained in Neonatal-Perinatal Medicine at Jefferson University Hospital and Pediatric Cardiology at the Children's Hospital of Philadelphia. Dr. Kochilas' initial research focused on understanding molecular mechanisms of heart development and the impact of genetic abnormalities on the outcomes of congenital heart diseases (CHD). Dr. Kochilas later joined the University of Minnesota, where he became the director of the Pediatric Cardiac Care Consortium (PCCC) a long standing registry containing more than 130,000 patients surviving surgeries or transcatheter interventions. The introduction of such surgical and other interventional techniques for congenital heart diseases (CHD) opened the way for the survival of patients beyond the boundaries imposed by the condition with which they were born. With these advancements, about 85-90% of infants with CHD are expected to reach adulthood and the number of adults with repaired or palliated CHD is now exceeding 1,000,000 in the US. These CHD survivors are expected to experience different morbidity and causes of death than the general population. Since the dramatic change in the fate of patients with CHD is a relatively recent event, data about the longer term "altered" history of patients surviving interventions for CHD remains largely unknown.

Dr. Kochilas aims to study mortality patterns and causes of death in the large cohort of patients enrolled in the Pediatric Cardiac Care Consortium (PCCC), the longest standing registry of outcomes for pediatric cardiac interventions in the world and the only one including data from cardiac, trans-catheter and electrophysiologic procedures from 48 centers in 27 U.S. states. The project leverages this unique clinical dataset and the National Death Index (NDI) which is the most accurate registry of death in the U.S. and includes causes of death as listed on the death certificate. Linking the two datasets will determine vital status, immediate and underlying cause of death in individuals with repaired or palliated CHD so that can be compared with data from the general population.

Dr. Kochilas hopes that completion of this study will provide valuable long-term data to health care providers for guiding the management of this rapidly growing population. In addition, the study may identify fatal conditions at risk for development in survivors with CHD and it may help to understand, prevent or minimize pregnancy associated-risks in women with CHD. This knowledge can be used to modify contributing risk factors, increase targeted surveillance for specific categories of patients and identify group of higher-risk patients who would benefit from additional interventions or alternative treatments strategies. More importantly, the information can also be used for comparative effectiveness analysis of different management strategies and provide families a better idea of the possible outcomes their children may face down the road about survival after reparative or palliative procedures for CHD.

## CONGRATULATIONS 2015 HERO CENTER PILOT AWARDEES

### ***Candidate Genes for Cardiomyopathy***

Guy Benian, MD, Emory University (Pathology)

Brian G. Petrich, PhD, Emory University (Pediatrics)

Birgit Funke, PhD, Harvard Medical School (Pathology)

### ***Genetic Analysis to Identify Causal Mutations and Inheritance Patterns in Histiocytoid Cardiomyopathy***

Bahig M. Shehata, MD, Emory University (Pathology)

Greg Gibson, PhD, Georgia Tech (Biology)

Caitlin Cundiff, BS, Georgia Tech (Biology)

Megan Hamling, BS, Children's Healthcare of Atlanta (Laboratory)

### ***In Vivo Imaging and Identification of Cerebral Vasculopathy in Murine Sickle Cell Disease***

Hyacinth I. Hyacinth, MD, PhD, MPH, Emory University (Pediatrics)

David R. Archer, PhD, Emory University (Pediatrics)

## CONGRATULATIONS 12015 PEDIATRIC RESEARCH CONFERENCE

### 1ST PLACE POSTER AWARD WINNER:

***Marcela K. Preininger; Rajneesh Jha; Qingling Wu; Monalisa Singh; Bo Wang; Joshua T. Maxwell; Aarti Dalal; Peter S. Fischbach; Mary B. Wagner; and Chunhui Xu***

**Induced Pluripotent Stem Cell-Derived Cardiomyocytes Recapitulate Clinically Observed Refractoriness to Therapeutic  $\beta$ -Blockade in a Patient-Specific Model of Catecholaminergic Polymorphic Ventricular Tachycardia (CPVT)**





**Dr. Mike Davis, winner in the Rising Star category,** is conducting research to help children who suffer from congenital heart defects. As director of the [Children's Healthcare of Atlanta and Emory University Heart Research and Outcomes Center \(HeRO\)](#), Davis has been a catalyst for pediatric heart research in Atlanta. His work centers on cardiac injury and efforts to repair these injuries through the use of cardiac stem cells and targeted delivery of molecules to injured heart tissues using nanoparticles. Improvements in pediatric heart surgery mean many more infants can survive, but they often develop additional problems. Davis is doing research aimed at extracting "reserve" cells when a patient is a baby then re-injecting these cells later to overcome injuries in heart tissue.

**Drs. William Mahle and Thomas Burns, winners in the Health Care Innovation category,** have taken a multidisciplinary approach to determine the effects of congenital heart disease on a child's brain. Their research collaboration among Children's Healthcare of Atlanta, Emory, Georgia Tech and Georgia State University, was the first to show evidence of congenital heart disease on the brains of teenagers. Their work confirmed a link between microstructural white matter disruptions and cognition. More children with congenital heart disease are surviving into adulthood, and physicians believe if they can intervene early they can correct some deficiencies in memory and organization skills.

