



Fiscal Year 2024 Annual Report

Dorothy M. Davis Heart and Lung Research Institute
473 West 12th Avenue
Columbus, OH 43210



**THE OHIO STATE
UNIVERSITY**

**DOROTHY M. DAVIS HEART AND
LUNG RESEARCH INSTITUTE**

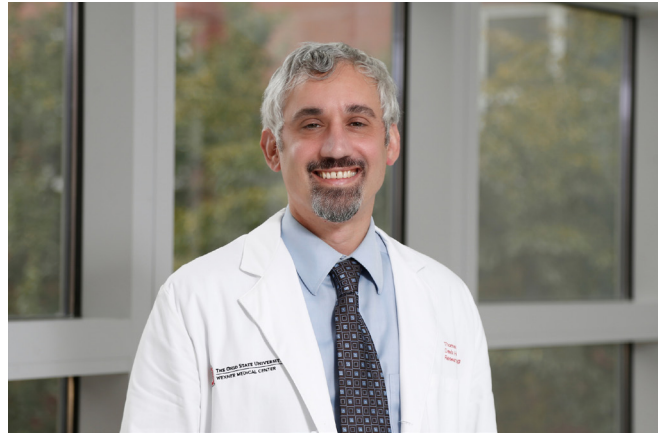
Table of Contents

- Welcome from the Director 4
- Executive Committee 5
- Administrative Team 6
- Associate Directors 7
- DHLRI Strategic Plan 8
- DHLRI Administrative Structure 9
- DHLRI Committees 10
- New Members 11
- Funding and Publications 12
- Core Labs 13
- Equipment 14
- Clinical Trials 14
- Development 15
- Cardiovascular Research 16
- Pulmonary Research 17
- Metabolism Research 18
- Advanced Therapeutics and Engineering 19
- Education and Outreach 20
- Research Day 20
- Connor Senn Symposium 21
- JB Fellowship 22
- Outreach 23
- R01-101 24
- Working Wednesdays 25
- Midwest Aging Consortium 25
- Featured Stories 26
- C.I.T.E-ing the Future 28
- Membership List 30
- Timeline 32

VISIT US AT
go.osu.edu/DHLRI
twitter/x: @OhioStateDHLRI

Welcome

Thomas Hund, PhD - DHLRI Director



On behalf of the Dorothy M. Davis Heart and Lung Research Institute (DHLRI) Leadership Team, I am pleased to present the Fiscal Year 2024 Annual Report, which stands as a testament to the unwavering commitment and remarkable achievements of our faculty, staff, and trainees. Their dedication has been the driving force behind our institute's progress and the advancements in heart and lung health. While this report can only showcase a fraction of their hard work, it highlights some important milestones reflecting the collective effort of this extraordinary group. The support from the OSU community, particularly the DHLRI Internal Advisory Committee, along with the guidance of College of Medicine **Dean Carol Bradford, MD**, and OSU Wexner Medical Center CEO **John Warner, MD**, has been instrumental in our success. The generosity of our community partners and donors has been equally crucial, fueling our mission to foster interdisciplinary collaboration and innovation for better health outcomes. Together, we celebrate the strides made and look forward to achieving new goals in the pursuit of excellence in heart and lung research.

Within the DHLRI, we espouse values of Collaboration, Innovation, Translation and Equity (CITE) as critical for our continued success. To foster collaboration over the past year, we welcomed 11 investigators into the Chlapaty Labs on the 5th floor of the Pelotonia Research Center (PaRC) (read more on page 26). In parallel, we invested heavily in shared equipment across all of our spaces and established 2 new core facilities for flow cytometry and advanced cardiac imaging. We celebrated several new large collaborative grants including a new NIH T32 on the Biology of Lung Aging (read more on page 26).



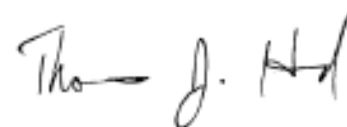
With an eye always on innovation, we participated in the recruitment of 10 new faculty in strategic research areas including 3 into the new College of Medicine Department of Molecular Medicine & Therapeutics (page 11). At the same time, we introduced several new initiatives to foster and recognize ingenuity and creativity among our members, including the Charles Webb Innovator of the Year Award. We also have worked with the College of Medicine Office of Research and OSU Enterprise for Research, Innovation and Knowledge to collect and analyze data on technology transfer and commercialization efforts within DHLRI.

Translation, or the process of converting discoveries in the lab into real-world medical interventions, remains a cornerstone of our mission. In this spirit, we worked with the College of Medicine to expand the Comprehensive Cardiovascular Biorepository, which provides clinically annotated biospecimens, including cardiac tissue and blood to investigators. We also created a working group involving clinicians, engineers and data scientists to identify barriers and opportunities for leveraging patient data for diagnostic and prognostic purposes.

Finally, in the area of equity, the newly established Diversity, Equity and Inclusion (DEI) Committee with **Rebecca Vanderpool, PhD** (Cardiovascular Medicine) as Chair has been busy defining strategy and launching new programs. **Damon Tweedy, MD**, author of "Black Man in a White Coat" and "Facing the Unseen" will be the inaugural DHLRI DEI Distinguished speaker this November. DHLRI also participated in outreach, including the AHA Goes Red for STEM event focused on educating middle school girls on career opportunities in STEM.

In closing, thank you for taking a moment to reflect with us on the tremendous success and exciting path forward as we work together to grow cardiovascular and pulmonary research and training in the DHLRI! The integration of new personnel and the initiation of novel programs are indicative of a dynamic and evolving research enterprise, poised to meet the challenges of the future while setting new benchmarks for success in the scientific community

Sincerely,



Thomas Hund, PhD
Director
Dorothy M. Davis Heart and Lung Research Institute

DHLRI Internal Advisory Committee

Administrative Team

Thomas Hund, PhD
Professor, Division of Cardiovascular Medicine
Director, Dorothy M. Davis Heart and Lung Research Institute

Kristin Stanford, PhD
Professor, Department of Surgery, General
Associate Director, Dorothy M. Davis Heart and Lung Research Institute
Associate Director, Diabetes and Metabolism Research Center

Penny Jones
Administrative Director, Davis Heart and Lung Research Institute

Izabelle Colvin
Research Programs Coordinator
Assistant to the Director, Davis Heart and Lung Research Institute

Alan Bakaletz
COM-RTS Liaison, Davis Heart and Lung Research Institute



Internal Advisory Committee

Matthew Corriere, MD
Professor and Director,
Division of Vascular Surgery

Isabelle Deschenes, PhD
Professor and Chair,
Department of Physiology and Cell Biology

Dana Glenn
Director, College of Medicine Grants Management Office

Deanna Golden-Kreutz, PhD
Senior Director, Center for Clinical Research Management

Richard Gumina, MD, PhD
Professor and Director,
Division of Cardiovascular Medicine
Associate Dean for Convergent Research,
College of Medicine

Jennifer Hargett
Director, Marketing Communications
Cancer, Heart, Surgery, & Networks
Comprehensive Cancer Center
Wexner Medical Center

Natalia Higueta-Castro, PhD
Associate Professor, Department of Biomedical Engineering
Director of Advanced Therapeutics and Engineering, DHLRI

Jeffrey Horowitz, MD
Professor and Director,
Division of Pulmonary, Critical Care, and Sleep Medicine

Sara Koenig, PhD
Senior Director, Business Operations
College of Medicine

E. Douglas Lewandowski, PhD
Professor, Division of Endocrinology
Director of Translational Research, DHLRI

Dana Mack
Senior Director of Development
Heart and Vascular Center

Rama Mallampalli, MD
Professor, Division of Pulmonary,
Critical Care, and Sleep Medicine
Chair, Department of Internal Medicine

Michael Martin
Associate Executive Director,
Richard M. Ross Heart Hospital

Ernest Mazzaferri, MD
Professor, Division of Cardiovascular Medicine
Medical Director, Richard M. Ross Heart Hospital
Interim Co-Director, Heart and Vascular Center

Ana Mora, MD
Professor, Division of Pulmonary,
Critical Care, and Sleep Medicine
Director of Lung Research, DHLRI

Matthew Ringel, MD
Professor and Chair,
Department of Molecular Medicine and Therapeutics

Bryan Whitson, MD, PhD
Professor and Director, Division of Cardiac Surgery
Interim Co-Director, Heart and Vascular Center

Loren E. Wold, PhD
Interim Sr. Associate Vice President,
Enterprise for Research, Innovation and Knowledge
Professor, Division of Cardiac Surgery
Associate Dean for Research Operations and Compliance,
College of Medicine

DHLRI Administrative Team



Thomas Hund, PhD
Director



Penny Jones
Administrative Director



Izabelle Colvin
Research Programs
Coordinator
Assistant to the Director



Jenifer Bennett
Senior Business Analyst



Dan Maloney
Financial Analyst



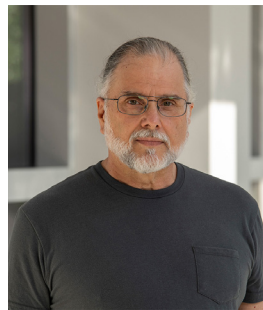
Coming Soon
Building Coordinator



DeeAnn Willis-Berry
Fiscal Officer



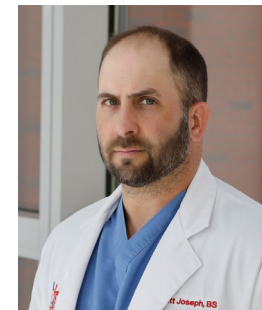
Latisha Roland
Office Coordinator



Alan Bakaletz
COMRTS - DHLRI IT
Service Liaison



Trent Sandstrom
Research Associate,
FLOW Core Coordinator



Matt Joseph
Sr. Research Associate,
Interventional Cardiology
Cath Core

Student Administrative Assistants

Andrew Bernhard -
Exercise Science

Ella Olberding -
Respiratory Therapy

Associate Directors



Kristin Stanford, PhD
Associate Director
Metabolism Lead

The general focus of Dr. Stanford's research is to investigate how various stressors, including exercise, cause adaptations to adipose tissue which effect overall metabolic health and glucose homeostasis. Her lab uses various omics analyses (metabolomics, structural lipidomics, and signaling lipidomics) to determine how adipose tissue adaptations contribute to whole-body metabolic and cardiac health. Current projects include investigating 1) the role of signaling lipids released from brown and white adipose tissue to mediate whole-body metabolic health and cardiac function; 2) the role of exercise-induced adaptations to adipose tissue and how these changes alter whole-body, skeletal muscle, and cardiac health; and 3) determining the effects of parental exercise on the metabolic and cardiovascular health of the offspring. Ultimately, she hopes the combined knowledge from these projects will allow us to integrate cellular and molecular aspects of adipocyte biology with energy metabolism and provide new therapeutic targets to aid in the fight against cardiovascular disease, obesity, metabolic disease, cancer and aging.



E. Douglas Lewandowski, PhD
Director of Translational Research
Cardiovascular Lead

Dr. Lewandowski pioneered quantifying metabolic flux, enzyme activity, and metabolite transport within cardiomyocytes of beating hearts with novel methodologies for NMR spectroscopy and mass spectrometry detection of stable isotope kinetics. Research focuses on genomic, transcriptional, and proteomic/post-translational regulation of metabolic flux and explores the metabolic basis and consequences of heart failure. He has elucidated numerous adaptive and maladaptive metabolic mechanisms in the pathogenesis of heart failure, and implemented novel, cardiac-specific gene therapies in models of heart disease. A recipient of the NIH R37 MERIT Award, he has received continuous NIH funding for over 30 years. He has been recognized with Distinguished Investigator Awards from the International Society for Heart Research and the British Society for Cardiovascular Research, named a University Scholar by the University of Illinois, and is an elected Fellow of the AAAS, ISHR, APS Cardiovascular Section, and AHA.



