



THE OHIO STATE UNIVERSITY

WEXNER MEDICAL CENTER

Dorothy M. Davis Heart and Lung Research Institute

Quarterly Newsletter

Spring 2024



Dennis diDinato, friend of the DHLRI, holding a game ball at the OSU vs Purdue basketball game to celebrate Heart Month.

A Message from the Director -



Welcome to the DHLRI Spring 2024 Update! As I hope you'll appreciate on the following pages, DHLRI members have already racked up an impressive record of achievement in calendar year 2024 with new papers, grants and honors. One area, in particular, where I see opportunity for our impact to grow over the months and years to come is in the field of artificial intelligence (AI), machine learning (ML), and data science. As we are all aware, there has been an exponential growth of interest in AI across virtually all aspects of society. A search for the term "artificial intelligence medicine" on PubMed yields fewer than 300 papers in 2017 compared to more than 10,000 in 2023. In line with this trend, OSU Advancement hosted a "lunch and learn" for the community in February on the topic of "Artificial intelligence in Medicine." DHLRI was well represented by **Rebecca Vanderpool, PhD** (Cardiovascular Medicine, CVM) who shared how her team is using AI to improve assessment of pathophysiology of right ventricular function in human patients. Her group, just months prior, published a beautiful paper in the *Journal of Heart and Lung Transplantation* that applied machine learning on data from a large pulmonary hypertension patient registry. Interestingly, this approach was able to identify disease subgroups within the population that would likely go unnoticed with conventional diagnostic procedures. The hope is that a diagnostic pipeline that includes AI/ML could facilitate risk stratification of patients and improve matching a patient to the right therapy. As we consider existing strengths at OSU in clinical service

and data analytics (including 2 large NSF-supported AI institutes), we have every reason to be optimistic about the potential for OSU to emerge as a leader in Cardiopulmonary AI in the years to come. That said, to advance in this space will require concerted effort to address real and perceived barriers to accessing and analyzing large amounts of clinical data, as well as validating and ultimately deploying the resulting analytical tools. A large medical center such as ours is a virtual treasure trove of clinical data that can be used to inform AI-based models. In fact, OSU already has workflows in place to mine de-identified data via the Information Warehouse, which is like a "digital twin" of the OSU electronic medical record with all personally identifiable information removed. More information on accessing clinical data for research may be found at: <https://ccts.osu.edu/content/clinical-data-access-research>. The challenge, then, is to make it easier for researchers to access the specific data they need in a compliant manner, and not just chartfield entries that can be easily pulled from a patient record but also more complex data like images and time-dependent waveforms. In a similar vein, processes are needed to systematically curate specialized datasets to ensure data quality, which requires among other resources the time of expert clinicians. Finally, we need to bolster support for the interdisciplinary teams of clinicians, data scientists, IT experts and engineers required to make sense of the data. These are just a few of the pressing challenges that will need attention for us to make inroads. I'm excited for DHLRI to help pave the way for OSU to attain excellence in Cardiopulmonary AI. With that, it's time to celebrate our faculty, staff, and trainees!

Sincerely,

Thomas J. Hund, PhD
 Professor, Departments of Internal Medicine and Biomedical Engineering
 Director and William D. and Jacquelyn L. Wells Chair,
 Dorothy M. Davis Heart and Lung Research Institute



Kudos -

We salute all of our faculty and trainees who submitted or received a new grant over the last quarter!

Huge congratulations to **Ana Mora, MD** [(Pulmonary, Critical Care and Sleep Medicine (PCCS))] and **Rama Mallampalli, MD** (PCCS) for their new NIH T32 grant to create a training program for MD and PhD postdoctoral fellows in the field of aging and lung disease!

Matthew Gorr, PhD (Cardiac Surgery) was awarded a new NIH R01 grant for his project studying the biology of pulmonary hypertension along with co-investigator **Richard Gumina, MD, PhD** [Cardiovascular Medicine (CVM)].