## PEDIATRIC BIOENGINEERING RESEARCH SUMMER EPXERINCE

For the second year, ten undergraduate students from across the country participated in the Nation's only pediatric bioengineering program. The program is made possible due to the collaborative efforts of Emory and Georgia Tech's Biomedical Engineering Department, the Department of Pediatrics within Emory University's School of Medicine, Emory College's Summer Undergraduate Research Program (SURE), and Children's Healthcare of Atlanta. Students had the opportunity to not only work in a lab doing Pediatric Engineering research, but also shadow clinicians to better understand pediatric medicine.

This is one of the only training programs in the country focused solely on pediatric bioengineering. Nearly \$500,000 in funding over five years will allow 10 talented undergraduate students each year to participate.

In addition, this year six Druid Hills High School students participated by shadowing the PERSE undergraduates within the laboratory setting. We would like to thank the Rhame Family Foundation, the Woodruff Health Science Center, and Emory's DOP for their financial support.

Feedback from the 2015 cohort, included below, documents the programs continued success. We look forward to continuing to establish the nation's premier program in pediatric bioengineering.

### *What did you learn about yourself during your summer research experience with PERSE?*

- I learned that if I stay focused and alert I can perform research to the best of my ability. I also learned that I am very interested in the field of cardiology through this program.
- My summer experience with PERSE helped me more definitively choose a goal in terms of both post undergraduate education and working as a practicing physician.
- This experience has encouraged me to pursue a MD/PhD degree , as well as to always remember the importance of research in medicine. In terms of my career, I aspire to work as both a pediatric doctor and a pediatric researcher

PERSE students college and majors

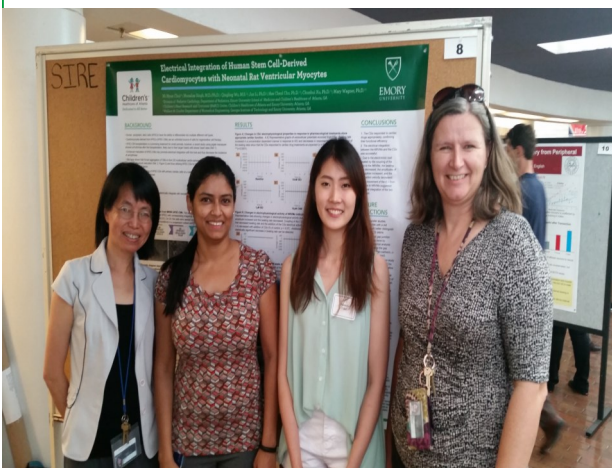
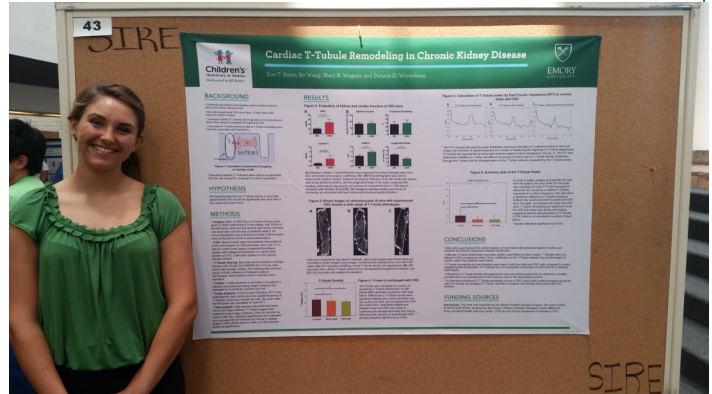
College	MAJOR
BROWN UNIVERSITY	Biology
UNIVERSITY OF SOUTHERN CA	Economics
DRURY UNIVERSITY	Biology and Chemistry
GEORGIA INSTITUTE OF TECHNOLOGY	Biochemistry
JOHNS HOPKINS UNIVERSITY	Biomedical Engineering
EMORY UNIVERSITY	Neuroscience and Behavioral Biology
GEORGIA INSTITUTE OF TECHNOLOGY	Biomedical Engineering
GEORGIA INSTITUTE OF TECHNOLOGY	Biomedical Engineering
DILLARD UNIVERSITY	Biology
NORTH CAROLINA AGRIC & TECH UNIV	Bioengineering

# PEDIATRIC BIOENGINEERING RESEARCH SUMMER EXPERIENCE (PERSE) CONTINUED

*If you were to describe the PERSE program to a student considering applying, what would you tell them?*

- The program is a very dynamic internship with a plethora of translational research topics to choose from. The experience is one that you will remember as you get older and progress in your career.
- PERSE is an ideal summer fellowship that allows you to work full time in cutting edge pediatric research while simultaneously observing the importance of medical research in a clinical setting
- It's a great way to understand what an MD/PhD would be like. It gives students access to new and exciting topics within pediatrics.
- I really enjoyed every aspect of the program. I think it's a great way to experience both the research and the clinical side of medicine. I truly gained a lot of knowledge from my involvement in PERSE and will look back fondly on this summer experience.

PERSE and Druid Hills students present their poster at the SURE Program Research Symposium



**Thank you to our 2015 PERSE Mentors:**

Drs. Erin Buckley, Hee Cheol Cho, Mike Davis, Greg Gibson, Bob Guldberg, Tony Kim, Wilbur Lam, Nael McCarty, Manu Platt, Paul Spearman, Mary Wagner, Chunhui Xu