Ana Mora, MD
Director of Lung Research
Pulmonary Lead

Dr. Mora received her MD degree from Universidad Nacional de Colombia. She did postdoctoral training at Vanderbilt University and moved in 2002 as independent investigator to Emory University. In 2010, she joined the Division of Pulmonary at the University of Pittsburgh, where she was member of the Vascular Medicine Institute and Director of Education of the Aging Institute. Dr. Mora is one of the pioneers of the study of the molecular aspects of the aging lung and the pathogenesis of age-related lung diseases, such as IPF. Her studies have elucidated a critical role of mitochondrial homeostasis in the vulnerability to lung injury and activation of fibrotic responses and senescence. She received in 2023 the ATS Recognition Award for Scientific Accomplishments. She is currently chair of the ATS RCMB Assembly Program Committee, and permanent member of the Lung Injury Repair and Remodeling (LIRR) NIH study section. Dr. Mora has received support for her research from ALA, AHA, and the NIH. Her work has been published in more than 100 peer reviewed publications, several book chapters, and editorial comments.



Natalia Higueta-Castro, PhD
Director of Advanced Therapeutics &
Engineering

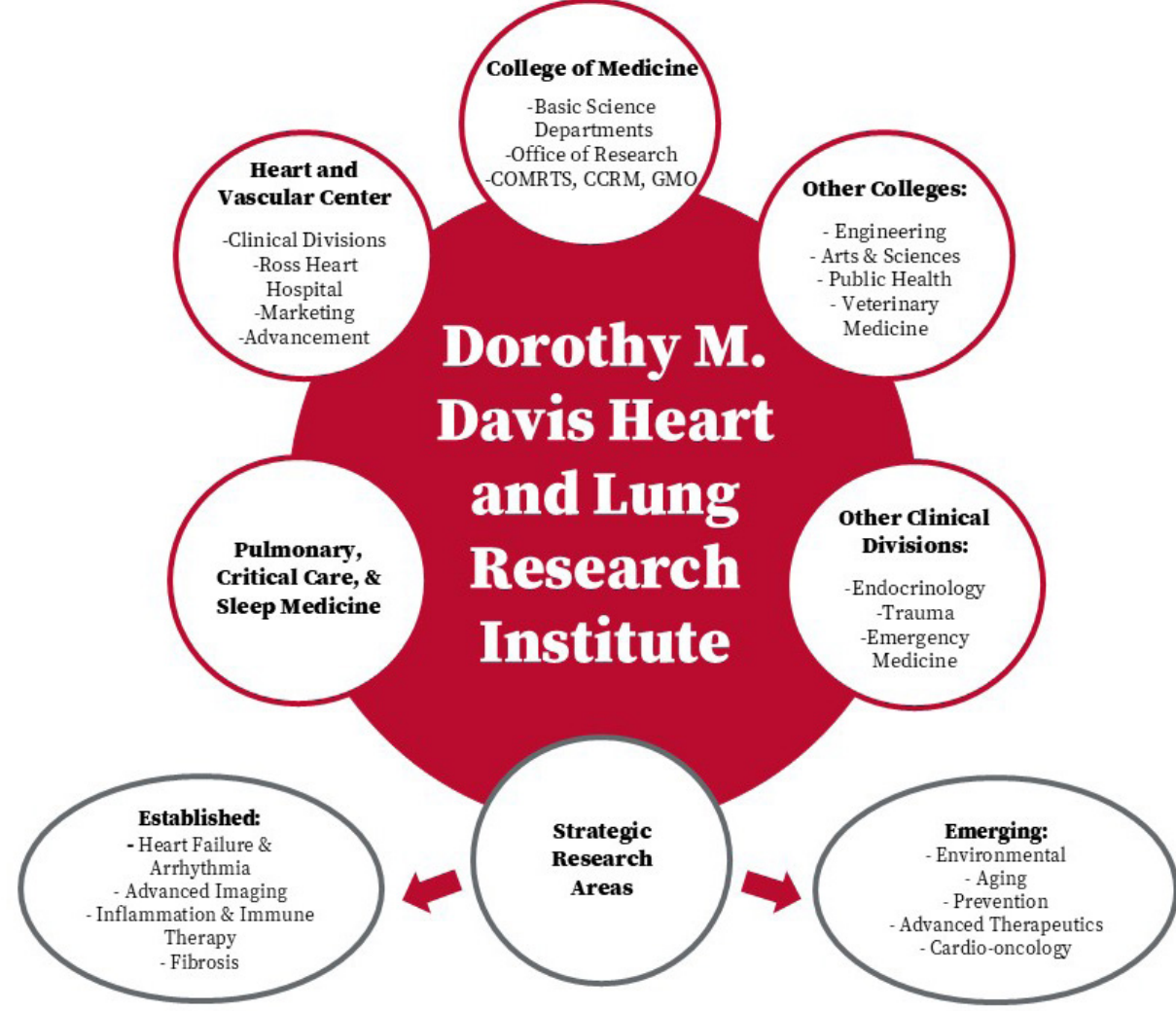
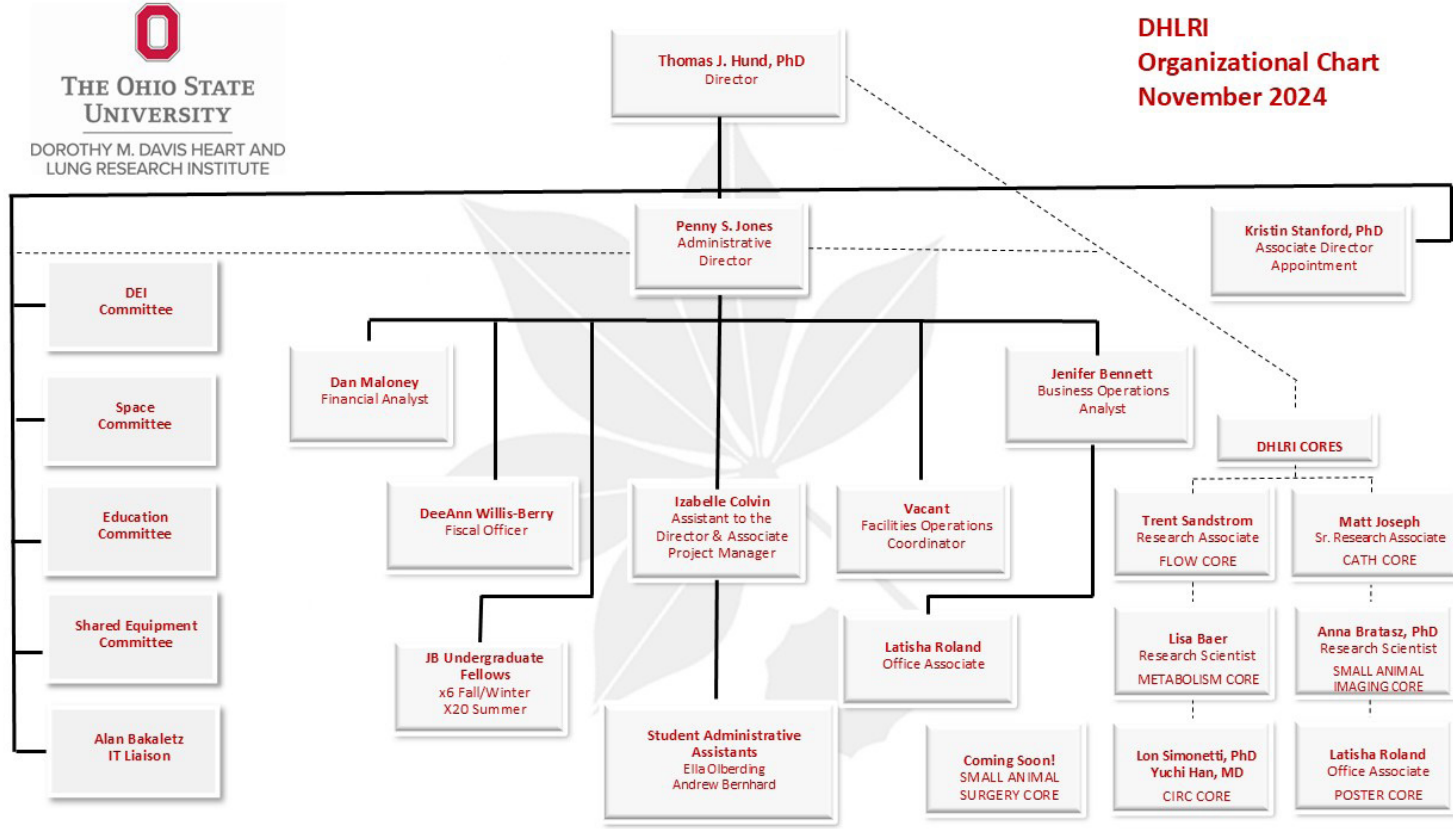
Dr. Higueta-Castro is an Associate Professor in the Departments of Biomedical Engineering and Neurosurgery at The Ohio State University (OSU). Dr. Higueta-Castro's research is at the forefront of several unique niches linking extracellular vesicles (EVs), gene and cell therapies, and nanomedicine fields, where she is pioneering the development of novel nanocarriers based on engineered EVs for far-reaching therapeutic applications, including neurofibromatosis type 1 (NF1), chronic low back pain, and acute respiratory distress syndrome (ARDS). This work has led to publications in high-ranking journals and over 15 patent filings, 11 of which were licensed to industry. She was recently recognized with the Cellular and Molecular Bioengineering (CMBE) Young Innovator Award (2023), and was named an OSU College of Engineering Innovation Scholar. The contributions of Dr. Higueta-Castro have been instrumental to advance the field of EV-based nanocarriers for non-viral gene and cell therapy applications.

DHLRI Strategic Plan

Davis Heart and Lung Research Institute FY25 Strategic Plan	
Strategy	Goal
Basic Research and Clinical Excellence and Discovery	<ul style="list-style-type: none"> Support Submission of large programmatic grants. Bridge basic science and clinical researchers through targeted investment(s).
Operational Excellence	<ul style="list-style-type: none"> Expand sustainable core services and shared resources.
Education	<ul style="list-style-type: none"> Expand the reach of DHLRI educational programs. Disseminate information and support collaboration in emerging fields. Bridge basic scientists and clinical researchers through educational programming. Support grant development and mentorship for students, fellows, and faculty.
Diversity, Equity and Inclusion	<ul style="list-style-type: none"> Identify and target barriers for professional development for all members. Promote diverse representation across spectrum of institute activities. Advance Education on disparities in healthcare and research. Grow outreach for underrepresented students.
Resource Stewardship	<ul style="list-style-type: none"> Partner with Advancement to match philanthropic support to strategic research areas. Pursue synergistic industry partnerships to advance research. Work with Advancement to expand the Schott Prize impact.
Outreach & Communication	<ul style="list-style-type: none"> Partner with local schools promoting STEM. Grow community partnerships / Central Ohio AHA. Promote wellness programming for internal faculty, staff and students as well as in community events.
Tech Transfer and IP Development	<ul style="list-style-type: none"> Grow partnerships with other centers / institutes at OSU. Promote entrepreneurship programs and IP development for faculty, staff and trainees. Advance Industry internship opportunities and preparedness training.
Workplace of Choice and Talent Acquisition	<ul style="list-style-type: none"> Partner with TIUs / Divisions to recruit funded scientists in strategic research areas. Advance career development opportunities for faculty, staff and trainees within the institute.