Daniel Addison, MD (CVM) and team were awarded a cardio oncology-related NIH R01 entitled: "Therapeutic strategies to mitigate toxicities of anthracycline-based therapeutics." Impressively, this is Dr. Addison's second new R01 in a 6-month period!

Joshua Joseph, MD (Endocrinology), along with other College of Medicine researchers received an AHA "Food is Medicine" grant to promote change and nutrition security for Medicaid-enrolled individuals with Cardiovascular-Kidney-Metabolic Syndrome.



Orlando Simonetti, PhD & Yixuan Liu



Hsiang-Ling Huang (Chinthalapudi Lab), Qinmao Ye (Yutong Zhao Lab) and **Yixuan Liu** (Simonetti Lab) were awarded AHA pre-doctoral fellowships.

Juan Mariangelo, PhD (Gyorke Lab) was awarded an AHA post-doctoral fellowship for his project, "Role of SOCE in the regulation of local protein synthesis in hypertrophy."

We also want to celebrate the many articles published so far in 2024 from our members - over 160 papers from January through end of March! We don't have enough space here to list them all, but want to call special attention to a few. Check out our website for featured publications from the last quarter and share with us any we might have missed!

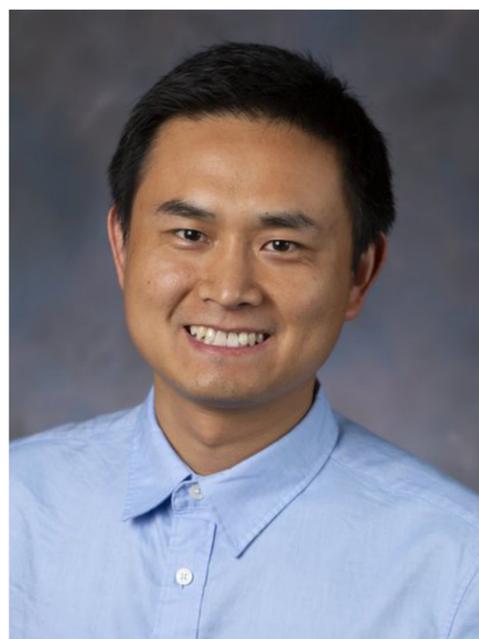
Rengasayee Veeraraghavan, PhD (BME) and team were featured by the Journal of the American College of Cardiology Electrophysiology for their paper on the chamber-specific effects of pathological intercalated disc remodeling, as occurs in many arrhythmic diseases.

Laszlo Farkas, MD (PCCS), Yohannes Mebratu, PhD (PCCS), and Prez Radwanski, PharmD, PhD (Pharmacy) all had papers published in the Journal of Clinical Investigation.

Kristin Stanford, PhD (Surgery) made the OSUMC and general news with her paper in Molecular Metabolism, "Maternal exercise preserves offspring cardiovascular health via oxidative regulation of the ryanodine receptor."



Kristin Stanford, PhD



Mingtao Zhao, DVM, PhD

Laxmi Mehta, MD (CVM) was lead author on the American Heart Scientific Statement "Opportunities in the postpartum period to reduce cardiovascular disease risk after adverse pregnancy outcomes" in the journal Circulation.

Mingtao Zhao, PhD (Nationwide Children's Hospital) appeared in Circulation as well with "Abnormal Progenitor Cell Differentiation and Cardiomyocyte Proliferation in Hypoplastic Right Heart Syndrome."



Finally, kudos to our members who were acknowledged with awards, invited talks, and other honors.

A special highlight spotlight on **Loren Wold, PhD** (Cardiac Surgery), **Tamur Gur, MD, PhD** (Psychiatry), and **Joshua Joseph, MD** (Endocrinology) at the College of Medicine's Winter Forum moderated by Dean of the College of Medicine **Carol Bradford, MD**. The group discussed their AHA-funded project led by Kristin Stanford, PhD (Surgery) on effects of psychosocial stress on cardiovascular health. **Dr. Joseph** was also appointed to the Columbus Board of Health, while **Drs. Wold and Stanford** gave invited talks at Stanford Cardiovascular Institute and Penn Cardiovascular Institute, respectively.