DHLRI Administrative Structure



DHLRI Committees

Diversity, Equity, and Inclusion

The DHLRI DEI Committee’s mission is to foster an inclusive environment that empowers all faculty, staff and trainees to pursue research with impact. The objective of this committee is to promote an equitable research and training environment for faculty, staff and trainees across the full spectrum of backgrounds.

Committee Members

- | | |
|---------------------------------|----------------------------------|
| Rebecca Vanderpool, PhD - Chair | Thomas J. Hund, PhD - ex officio |
| Lisa Baer | Penny Jones, ex officio |
| Brandon Biesiadecki, PhD | Yohannes Mebratu, DVM, PhD |
| Izabelle Colvin | Michael Tranter, PhD |
| Natalia Higueta-Castro | DeeAnn Willis-Berry |



Rebecca Vanderpool, PhD

Education

The DHLRI Education Committee’s mission is to coordinate educational and training programs that foster collaboration, innovation, and translation across career stages. To this end, the objectives of this committee are to provide formal and informal opportunities for the exchange of ideas and research among the DHLRI and broader OSU community, to foster engagement with the larger scientific community for bidirectional flow of information/networking/outreach, and to support the development of future leaders in heart and lung research.

Committee Members

- | | |
|----------------------------------|--------------------------|
| Seth Weinberg, PhD - Chair | Onur Kanisicak, PhD |
| Jenifer Bennett | Jill Rafael-Fortney, PhD |
| Tatiana Cuellar-Gaviria, PhD | Latisha Roland |
| Mona El Refaey, PhD | Rebecca Shaheen |
| Laszlo Farkas, MD | Kristin Stanford, PhD |
| Thomas J. Hund, PhD - ex officio | Nuo Sun, PhD |
| Penny Jones - ex officio | Lufang Zhou, PhD |



Seth Weinberg, PhD

Space

The DHLRI Space Committee’s mission is to ensure the assignment of space in a transparent, equitable, and efficient fashion that fosters collaborative research representation related to cardiovascular, lung and related complex human disease. The objectives of this committee are to advise DHLRI Leadership on space requests and management in a manner that supports the overall mission of the Institute in accordance with the guidelines set forth by the policies of the College of Medicine and the University.

Committee Members

- | | |
|-------------------------------|------------------|
| Kristin Stanford, PhD - Chair | Loren Wold, PhD |
| Xun Ai, MD | Yutong Zhao, PhD |
| Kymerly Gowdy, PhD | |
| Thomas J. Hund - ex officio | |
| Penny Jones - ex officio | |



Kristin Stanford, PhD

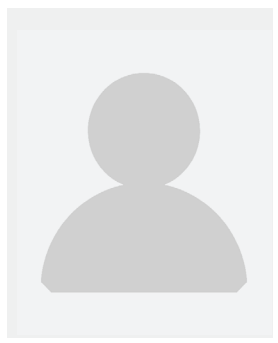
New Members



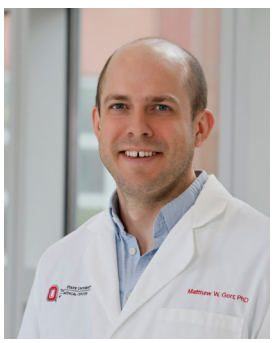
Maneesh Bhargava, MD, PhD
Professor,
PCCS



Matthew Corriere, MD
Professor and Chair,
Vascular Surgery



Sarah Gallucci, DO
Assistant Professor,
PCCS



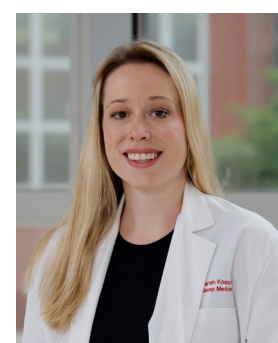
Matthew Gorr, PhD
Assistant Professor,
Cardiac Surgery



Sampath Gunda, MD
Assistant Professor,
CVM



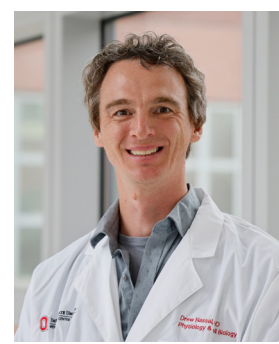
Onur Kanisicak, PhD
Assistant Professor,
EM



Sarah Knapp, MD
Assistant Professor,
PCCS



Kiran Nakka, PhD
Assistant Professor,
PCB



Drew Nassal, PhD
Assistant Professor,
PCB



Wandu Zhu, PhD
Assistant Professor,
MMT

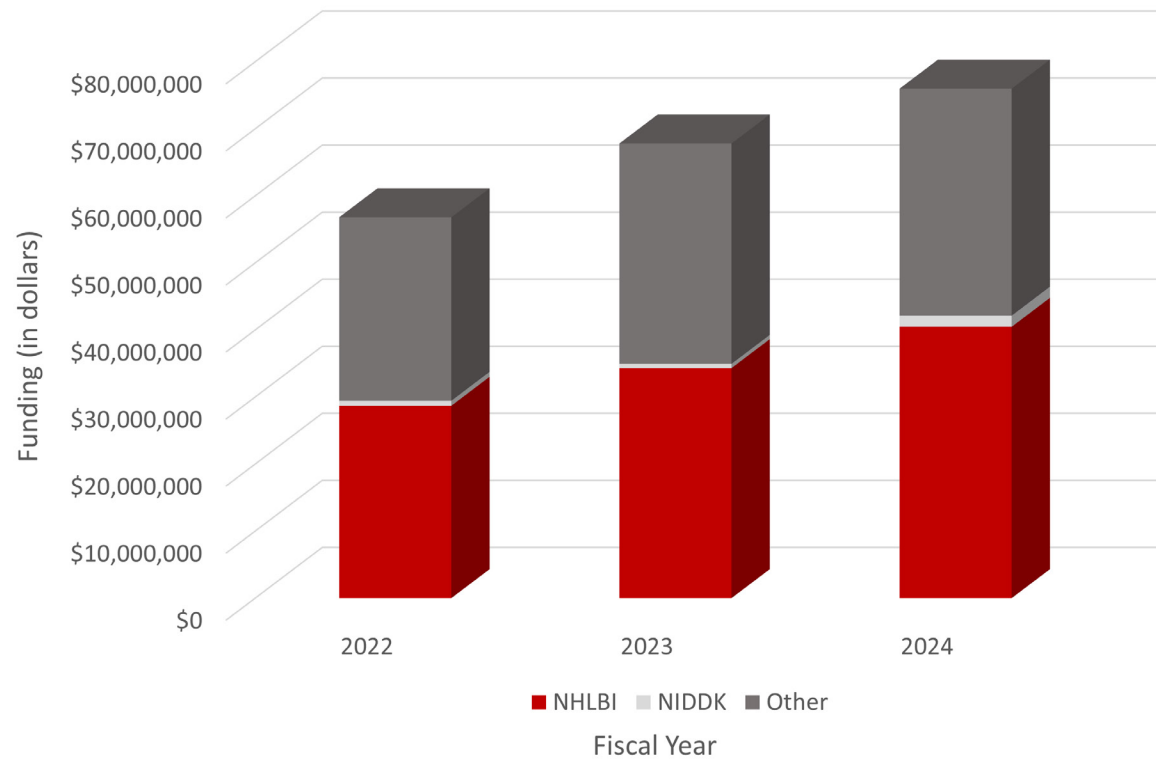
- Department Abbreviation Key**
- CVM** - Cardiovascular Medicine
 - EM** - Emergency Medicine
 - PCCS** - Pulmonary, Critical Care, & Sleep Medicine
 - PCB** - Physiology & Cell Biology
 - MMT** - Molecular Medicine & Therapeutics



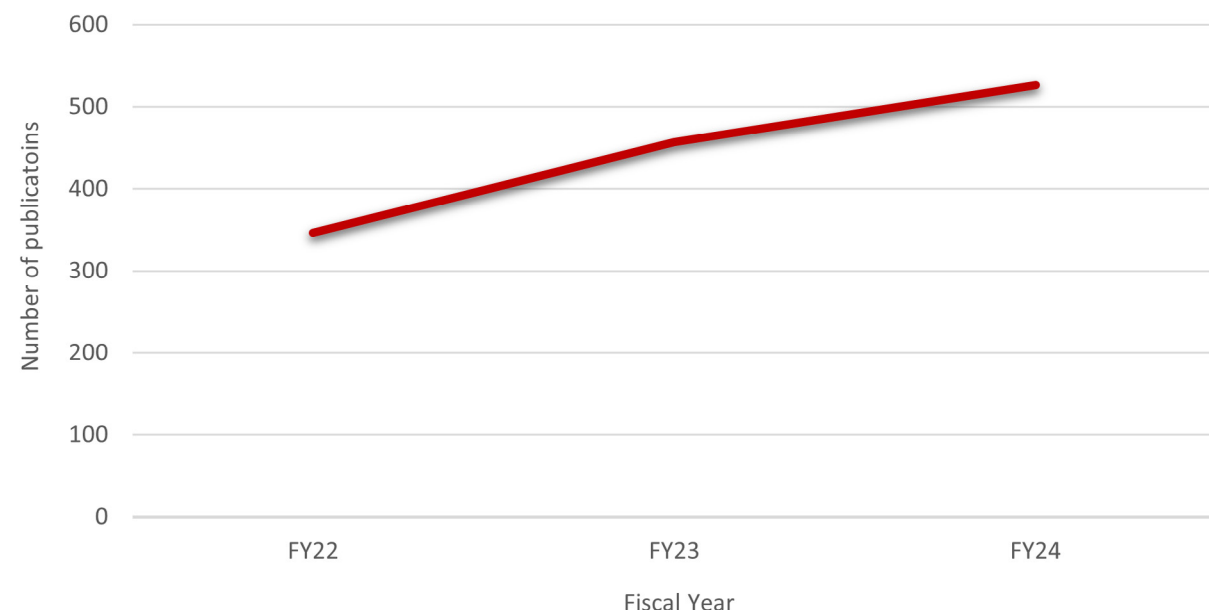
Funding & Publications

DHLRI Members demonstrated exemplary productivity and impact over FY24. Specific examples of noteworthy accomplishments may be found in the Research Area sections and we'd like to call special attention to several new interdisciplinary and collaborative grants, including a new NIH T32 in Biology of Lung Aging (see page 26 for more information). In general, FY24 witnessed another record setting year in numbers of publications, grants submitted, clinical trials, and total annual funding (>\$75M). While these metrics do not tell the whole story, they clearly indicate growing impact within the DHLRI. Kudos to the many faculty, trainees and staff who helped push research to new heights in FY2024!