Daniel Gallego-Perez, PhD (Surgery / BME) was awarded the OSU Office of Undergraduate Research & Creative Inquiry Excellence in Undergraduate Research Mentoring Award. Several DHLRI Researchers presented their work at the Biophysical Society 2024 Conference. **Vladimir Bogdanov** (Gyorke Lab) was the recipient of the 2024 Student Research Achievement Award. DHLRI was also well-represented at the Gordon Research Conference on Biology of Acute Respiratory infection.



Dean Carol Bradford, MD, Loren Wold, PhD, Tamar Gur, MD, PhD, and Joshua Joseph, MD



Dean Ayanna Howard, PhD and Peter Mohler, PhD awarding Daniel Gallego-Perez, PhD the OSU Office of Undergraduate Research & Creative Inquiry Excellence in Undergraduate Research Mentoring Award

Transitions -

DHLRI is very pleased to welcome 4 new investigators who started in January: **Matthew Gorr, PhD** (Cardiac Surgery), **Onur Kanisicak, PhD** (Emergency Medicine), **Kiran Nakka, PhD** [(Physiology & Cell Biology, (PCB))] and **Drew Nassal, PhD** (PCB).

We are also very happy for **Seth Weinberg, PhD** (BME), who was named Associate Dean for Research in the College of Engineering, as well as a Fellow of the American Heart Association.



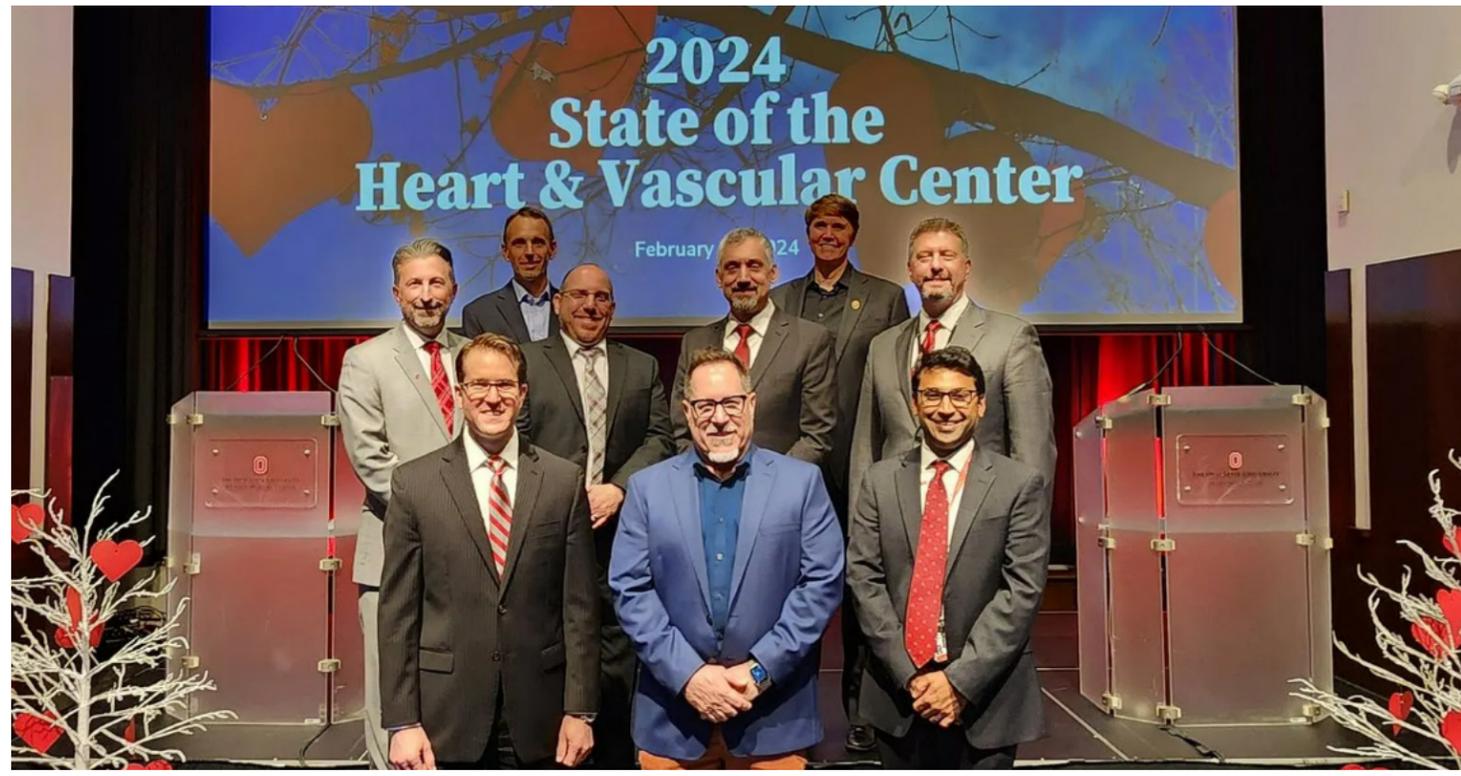


Many events transpired over February's celebration of Heart Month!

DHLRI showed up en force for the Central Ohio American Heart Association's "Go Red For Women Celebration" with featured presentations from **Laxmi Mehta, MD** (CVM) and **Joshua Joseph, MD** (Endocrinology).



Joshua Joseph, MD demonstrating CPR with Brutus Buckeye



Heart and Vascular Center Leadership at the State of the HVC Event - Longaberger Alumni House



Dr. Hund delivering a game ball to DHLRI donors at the OSU Men's Basketball game against Purdue.

Dr. Hund, Penny Jones (DHLRI), **Nahush Mokadam, MD** (Cardiac Surg), and **Ben Parker** (Advancement) hosted many supporters of the DHLRI at the OSU Men's Basketball game, which concluded with an upset over #2 Purdue.

The **Heart and Vascular Center** (HVC) presented an insightful and engaging celebration of achievements realized in its clinical, research and outreach missions. Held at the Longaberger Alumni House, donors, leaders, and advocates, who had played a vital role in supporting the mission of the HVC and the DHLRI, gathered to learn of not only past accomplishments but future strategic initiatives. In addition to this event, an afternoon dedicated to a **Celebration of Excellence** was held at The Ohio State Richard M. Ross Heart Hospital for the entire faculty, staff and learners of the HVC.



Happenings -

DHLRI Research in Progress maintained a very busy schedule through the Spring with featured talks from **Nadia Hansel, MD** (Johns Hopkins), **David Chiang, MD, PhD** (Harvard), **Ormond MacDougald, PhD** (University of Michigan), **Jianyi Zhang, MD, PhD** (University of Alabama, Birmingham), **Jonathan Lederer, MD, PhD** (University of Maryland), **Megan Lancaster, MD, PhD** (Vanderbilt University), **Ke Cheng, PhD** (Columbia University), and our very own **Sara Koenig, PhD** (CVM) and **Drew Nassal, PhD** (PCB). We also hosted **Maria Kontaridis, PhD** (Masonic Medical Research Institute) as a DHLRI Discovery Series speaker.

Davis Heart and Lung Research Institute
Research In Progress

"Regulation of the Cardiac Voltage-Gated Sodium Channel"

David Y. Chiang, MD, PhD
Research Fellow, Cardiovascular Genetics
Brigham and Women's Hospital
Clinical Fellow, Clinical Genetics
Boston Children's Hospital
Harvard Medical School

DATE: February 9, 2024
TIME: 1pm-2pm
LOCATION: 170 DHLRI

Pizza will be served

David Chiang, MD, PhD Research in Progress Slide

Research in Progress wrapped up for the semester at the end of April and will resume in Fall every Friday from 1-2pm in DHLRI 170. Keep an eye out for Special Seminars sporadically throughout the summer.