Total DHLRI Extramural Funding



DHLRI Publications



Core Labs

Cardiovascular Imaging Research Center (CIRC)

The mission of the Cardiovascular Imaging Research Center (CIRC) is to provide high quality human and large animal cardiovascular imaging and image analysis services. The CIRC team helps to identify the optimal imaging modality, and to design appropriate imaging experiments and data analysis strategies through whole-body magnetic resonance imaging (MRI) scanners, whole-body X-ray computed tomography (CT) scanners, image post-processing hardware and software. CIRC has access to CT and MRI (1.5T) equipment located in the Ross Heart Hospital, and to MRI (0.55T and 3T) equipment located at the Martha Morehouse Outpatient Center. *Managers: Yuchi Han, MD and Orlando Simonetti, PhD*

Flow Core

This state-of-the-art Flow Cytometry Core is capable of cell analysis and sorting at the single cell level. It includes a spectral high-resolution cell analysis flow sorter (Cytek® Northern Lights) equipped with 3-lasers (BVR), a flow nanoanalyzer from NanoFCM capable of measuring fluorescence in small particles (such as exosomes) and organelles (such as mitochondria), and a flow cell sorter (Cytek® Aurora) equipped with 3-lasers (BVR) and technical support personnel expert in using these machines for various scientific applications. *Manager: Trent Sandstrom*

Metabolism Core (Previously CLAMS)

Columbus Instrument's Comprehensive Lab Animal Monitoring System (CLAMS) incorporates sub-systems for open circuit calorimetry and activity in an environmental chamber: Oxymax/CLAMS is the one-test solution for simultaneous multi parameter assessment of one to nine mice. *Manager: Lisa Baer*

Interventional Cardiology Cath Core Lab

The Cath Core is a fully equipped interventional Cath/EP suite with an OEC 9800 Plus fluoroscopic C-arm. This imaging system has cine, digital spot, and digital subtraction angiography (DSA) capabilities as well as a dedicated cardiac review station for post imaging processing. In addition to the equipment, the Cath Core also provides the experienced interventional and surgical support personnel needed to complete your large animal preclinical experiments. *Manager: Matthew Joseph*



Small Animal Imaging Core

The Small Animal Imaging Core (SAIC) is a comprehensive small animal imaging facility. This facility includes high resolution imaging equipment (MRI, ultrasound, microCT and optical), X-ray irradiators (SARRP, RS-2000, GammaCell), body composition analyzer, and personnel trained in the operation of each imaging modality and small animal handling procedures, as well as analytical software support for quantitative image analysis. In addition to providing interim animal housing for serial imaging studies, the SAIC also offers on-site suites for surgical procedures, and animal care provided by the University Laboratory Animal Resources. Image reconstruction, multi-modality fusion, quantitative image analysis. *Manager: Anna Bratasz, PhD*

Comprehensive Small Animal Surgery Core (Coming Soon)

Manager: Nuo Sun, PhD

Equipment

DHLRI expanded its shared equipment portfolio with the purchase of a Xenium Analyzer (10x Genomics). Managed by researchers Drs. Ana Mora and Mauricio Rojas of Pulmonary, Critical Care and Sleep Medicine, the equipment enhanced research programs focused on lung and heart tissues as it defined anatomical and spatial gene expression patterns in these sets of studies as well as future mapping efforts of disease organs.

In addition, a Cytation C10 Confocal Imaging Reader was purchased offering considerable advancements over most plate readers and continues to offer unique capabilities over other confocal microscopes. The C10 has confocal microscopy capabilities to capture automated, high resolution time-lapse imaging of live cell experiments under multiple conditions over several hours.

Lastly, DHLRI engaged with Thermo Scientific in holistically reviewing purchases made by DHLRI resulting in discounted pricing of basic, but necessary, standard equipment. Such equipment resulted in the replacement of aging -80s, tabletop Ultra Centrifuges, floor Superspeed Centrifuges, Micro Centrifuges and biosafety cabinets.

Over \$1M in shared equipment purchases were committed to supporting DHLRI research programs offering enhanced accuracy and precision, increased efficiency, and a competitive edge to attract funding and collaboration.



Clinical Trials

The College of Medicine’s Center for Clinical Research Management (CCRM) provides administrative infrastructure for the management of non-cancer clinical and translational research in partnership with investigators, staff, and leadership. CCRM’s primary goals include strategically aligning research resources and personnel; increasing compliance and managing risk; serving as a catalyst for process improvement; identifying barriers and developing solutions for study feasibility, startup, and enrollment; overseeing and improving revenue recovery; and providing comprehensive tracking and reporting of research activities. During FY24 the CCRM managed over 2,000 studies across 45 clinical divisions working closely with 452 principal investigators and 261 coordinating research staff.

DHLRI Related Clinical Trials

- Cardiovascular Medicine
- Pulmonary, Critical Care & Sleep Medicine
- Cardiothoracic Surgery
- Vascular Surgery

Notably, OSU was the first study site in the United States to treat/implant participants in the following studies: Electrophysiology (PI: **Muhammad Afzal**, LEADR LBBAP; PI: **John Hummel**, COMPANION AI); heart failure (PI: **Rami Kahwash**, FIRE1); interventional cardiology (PI: **Scott Lily**, ALT-FLOW II); and vascular surgery (PI: **Kristine Orion**, stAAABLE). The pulmonary investigator-initiated translational study (PI: **Elliott Crouser**, ExVivo) published Crouser ED, Julian MW, Locke LW, Bicer S, Mitchell JR, Singha A, Kramer PJ, Rajaram MVS, Raman SV. The Renin-Angiotensin-Aldosterone System Regulates Sarcoidosis Granulomatous Inflammation. *Am J Respir Crit Care Med*. 2024 Aug 15;210(4):497-507. doi: 10.1164/rccm.202402-0265OC. PMID: 38941161; PMCID: PMC11351795.

Development

New Development Team

Dana Mack - Senior Director, Heart and Vascular Center and Cardiovascular Medicine Leadership, DHLRI Leadership

Stephenie Robertson - Director, Women’s Health, Pulmonary Medicine Leadership

Emily Swank - Director, Cardio-oncology, Transplant, Cardiac and Vascular Surgery Leadership

Lily Dixon - Administrative Assistant



Emily Swank, Stephenie Robertson, and Dana Mack

Giving to DHLRI in Fiscal Year 2024

Total Dollars
\$895,783.52

Total Number of Gifts
656

Top Supporters & Gifts

- An estate gift from Preston Ford, a grateful patient and Healing Hearts participant. Preston started his donor journey by giving \$500 after a tour of the DHLRI and through building the relationship, he has committed to leaving DHLRI in his estate. We anticipate there will be more in the future for Mr. Ford as he continues to build relationships with Advancement and DHLRI.
- A gift to support Dr. Bryan Tillman’s lab from Dave and Laura Schoettmer. Dave and Laura came to Advancement through AHA, as they had made a pledge to support aortic and vascular disease research, but the grants were not being awarded to OSUMC. They decided to complete the pledge at DHLRI after meeting Dr. Tillman and hearing about his innovative lab and research. Managed by the DHLRI, the Schoettmer Fund advances Dr. Tillman’s research in the advancement of cardiovascular health and supporting analytic technology tools and staff. Our relationship continues to build with Dave and Laura as their daughter has just started vet school at Ohio State.
- A gift to support Dilated Cardiomyopathy Research in Dr. Ray Hershberger’s lab.

Highlights

At the Table – In late August, Advancement hosted an evening at The Ross Heart Gardens to share the research taking place in the Gumina Lab. Roughly 50 people attended with each table having their own subject matter expert in cardiovascular disease.

Buckeye Funder – Through small peer-to-peer fundraising efforts, over \$25,000 has been raised by two families, Deneen & Dave Schamer to support the work happening in Dr. Sara Koenig’s lab and the Bradley Family to support the Walter Bradley Research and Education Fund at the DHLRI. Buckeye Funder provides a unique way for DHLRI supporters to contribute to the DHLRI mission.

Cardiovascular Research

Honors

Loren Wold, PhD (Cardiac Surgery) was named Editor and Chief of FASEB Journal.

Douglas Lewandowski, PhD (Endocrinology, Diabetes, and Metabolism) was invited to speak at the UCLA Cardiovascular Research Theme Retreat.

Featured Publications

Salyer LG, et al. (Biesiadecki Lab) Troponin I Tyrosine Phosphorylation Beneficially Accelerates Diastolic Function. *Circ Res.* 2024; 134(1):33-45.

<https://pubmed.ncbi.nlm.nih.gov/38095088/>

Yu Y, et al. (Ming-Tao Zhao Lab) Abnormal Progenitor Cell Differentiation and Cardiomyocyte Proliferation in Hypoplastic Right Heart Syndrome. *Circulation.* 2024;149(11):888-891.

<https://pubmed.ncbi.nlm.nih.gov/38466780/>

King DR, et al. (Radwanski Lab) Cardiac-Specific Deletion of Scn8a Mitigates Dravet Syndrome-Associated Sudden Death in Adults. *JACC Clin Electrophysiol.* 2024;10(5):829-842.

<https://pubmed.ncbi.nlm.nih.gov/38430092/>

American Heart Association Conferences

The DHLRI was well represented at both the 2024 **AHA Basic Science Council Scientific Sessions** in August and the 2023 **AHA National Scientific Sessions** in November with abstract presentations by DHLRI scientists.

Lorien Salyer, PhD, a postdoctoral trainee in the Biesiadecki lab, gave an oral presentation of her work at the 2024 AHA Basic Science Council Scientific Sessions in Chicago.

Azariyas Challa, MD, PhD, a cardiology fellow in the Lewandowski lab supported by the NIH/NHLBI funded Cardiometabolic T32 training grant, gave an invited talk at the 2023 AHA Scientific Sessions in Philadelphia.



Major Grants

NIH NHLBI: *A Retrievable, Chambered Stentgraft to Achieve Localized, High Intensity Drug Delivery for Treatment of Vascular Restenosis*

Bryan Tillman, MD, PhD (Vascular Surgery)

This study will first compare the Retrievable Drug Delivery Stentgraft (RDDS) to Drug Coated Balloons (DCB) in a bioreactor, as well as a porcine model of neointimal hyperplasia, using assays such as quantitative mass spectrometry of both drug delivery and drug losses, histologic assessment of arterial healing and restenosis. We hypothesize that the RDDS will reduce circulatory losses of the anti-restenotic agent paclitaxel (PXL), increase the amount of PXL delivered to the vessel wall, allow doses of PXL that are not possible with DCB, increase the duration of PXL exposure to the vessel wall, and reduce intimal hyperplasia more effectively than DCB.

NIH NHLBI R01: *Novel role of spectrin cytoskeleton in regulation of cardiac fibroblast activity, long-range communication and injury-induced fibrosis*

Thomas Hund, PhD (Cardiovascular Medicine)

The first-ever comprehensive quantification of intercalated disk structure and molecular organization using cutting-edge light and electron microscopy and computational analysis for a theoretical underpinning of ion channel pools and intercalated disk nanoscale structure confer global/local control of cardiac



Bryan Tillman, MD, PhD



OSU students at the 2023 AHA Scientific Sessions

Pulmonary Research

Honors

Kymerly Gowdy, PhD was awarded the American Thoracic Society Mid-Career Achievement Award.

Joseph Bednash, MD was awarded the American Thoracic Society REACCh Award for Early Academic Achievement

Laszlo Farkas, MD was awarded a College of Medicine, Dean's Discovery Grant Award.

American Thoracic Society 2023

The Pulmonary, Critical Care, and Sleep Medicine team had a diverse and impactful representation at the American Thoracic Society 2024 Conference in San Diego, CA. Faculty, Staff, and Trainees were involved in many programmed sessions with ranging from presentations at thematic poster sessions to serving as moderators of poster sessions and scientific symposia.

In addition to Dr. Gowdy's Mid-Career Achievement Award, **Lorena Rosas, PhD** (Mora / Rojas Labs) was awarded the ATS Underrepresented Trainee Development Scholarship and **Sourabh Soni, PhD** was awarded the Assembly on Respiratory Cell and Molecular Biology Abstract Scholarship.

We applaud the efforts of our faculty, trainees and staff in making this such a successful event. We are now gearing up again for ATS 2025 in San Francisco, CA.



Featured Publications

Johnson BS, et al. (Mallampalli Lab) Targeted degradation of extracellular mitochondrial aspartyl-tRNA synthetase modulates immune responses. *Nat Communication.* 2024; 15(1):6172.
<https://pubmed.ncbi.nlm.nih.gov/39039092/>

Crouser E, et al. The Renin-Angiotensin-Aldosterone System Regulates Sarcoidosis Granulomatous Inflammation. *Am J Respir Crit Care Med.* 2024; 210(4):497-507
<https://pubmed.ncbi.nlm.nih.gov/38941161/>

Piper B, et al. (Farkas Lab) RRAB7 deficiency impairs pulmonary artery endothelial function and promotes pulmonary hypertension. *J Clin Invest.* 2024; 134(3):e169441.
<https://pubmed.ncbi.nlm.nih.gov/38015641/>

Mebratu YA, et al. Bik promotes proteasomal degradation to control low-grade inflammation. *J Clin Invest.* 2023;134(4):e170594.
<https://pubmed.ncbi.nlm.nih.gov/38113109/>

Jia M, et al. (Mora / Rojas Lab) Transcriptional changes of the aging lung. *Aging Cell.* 2023;22(10):e13969.
<https://pubmed.ncbi.nlm.nih.gov/37706427/>

Cochran SJ, et al. (Gowdy Lab) Repeated exposure to eucalyptus wood smoke alters pulmonary gene and metabolic profiles in male Long-Evans rats. *Toxicol Sci.* 2024;199(2):332-348.
<https://pubmed.ncbi.nlm.nih.gov/38544285/>

Major Grants

NIH NHLBI R01: *E3 Ligase-Mediated Immunosuppression in Acute Lung Injury*
Rama Mallampalli, MD (Internal Medicine)

NIH NHLBI R01: *Molecular Characterization of Progressive Pulmonary Sarcoidosis*
Elliot Crouser, MD (Pulmonary, Critical Care, and Sleep Medicine)

NIH NHLBI R01: *Regulation of Repair Responses in the Lung by Fatty Acid Oxidation*

Ana Mora, MD & Mauricio Rojas, MD (Pulmonary, Critical Care, and Sleep Medicine)

Metabolism Research

Publications

Parodis et al. (Rovin Lab) Effect of Belimumab on Preventing de novo Renal Lupus Flares. *Kidney Int Rep.* 2023; 8(9): 1822-1830.
<https://pubmed.ncbi.nlm.nih.gov/37705915/>

Williams et al. (Joseph Lab) Association of Socioeconomic Status With Life's Essential 8 Varies by Race and Ethnicity. *J Am Heart Assoc.* 2023;12(18):e029254.
<https://pubmed.ncbi.nlm.nih.gov/37702137/>

Willows et al. (Townsend Lab) Contributions of mouse genetic strain background to age-related phenotypes in physically active HET3 mice. *Neurobiol Aging.* 2024;126:58-69.
<https://pubmed.ncbi.nlm.nih.gov/38325031/>

Serrano et al. (Kyriazis Lab) The TAS1R2 G-protein-coupled receptor is an ambient glucose sensor in skeletal muscle that regulates NAD homeostasis and mitochondrial capacity. *Nat Commun.* 2024;15(1):4915.
<https://pubmed.ncbi.nlm.nih.gov/38851747/>

Shantaram et al. (Hsueh Lab) Obesity-associated microbiomes instigate visceral adipose tissue inflammation by recruitment of distinct neutrophils. *Nat Commun.* 2024;15(1):5434.
<https://pubmed.ncbi.nlm.nih.gov/38937454/>



PHAT

The third annual **Preventative Health of Adipose Tissue (PHAT) Symposium** took place on Friday, April 12, 2024 in the DHLRI. A keynote talk was given by **Dr. Silvia Corvera, PhD** from UMass Medical Center. This interdisciplinary international event was open to researchers whose work intersects with the study of adipose tissue, with the goal of bringing together new research teams and collaborations and stimulating discussions around the future of adipose tissue research across the basic, translational, and clinical spectrum.

Major Grants

NIH NIA R01: *Improving sarcopenia by targeting mitochondria*

Martha Belury, PhD (Food Science and Technology) We propose to test whether supplementing the diet with an oil rich linoleic acid (LA; 18:2n6), the preferred fatty acyl constituent of cardiolipin, improves muscle strength and physical mobility.

NIH NIMH R01: *Orchestrating tryptophan metabolites to protect neurodevelopment from prenatal stress*

Tamar Gur, MD, PhD (Psychiatry) This proposal will address the following questions: 1) Does replenishing *Parasutterella excrementihominis* prevent stress-induced increases in Trp, fetal neuroinflammation, and social behavior? 2) What is the interplay between *Parasutterella excrementihominis* anti-inflammatory effects and Trp abundance? 3) Are prenatal stress effects on neurodevelopment mediated through Trp metabolites?

AHA SFRN: *Chronic Psychosocial Stress and CVD: Brain-Heart-Gut Axis: An SFRN Chronic Stress Collaborative Project*

Kristin Stanford, PhD (Surgery), **Loren Wold, PhD** (Cardiac Surgery), **Joshua Joseph, MD** (Endocrinology, Diabetes, and Metabolism), **Kristin Tamar Gur, MD, PhD** (Psychiatry)

This collaborative effort brings together experts in cardiovascular disease, environmental risk factors, exercise physiology, gut microbiome, epidemiology, cardiometabolic health, community-based participatory research and clinical research. Heart disease is the leading cause of death, and we know chronic stress can cause an increased risk of coronary artery disease and stroke. It's essential to define interactions and potential interventions between stress and cardiovascular disease.



Silvia Corvera, PhD



Advanced Therapeutics & Engineering

Honors

Kristy Townsend, PhD (Associate Professor, Neurosurgery) was recognized with the **Webb Family Innovator of the Year Award** (Dorothy M. Davis Heart and Lung Research Institute). This newly established award recognizes an outstanding DHLRI member who has demonstrated exceptional creativity, leadership, and dedication to technology transfer and commercialization. The award also serves to honor the memory of **Charles (Chuck) Webb**, a longtime supporter of the DHLRI, who is remembered for his self-made success in finance, exemplary work ethic, commitment to family, and the many ways he supported his community.

Daniel Gallego-Perez, PhD (Professor, Biomedical Engineering and Surgery) was elected to the **American Institute for Medical and Biological Engineering (AIMBE) College of Fellows**. This prestigious recognition honors outstanding individuals who have made significant contributions to the fields of medical and biological engineering. Dr. Gallego-Perez has been recognized "for his outstanding contributions to the development of nanotechnology-based platforms for non-viral gene delivery, tissue reprogramming, regenerative medicine, and cancer therapies."

NanoDDS

Strong representation of DHLRI at the 22nd International Nanomedicine and Drug Delivery Symposium (NanoDDS) (September 2024), where our trainees were recognized for their rigorous and innovative work including Ana Salazar-Puerta recognized with a Postdoctoral Travel Award, Diego Alzate-Correa recognized for his outstanding poster presentation, Tatiana Cuellar-Gaviria recognized with Postdoctoral Travel Award, and Maria Angelica Rincon-Benavides recognized with a Poster Award from the Royal Society of Chemistry.



Ana Salazar-Puerta, Diego Alzate-Correa, and Tatiana Cuellar-Gaviria

Publications

Blaszkiwicz, et al. (Lab) Gene therapy approaches for obesity-induced adipose neuropathy: Device-targeted AAV-mediated neurotrophic factor delivery to adipocytes in subcutaneous adipose. *Mol Ther.* 2024;32(5):1407-1424.
doi: 10.1016/j.ymthe.2024.02.035

Tang SN, Salazar-Puerta AI, et al. (Gallego-Perez Lab) Engineered extracellular vesicle-based gene therapy for the treatment of discogenic back pain. *Biomaterials.* 2024; 308:122562.
doi: 10.1016/j.biomaterials.2024.122562.

Technology Related Grants

Bryan Tillman, MD, PhD (Vascular Surgery) was awarded a \$3.4 million grant from the NHLBI to study A Retrievable, Chambered Stentgraft to Achieve Localized, High Intensity Drug Delivery for Treatment of Vascular Restenosis.

International Symposium on Extracellular Vesicles in Regenerative Sciences



DHLRI investigators represented the US along colleagues from Columbia University, Harvard, and the University of Texas MD Anderson Cancer Center, at the 2024 International Symposium on Extracellular Vesicles in Regenerative Sciences, organized by the School of Life Sciences at Shanghai University, where we highlighted our pioneering work in the field of non-viral Gene and Cell Therapies.

Education & Outreach

DHLRI 19th Annual Research Day

In October, the 2024 DHLRI 19th Annual Research Day was a resounding success. Highlighting the significance of academic and scientific research, the event boasted >130 posters and was attended by hundreds of participants and viewers.

Representing a diverse scope of discovery, researchers from undergrads to faculty presented their work through posters and talks. Community partners, such as the American Heart Association, attended, getting a first-hand look at their funding support in action.

OSU's very own **Joshua Joseph, MD, MPH, FAHA, ACI** (Endocrinology, Diabetes, and Metabolism) gave the keynote to a standing room only audience, "Cardiometabolic Risk: From People to Populations".

Dr. Joseph is an Associate Professor of Internal Medicine, Endowed Professor for Research in Internal Medicine in the Division of Endocrinology, Diabetes and Metabolism, an Investigator in the Diabetes & Metabolism Research Center and Affiliated Faculty, Translational Data Analytics Institute. His engaging talk spoke to approaches to diabetes treatment that reduces cardiovascular risk, the current state of cardiometabolic risk in diabetes and shared real-world examples of interventions to advance cardiometabolic health and health equity.



2024 DHLRI Research Day

Awards

The day concluded with a celebration of honors that recognized outstanding clinical and research impact, innovating projects, mentorship and partnership.



Joshua Joseph, MD, MPH, FAHA, ACI

- Sakima Smith, MD -**
Melissa G. Piper Distinguished Mentor Award
- Kristy Townsend, PhD -**
Chuck Webb Innovator of the Year Award
- Daniela Farkas -**
Distinguished Basic Research Staff Award
- Jennifer Smith -**
Distinguished Clinical Research Staff Award
- Priya Roy, MD -**
Distinguished Clinical Fellow Award
- Andy Newland and Phillip Tate-**
Distinguished Administrative Staff Award
- Lorena Rosas, PhD -**
Post-Doctoral Scholar of the Year Award
- Dharti Shantaram -**
Graduate Student of the Year Award



Connor Senn Symposium

On December 9, 2023, at The Ohio Union, the Connor Senn Research and Symposium Fund sponsored the Connor Senn Symposium on Sudden Cardiac Arrest in the Athlete. Presented by The Ohio State University's Heart & Vascular Center, Dorothy M. Davis Heart and Lung Research Institute, Ohio State Sports Medicine, The Heart Center at Nationwide Children's Hospital, and the Division of Cardiovascular Medicine, the symposium detailed causes and mechanisms of SCA, reviewed how to develop emergency treatment plans, provisions of proper work up, and then, with shared decision making, formulating a plan for return to play if feasible. Invited guest presenters included **Eugene Chung, MD, MPH**, Professor of Internal Medicine, Division of Cardiovascular Medicine and Director of Sports Cardiology Clinic at Michigan Medicine and **Kimberly Harmon, MD**, Professor, Departments of Family Medicine and Orthopedics and Sports Medicine, Head Football Physician at the University of Washington and Deputy Chief Medical Officer of the National Hockey League. Many OSU clinicians and researchers presented at the event which was attended by >125 physicians, scientists, high school athletic directors, and trainers.

A Letter from Lance Senn

Thank you all for coming and spending your weekend time to make the world a better place.