DHLRI, in partnership with the College of Medicine, launched a second cohort of faculty working on their first R01 through the **R01-101 Grant Mentorship Program**, led by **Loren Wold, PhD** (Cardiac Surgery). More information can be found on the DHLRI website: <https://medicine.osu.edu/departments/davis-heart-lung-research-institute/r01-101-grant-mentoring-program>



DAVIS HEART & LUNG RESEARCH INSTITUTE DISCOVERY SERIES

"The Importance of Signaling Modulations in Obesity, Heart Disease and Fibrosis"

All Welcome!!!

Date: **Friday, March 8, 2024**
Time: **1:00pm-2:00pm**
Location: **170 DHLRI**

Presenter
Maria I. Kontaridis, PhD
Executive Director
Gordon K. Mize Professor and Chair of Biomedical Research and Translational Medicine
Director of Research
Masonic Medical Research Institute

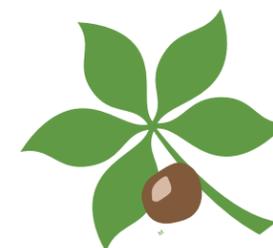
Maria Kontaridis, PhD Discovery Series Slide

The **DHLRI Flow Cytometry Core** officially opened for business. The DHLRI flow cytometry core provides cell sorting and immunophenotyping services for DHLRI members. More information can be found on this and all DHLRI cores may be found here: <https://medicine.osu.edu/departments/davis-heart-lung-research-institute/core-labs-and-research-centers/>

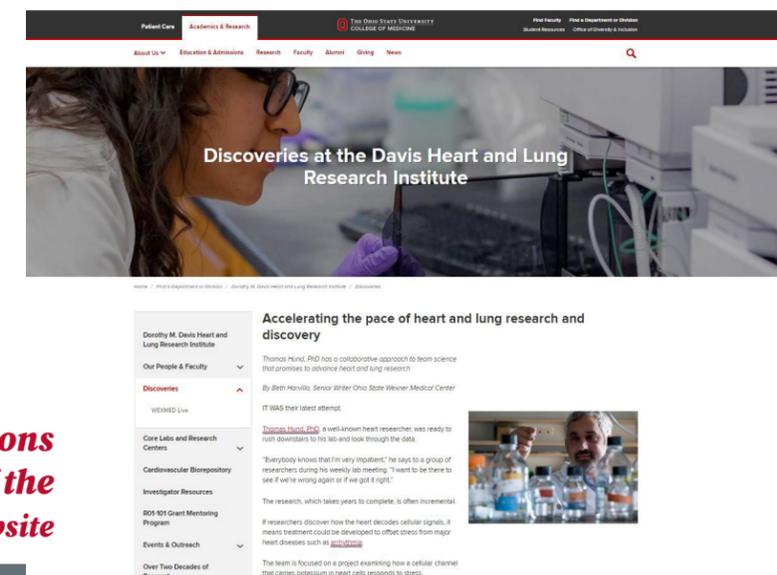


Metro High School students listening to instruction on Electron Microscopy

Rengasayee (Sai) Veeraghavan, PhD (BME) conducted a 10-day Electron Microscopy course with a group of students from Metro High School. In this program, 9th and 10th grade students explored biological and material samples and learned the science and practice of Scanning Electron Microscopy. Several Students earned certifications as independent operators of Hitachi's tabletop Scanning Electron Microscope.