I apologize for this not coming out in my voice but even after 22 years it still takes my breath away and I just can't get it out. My message, once I take the 50,000 foot view is; PROGRESS. So let me digress. Danielle and Tom gave me a tour of the Pelotonia Research Center last week as we were sitting at a conference table looking over West Campus. I remembered when we rode our bikes as young boys from Star Rd through what was only farm fields on the way to sneak into the Shoes' football field and play football until we got caught and kicked out. Fast forward to 2024 and the view looks out at a myriad of medical research and patient treatment facilities almost beyond belief.

When progress is measured in tiny infinitesimal steps it is hard to remember how far medical science has come in 22 years. In Connor's case there was no AED at the field. It seemed like it took a long time before the ambulance arrived and the trip to the hospital also took a very long time without treatment. No paddles; Only a halfhearted attempt at cardiopulmonary resuscitation. I later realized my son had a very slim chance at survival and probably passed on the field. Contrast that with the response we witnessed when an NFL player athlete collapsed, coded and fully recovered. Or soccer players whose hearts stop and are automatically revived by an implanted defibrillator.

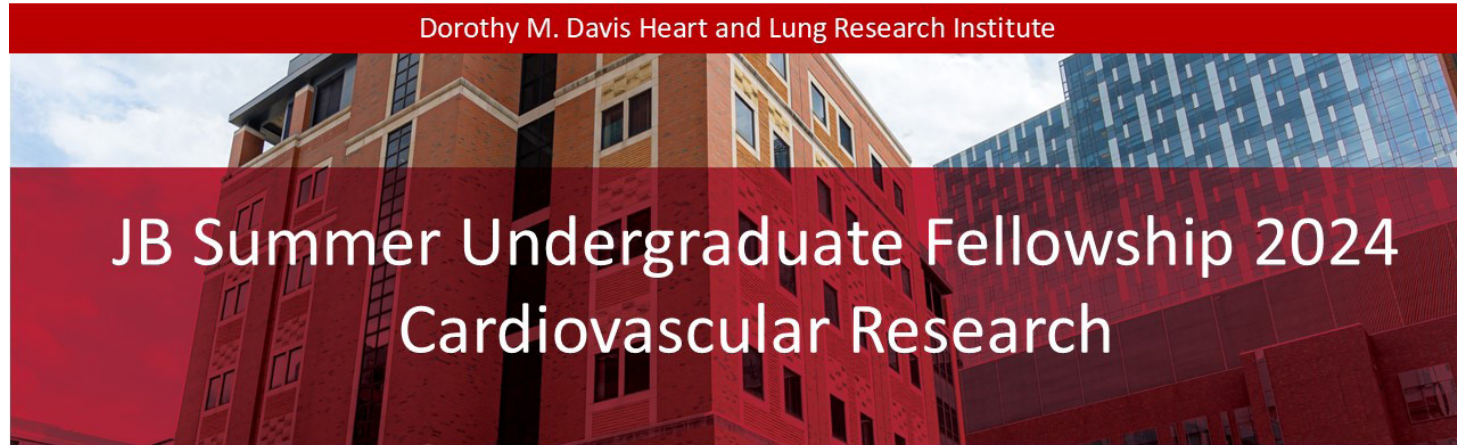
There are stories all over the world of young athletes being saved by the critical, quick response of a trainer, parent or bystander that knows how to respond and has the right equipment. Many tragedies averted. In our case we were grateful to have had a wonderful athletic staff and support from the University family and friends to help us through. If you want to see the true mettle of an organization look at how they behave when the chips are down. In the months and years following Connor's death, through private donations and the Connor Senn Memorial Game, enough money was raised to endow a full athletic scholarship. There was enough left over to start a second fully funded endowed scholarship for basic scientific research at the Dorothy M. Davis Heart and Lung Institute. I will leave it to the doctors to relay the story of how basic genetic research has found the gene mutation that caused Connor's death and how that knowledge has produced a test that can be administered all over the world, even in utero. That would not have happened without these wonderful researchers located right here in our own backyard. In the months and years following Connor's death, through private donations and the Connor Senn Memorial Game, enough money was raised to endow a full athletic scholarship. There was enough left over to start a second fully funded endowed scholarship for basic scientific research at the Dorothy M. Davis Heart and Lung Institute. I will leave it to the doctors to relay the story of how basic genetic research has found the gene mutation that caused Connor's death and how that knowledge has produced a test that can be administered all over the world, even in utero.

In conclusion, I am so moved that this Saturday we have come together as coaches, trainers, first responders, researchers, and clinicians to share and build on our experience. This is truly a unique group! It is time to celebrate Connor's life and be grateful for this day.

Thank you for being here,
Lance Senn

JB Cardiovascular Undergraduate Fellowship

Dorothy M. Davis Heart and Lung Research Institute



JB Summer Undergraduate Fellowship 2024 Cardiovascular Research



Capital University
Ask. Think. Lead.



UNIVERSITY OF
Cincinnati

MIAMI
UNIVERSITY



THE
UNIVERSITY
OF IOWA

The JB Cardiovascular Medicine Summer Undergraduate Research Fellowship commenced its third cohort providing research training opportunities for OSU and non-OSU undergraduate students in translational cardiovascular science. Managed by DHLRI, trainees spent the summer in a lab co-mentored by a clinical and basic science/engineering faculty member experiencing lab skills ranging from entry research up to the participation in translational projects aimed at advancing our understanding or developing new therapeutic/diagnostic strategies for human cardiovascular disease. Mentors included Drs. **Kymerly Gowdy** and **Matthew Long** (Division of Pulmonary, Critical Care and Sleep Medicine), **Loren Wold**, **Mona El Refaey** and **Hua Zhu** (Division of Cardiac Surgery) **Mahmood Khan** and **Onur Kanisicak** (Department of Emergency Medicine), **Michael Tranter** (Department of Molecular Medicine and Therapeutics), **Kristin Stanford** (Department of Surgery), **Noah Weisleder**, **Krishna Chinthalapudi**, **Sarah Heissler** and **Nuo Sun** (Department of Physiology and Cell Biology), and **Tom Hund**, **Richard Gumina**, **Sakima Smith**, and **Rebecca Vanderpool** (Division of Cardiovascular Medicine). With a record 88 applicants, eighteen were awarded with six OSU undergrads continuing their projects through Fall/Spring Semesters. A special mention for **Penny Jones** (DHLRI, Department Administrator) and **Izabelle Colvin** (DHLRI, Associate Project Manager) for managing the program.



JB Fellows and their mentors at the end-of-program poster session

AHA STEM Goes Red

In May, the DHLRI was proud to represent the OSU Wexner Medical Center at the Central Ohio American Heart Association's STEM Goes Red event. The 5th year of this annual event focused on STEM career awareness with interactive demonstrations for roughly 100 middle school girls from the Columbus area. Dr. Thomas Hund, Penny Jones, Izabelle Colvin, and Ning Li, PhD, along with representatives from Biosense Webster provided interactive and immersive experiences such as virtual reality tours of a clinical electrophysiology lab and computer simulations of

AHA Summer Research Fellowship

In further partnership with the American Heart Association, the OSU Office of Undergraduate Research & Creative Inquiry (OUR&CI) and DHLRI, awarded five summer fellowships to undergraduate students who demonstrated an interest in pursuing a cardiovascular and stroke research career. THE USFP summer program carried a research award of \$6,000 as well as the opportunity for a \$3,000 travel award to attend a scientific meeting with their AHA mentor. This program offered meaningful research experiences that supported the mission of the American Heart Association to undergraduate college students. Recipients included **Nash Densel** (Mentor: **Paco Herson, PhD** – Department of Neurosurgery), **Campbell Clarkson** (Mentor **Xun Ai, MD** – Department of Physiology & Cell Biology), **Shane Tain** (Mentor: Hua Zhu, PhD – Division of Cardiac Surgery), and **Syed Ashraf** (Mentor: **Mahmood Khan, PhD** – Department of Emergency Medicine) . A special thank you to **Deb Wheeler** who has continued to be the driving force behind this USFP grant.

American Heart Association



STEM Goes Red™

CommUNITYten



In June, the DHLRI was proud to be a sponsor of the inaugural **CommUNITYten**: The Big Ten Academic Alliance (BTAA) for Women in Medicine and Biomedical Science Conference. The two-day conference, held at The Ohio Union, was inspired by groups working together to support each other in building a community across the BTAA peer institutions with the aim to move the gender equity needle at Ohio State and across the nation. Attended by medical, health and biomedical sciences professionals, faculty, staff,

trainees and students of all genders, the conference included an engaging workshop in science communication training from the Alan Alda Center for Communicating Science as well as national speakers on leadership and gender equity including **Nwando Olayiwola, MD, MPH**, internationally renowned physician, health care executive and woman's health advocate, and **Nancy Spector, MD**, executive leadership in Academic Medicine® (ELAM) and Health Care (ELH) and senior vice dean for faculty at Drexel University College of Medicine. In addition, the program featured panels of journal editing experts, mini coaching sessions, proven experiences in building advocate/ally programs, networking events, and mindfulness activities.

Community Professional Development Gender Equity

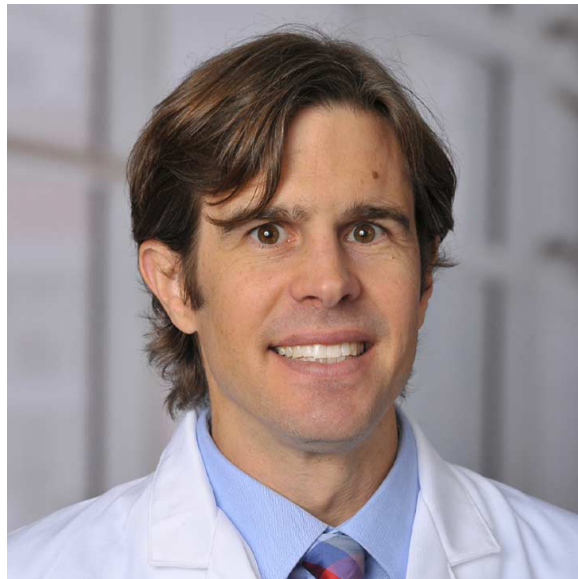
R01-101

The College of Medicine/DHLRI Grant Writing Program, “R01-101” was highly effective in supporting junior faculty through the process of preparing and submitting their R01 grant proposals. Continuing with two new cohorts, the program paired junior faculty submitting their first R01, with an assigned mentor. From July 2023-January 2024 and March - September 2024, selected applicants received personalized guidance on key aspects of grant writing, including refining the aims page to ensure clarity and impact, enhancing the narratives of background and research strategies, and developing a detailed and realistic budget support proposed research activities. Participants engaged in a mock study session providing critical feedback and refinement of their proposals.

The July cohort consisted of Drs. **Andrew Sas** [has received NOA] (Neurology), **Nate Bates** (Orthopedics), **Jacy Wagnon** [has received NOA] (Neuroscience), **Rebecca Vanderpool**



(Cardiovascular Medicine), **Matthew Long** (Pulmonary Critical Care and Sleep Medicine), **Nicholas Ferrell** (Nephrology), and **Asvin Ganapathi** (Cardiac Surgery). The March cohort consisted of Drs. **Zhentao Zhang** (Cardiac Surgery), **Stanley Huang** (Microbial Infection and Immunity), **Chris Fortney** (Nursing), **Kiran Nakka** (Physiology and Cell Biology), **Juliet Varghese** (Biomedical Engineering), **Saurabh Rajpal** (Cardiovascular Medicine), **Allen Mallory** (Human Development & Family Science), **Holly Jones** (Nursing), and **Mary Cole** (Radiologic Sciences and Therapy).



Andrew Sas, MD

Previous cohort successes include R01 recipients Drs. **Sarah Heissler**, **Shyam Bansal**, **Matthew Stratton**, **Krishna Chinthalapudi**, **Jie Hue**, **Janna Stephen**, **Natalia Higuaita-Castro**, and **Daniel Gallego-Perez**.



Jacy Wagnon, PhD

Working Wednesdays

DHLRI presented a new learning series, “Working Wednesdays”. Held on the third Wednesday of the month, these sessions covered a wide range of topics to explore the

intersection of scientific innovation and the business of science best practices. Presentations covered “Managing Grants” (Grants Management Office), “Workday Financials Tips and Tricks” and “Workday Travel Process” (DHLRI Administration), “Working with Human Subjects” (Office of Responsible Research Practices), and “Conflicts of Interest and Outside Activities Information” (Office of Secure Research).

The series continues in FY25 with planned presentations to include “R01-101- A Grant Writing Series”, “Women In Medicine and Science (WIMS)”, and Intellectual Property, to name only a few.



Midwest Aging Consortium

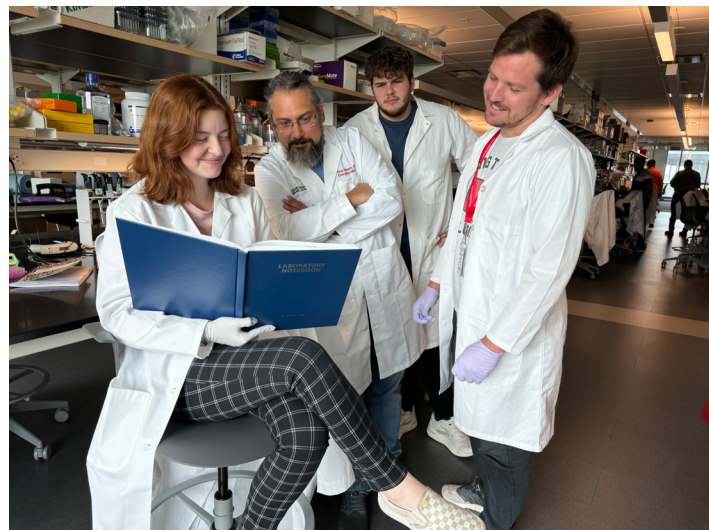


Last April the Ohio State University held the 5th Midwest Aging Consortium (MAC) meeting. The MAC has been a beacon of collaboration, bringing together institutions in the upper Midwest to advance aging research. The MAC currently spans 9 states in the Midwestern United States: Indiana, Illinois, Iowa, Kentucky, Michigan, Minnesota, North Dakota, Ohio, and Wisconsin. In the 2024 meeting, the represented institutions at the symposium included Albert Einstein College of Medicine, Mayo Clinic, the Universities of Case Western Reserve, Cleveland State, Indiana, Illinois-Chicago, Iowa, Iowa State, Kansas State, Kentucky, Miami (Ohio), Michigan, Michigan State, Minnesota, Northwestern, Ohio State, North Dakota, Iowa State, Stanford, Southern Illinois, Wayne State, Wisconsin–Madison, and Xavier. The goals of the MAC are to leverage the respective strengths of different programs, centers, and institutes of aging across the Midwest in order to accelerate scientific discovery and to provide a strong training environment for graduate students, post-doctoral scholars, and early-stage investigators. In attendance were 147 participants from 22 institutions presenting 72 abstracts. Drs. **Maria M. Mihaylova**, **Ana L. Mora**, and **Mauricio Rojas** of The Ohio State University were the organizers of the meeting.

Sponsors of the 2024 MAC include NIH R13 grant, Glenn Foundation, Hevolution/AFAR, education grant from Boehringer Ingelheim, and from OSU the Division of Pulmonary, Critical Care and Sleep Medicine, the Davis Heart Lung Research Institute, and the Infectious Disease Institute.

Featured Stories

Pelotonia Research Center (PaRC)



May 2024 marked the 1-year anniversary of the Pelotonia Research Center (PaRC), a state-of-the-art 305,000 square foot research building located in the Carmenton Innovation District on OSU West Campus. In a short period of time, the DHLRI has helped relocate or recruit 11 investigators and their labs to the Chlapaty Labs on the 5th floor of the Pelotonia Research Center. The DHLRI spaces in PaRC are organized into 5 different research neighborhoods: AI for Health, Heart Failure & Arrhythmia, Genetic Basis of Disease, Regenerative Medicine, and Protein Structure-Function in Disease. We are grateful for the flexibility, patience and collaborative spirit of our members who have embraced this opportunity to occupy some of the

most advanced research space on campus. In parallel, we have invested in new shared equipment to support our teams and have collaborated with the Enterprise for Research, Innovation and Knowledge, College of Medicine, the Comprehensive Cancer Center, Gene Therapy Institute, and other units to coordinate the establishment of essential core labs housed in the PaRC. DHLRI is leading operations for 2 of the PaRC: Small Animal Imaging and Comprehensive Small Animal Surgery. We are very excited about the transformative work that is already ongoing in the new space and look forward to the breakthrough discoveries to come!

T32 Postdoctoral Research Training Fellowship in the Biology and Aging and Lung Diseases

Age-related decline in lung resilience acts as a significant risk factor for pulmonary chronic diseases. With the increase in aging populations around the world, there is a growing and urgent need to invest in training physician-scientists and biomedical researchers with a focus geared toward the biology of pulmonary diseases and aging.

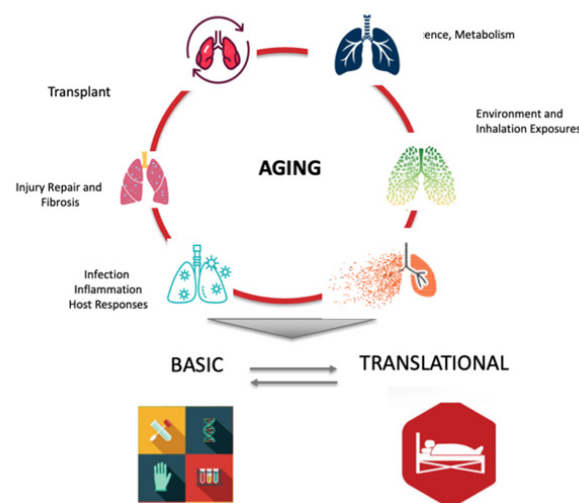
Our NIH-funded T32 training program is designed to train postdoctoral MD and PhD fellows into future leaders, stewarding cutting-edge research in the field of aging and lung disease. The program fosters a multidisciplinary approach- integrating basic mechanistic investigation of pulmonary diseases and the biology of aging with clinical and translational investigation of acute and chronic lung disease.

Our postdoctoral T32 training program offers 3 years of structured training for five postdoctoral fellows from MD or PhD backgrounds.

A dual mentorship training design will give trainees essential cross-disciplinary scientific and professional guidance in 6 areas:

- 1) Aging, senescence, and metabolism,
- 2) Immunity and host defense,
- 3) Injury and repair,
- 4) Environmental exposures,
- 5) Therapeutics and Transplant,
- 6) Biomedical informatics.

Our training faculty for this program are well established in broad areas of expertise that include acute lung injury, lung repair and fibrosis, airway biology including asthma and cystic fibrosis, pulmonary hypertension, immunology and the host-response to environmental exposures, respiratory infection, lung transplantation, metabolic alterations, genetics and aging biology and biomedical informatics. The program is directed by Drs Ana L Mora and Rama Mallampalli.



President Carter Visits DHLRI

OSU President Walter “Ted” Carter visited the DHLRI in April as part of his tour of research, education and patient care in the College of Medicine and School of Health and Rehabilitation Sciences. President Carter, joined by Dean Carol Bradford, learned how cardiac myocytes from mouse models of disease and donor human hearts not suitable for transplant are utilized in the Hund lab to generate new insights into molecular basis of heart failure and arrhythmia. In addition to the DHLRI, President Carter visited the Interdisciplinary Health Sciences Center, the Clinical Skills Education and Assessment Center in Prior Hall and the Athletic Training Lab in Atwell Hall.



Dean Carol Bradford with OSU President, Walter “Ted” Carter, Tom Hund, PhD, and Beka Shaheen (Hund Lab)

Schottenstein Prize

The Jay and Jeanie Schottenstein Prize in Cardiovascular Sciences provides national and international recognition to a physician or biomedical scientist who has made extraordinary contributions to improving health care or who has successfully pursued innovative research demonstrating translational benefits for patient care. This year’s recipient was Richard N. Kitsis, MD, Director, Wilf Family Cardiovascular Research Institute and Dr. Gerald and Myra Dorros Chair in Cardiovascular Disease at the Albert Einstein College of Medicine in New York City.

A native of Boston, Dr. Kitsis graduated summa cum laude from Harvard College with a bachelor’s degree in chemistry and completed medical school at the University of California San Francisco. His research is focused on cell death, particularly as it relates to heart disease. His lab was the first to show that regulated forms of cell death have critical roles in the pathogenesis of heart attacks. Dr. Kitsis has served as chair of the American Heart Association Council on Basic Cardiovascular Sciences and received the President’s Distinguished Lecture Award of the International Society for Heart Research.



Richard Kitsis, MD

Past Schottenstein Laureates

- 2021 - Mark Anderson, MD, PhD
- 2019 - Dan Roden, MD
- 2017 - Helen Hobbs, MD
- 2015 - Roberto Bolli, MD, FAHA
- 2013 - Garret FitzGerald, MD, FRS
- 2011 - Christine Seidman, MD



C.I.T.E - ing the Future

DHLRI Strategic Plan

As reflected in this Annual Report, the DHLRI continues to grow across all aspects of our mission. That said, we are always striving to attain new heights in terms of research impact. To ensure that we maintain a positive trajectory, we have defined specific goals in alignment with our core principles of Collaboration, Innovation, Translation and Equity. Here, we highlight some of the initiatives we will pursue over the year ahead.

Collaboration

The submission of large, programmatic federal and foundation grants to support interdisciplinary teams remains a high priority for the DHLRI. To be competitive in this space requires the expansion of sustainable core services and shared resources. As we expand these important resources, we will espouse an operational model based on efficiency, fiscal responsibility, and partnership with other units sharing common goals and values. We also aim to support collaboration in emerging fields (e.g. data analytics and modeling, aging, women's health) by promoting educational programs that bring researchers from different backgrounds/disciplines together. Finally, we will enhance grant development and mentorship support for students, fellows, and faculty across career stages.