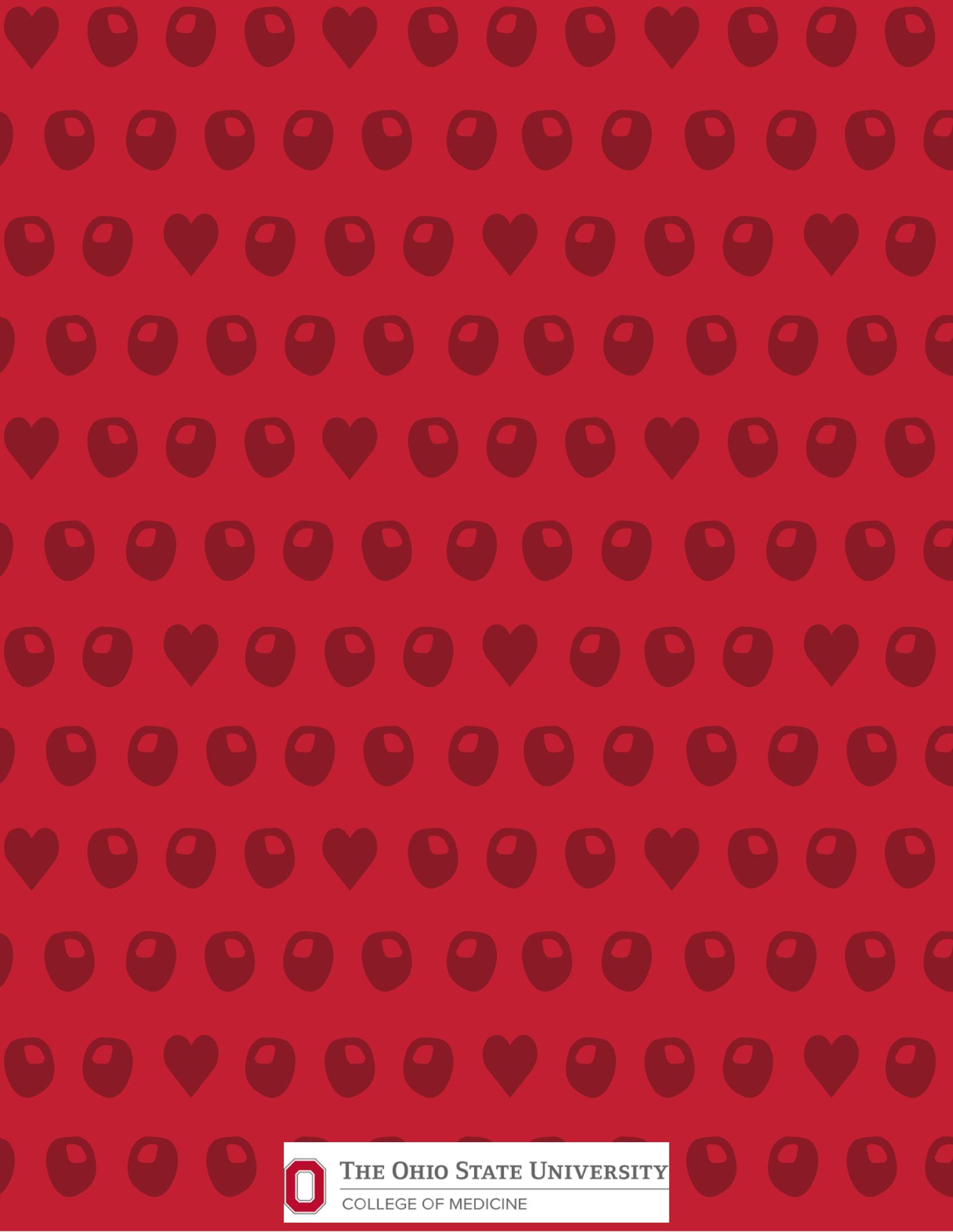
Updated featured stories and publications can be found on the "Discoveries" page of the DHLRI Website



A new DHLRI Annual Report was released in November! You can view current and previous Annual Reports and Quarterly Newsletters at: <https://medicine.osu.edu/departments/davis-heart-lung-research-institute/our-people/message-from-the-director>

The DHLRI website has also been updated for the quarter, including a new featured story, featured publicatoin, a new events & outreach schedule, and administrative staff updates.

Please reach out to Izabelle Colvin, Editor, (Izabelle.Colvin@osumc.edu) with any submissions for next quarter's newsletter. Photos to accompany your announcement are appreciated.



THE OHIO STATE UNIVERSITY
COLLEGE OF MEDICINE