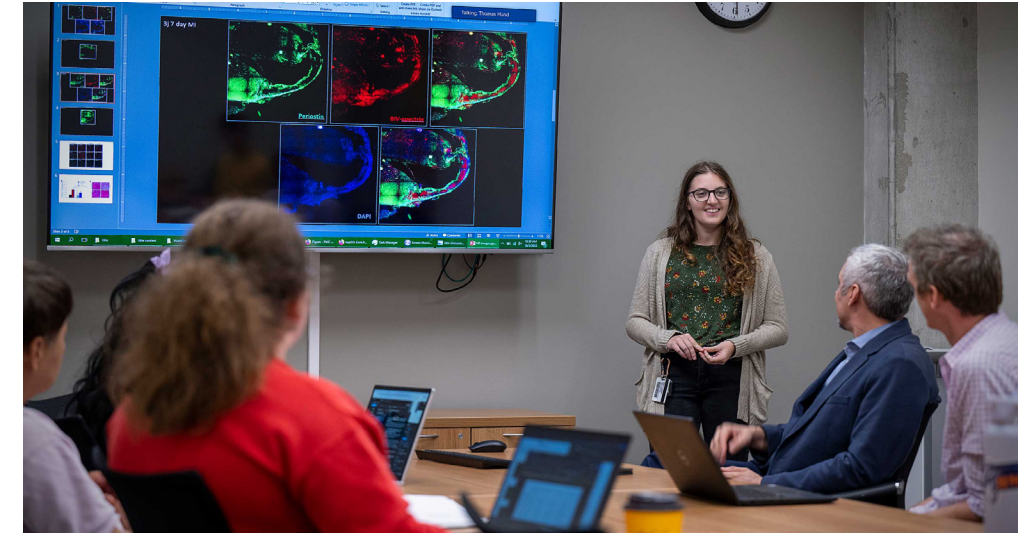
Sarah Morbitzer (JB Fellow) performing an experiment with Evangelie Schott (Gowdy Lab)

Innovation

We strive to create an environment that fosters new ideas and technology with the ultimate goal of advancing breakthroughs. An important part of this effort will be to recruit creative faculty at the forefront of discovery in partnership with like-minded departments and divisions. This effort will require continued availability of high-quality research space and infrastructure. While the Chlapaty Labs in the Pelotonia Research Center will remain an important resource to support recruitment, it will be important to identify additional opportunities for expansion of our physical plant. Likewise, we aim to be innovative with how we support faculty by tapping into the combined experience and creativity of our administrative team (>160 cumulative years of DHLRI experience). We seek to be on the cutting edge both locally and nationally in terms of how we conduct the “business of science.” In parallel, we will seek ways to support our faculty in the development of intellectual property including entrepreneurship and IP development programs. Pursue synergistic industry partnerships to advance cutting edge research. Finally, it will be crucial for us to continue to partner with Advancement to identify philanthropic sources to support innovative research with high potential for impact.

Translation

Another important component of our strategy to increase impact is to strengthen the bridge between basic science, engineering, and patient care through targeted investment. As one example, there is tremendous opportunity to leverage patient data for research purposes, from identifying new risk factors and mechanisms for disease to improvements in diagnosis, risk stratification and optimal delivery of care. Based on our high clinical volumes across a broad spectrum of patient populations and existing strengths in medicine, engineering, and data science, OSU has great potential to be a leader in this space, but concerted actions are required to realize our full potential. Over the next year, we seek to engage in conversation with key stakeholders across the medical center and university to



Rebecca Shaheen presenting her research to the Hund Lab.

Equity

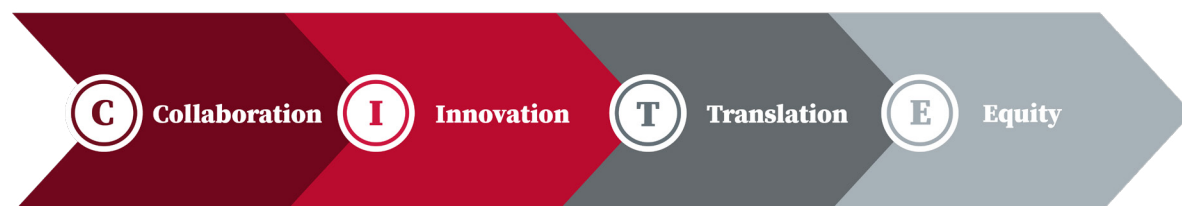


Drs. Tom Hund and Ning Li (Fedorov), Penny Jones, Isabelle Colvin, and representatives from Biosense Webster helping middle school students perform cardiac catheterization procedures on virtual reality headsets

Over the past year, we have placed a major emphasis on incorporating diversity, equity and inclusion into our mission based on the value we place on an environment where everyone feels welcome and the observation that diverse teams outperform less than diverse ones. Going forward, we will continue to work to identify and target barriers for professional development for all members. We also will advance educational programming on disparities in healthcare and research. Finally, we aim to partner with local schools promoting STEM and grow community partnerships.

In-Closing...

Thank you for being part of our journey to advance discoveries that enhance the quality of life for individuals with heart and lung diseases. I am immensely proud of what we have achieved so far and am equally excited about the opportunities ahead, driven by a culture of collaboration, innovation, translation, and equity.



DHLRI Membership List

Biological Chemistry & Pharmacology

Arthur Burghes, PhD
Nicholas Funderburg, PhD
George Kyriazis, PhD
Kamal Mehta, PhD
Kirk Mykytyn, PhD

Biomedical Engineering

Rizwan Ahmad, PhD
Daniel Conway, PhD
Daniel Gallego-Perez, PhD
Samir Ghadiali, PhD
Keith Gooch, PhD
Natalia Higueta-Castro, PhD
Mark Ruegsegger, PhD
Rengasayee Veeraraghavan, PhD
Seth Weinberg, PhD

Biomedical Sciences | Microbial Infection & Immunity

Amal Amer, MD, PhD

Center for Biostatistics

Stanley Lemeshow, PhD

Chemical & Biomolecular Engineering

Jeffrey Chalmers, PhD
Andre Palmer, PhD

Dentistry

John Sheridan, PhD

Electrical Engineering

Lee Potter, PhD

Emergency Medicine

Mahmood Khan, MPharm, PhD

Epidemiology

Amy Ferketich, PhD

Family & Community Medicine

TM Adesanya, MD, PhD
Randell Wexler, MD

Food Science & Technology

Ahmed Yousef, PhD

Health & Rehabilitation Services | Medical Sciences Division

Mireia Gurerau, PharmD, PhD

Human Nutrition

Martha Belury, PhD
Ouliana Ziouzenkova, MD

Internal Medicine | Cardiovascular Medicine

William Abraham, MD
Umair Ahmad, MD
Talal Attar, MD
Ralph Augustini, MD

Cindy Baker, MD
Ragavendra Baliga, MD
Michelle Ballinger, MD
Philip Binkley, MD
Indra Bole, MD

Konstantinos Boudoulas, MD

Vincent Brinkman, MD

Curt Daniels, MD

Steven Dean, MD

Michael Donnally, MD

Beth Foreman, MD

Veronica Franco, MD

Katarzyna Gil, MD

Richard Gumina, MD, PhD

Sampath Gunda, MD

Garrie Haas, MD

Yuchi Han, MD

Thura Harfi, MD

Ayesha Hasan, MD

Lauren Hassen, MD

Mahmoud Houmsse, MD

William Houser, MD

John Hummel, MD

Thomas Hund, PhD

Rami Kahwash, MD

Steven Kalbfleisch, MD

Arsad Karcic, MD

Sara Koenig, PhD

Tapan Kundu, MD

John Larry, MD

Lauren Lastinger, MD

Scott Lilly, MD, PhD

Jim Liu, MD

Doug Magorien, MD

Raymond Magorien, MD

Unni Marar, MD

William Marshall, MD

Ernest Mazzafferri, MD

Isla McClelland, MD

Laxmi Mehta, MD

Wesley Milks, MD

Paul Moodispaw, MD

David Orsinelli, MD

Vaiibhav Patel, MD

Adam Potter, MD

Ben Romer, MD

James Ryan, MD

Salvatore Savona, MD

Sakima Smith, MD
Gbemiga Sofowora, MD

Blair Suter, MD

Matthew Tong, MD

Ajay Vallakati, MD

Rebecca Vanderpool, PhD

Scott Visovatti, MD

Karolina Zareba, MD

Internal Medicine | Endocrinology, Diabetes, & Metabolism

Andrew Carley, PhD
Joshua Joseph, MD
Willa Hsueh, MD
E. Douglas Lewandowski, PhD

Internal Medicine | Human Genetics

Jason Cowan, PhD
Elizabeth Jordan, MS, LGC
Daniel Kinnamon, PhD
Ray Hershberger, MD

Internal Medicine | Microbiology

Daniel Wozniak, PhD

Internal Medicine | Nephrology

Daniel Birmingham, PhD
Nicholas Ferrell, PhD
Pei-Hui Lin, PhD
Todd Pesavento, MD
Brad Rovin, MD

Internal Medicine | Pulmonary, Critical Care & Sleep Medicine

Eric Adkins, MD
Naeem Ali, MD
Emily Amin, MD
Megan Ballinger, PhD
Joseph Bednash, MD
Ian Bentley, MD
Maneesh Bhargava, MD, PhD
Nitin Bhatt, MD
Kelsey Black, MD
Nathan Brummel, MD
Lawrence Chan, DO
Meg Chase, MD
John Christman, MD
Sarah Cohen, MD, MS
Megan Conroy, MD
Avraham Cooper, MD
Sangwoon Chung, PhD
Elliot Crouser, MD

Philip Diaz, MD
Ryan Donald, MD
Gregory Eisinger, MD
Joshua Englert, MD
Vincent Esguerra, MD
Matthew Exline, MD
Laszlo Farkas, MD
Lynn Fussner, MD
Sarah Gallucci, DO
Christian Ghattas, MBBCh

Josh Gordon, MD
Kymberly Gowdy, PhD
Derrick Herman, MD
Kevin Ho, MD
Steven Holfinger, MD
Jeffrey Horowitz, MD
Matt Huang, MD
Jennica Johns, MD
Nkechi Ijioma, MD
Manjula Karpurapu, PhD
Meena Khan, MD
Stephen Kirkby, MD

Sarah Knapp, MD
Laura Leuenberger, MD
James Londino, PhD
Matthew Long, PhD
Ulysses Magalang, MD
Rama Mallampalli, MD
Yohannes Mebratu, PhD
Jesse Mindel, MD
Ana Mora, MD
Richard Nho, PhD
David Nunley, MD
John Odackal, MD
Stella Ogake, MBBCh
Jasleen Pannu, MBBS

Sonal Pannu, MD
Narasimham Parinandi, PhD
Jonathan Parsons, MD
Nicholas Pastis, MD
Dustin Peth, DO
Verai Ramasammy, MD
Alberto Revelo, MD
Mauricio Rojas, MD
Justin Rosenheck, DO
Anasuya Sarkar, PhD
Troy Schaffernocker, MD
Arindam Singha, MD
Bronwyn Small, MD

Carleen Spitzer, MD
Jerome Stasek, MD
Kyle Stinehart, MD
Sarah Tapyrik, MD
Joanna Tsai, MD
Jing Wang, MD
Michael Wert, MD

Internal Medicine | Rheumatology and Immunology

Latha Ganesan, PhD

Microbial Infection and Immunity

Adriana Forero, PhD
Emily Hemann, PhD
Murugesan Rajaram, PhD

Molecular Medicine & Therapeutics

Matthew Ringel, MD
Michael Tranter, PhD
Wandi Zhu, PhD

Neurological Surgery

Paco Herson, PhD
Kristy Townsend, PhD

Neuroscience

Phillip Popovich, PhD

Obstetrics & Gynecology

William Grobman, MD
Douglas Kniss, PhD

Pediatrics | Nationwide Children's Hospital

Benjamin Blais, MD
Christopher Breuer, MD
Vidu Garg, MD
John Gunn, PhD
Mark Hall, MD
Deqiang Li, MD, PhD
Brenda Lilly, PhD
Leif Nelin, MD
Mingtao Zhao, DVM, PhD

Pharmacy

Terry Elton, PhD
Przemyslaw Radwanski, PharmD, PhD

Physiology and Cell Biology

Xun Ai, MD
Kedryn Baskin, PhD
Brandon Biesiadecki, PhD
Krishna Chinthalapudi, PhD
Jonathan Davis, PhD
Isabelle Deschenes, PhD
Vadim Fedorov, PhD
Jidong Fu, MD, PhD
Sandor Gyorke, PhD

Sarah Heissler, PhD
Paul Janssen, PhD
Beth Lee, PhD
Christoph Lepper, PhD
Peter Mohler, PhD
Kiran Nakka, PhD
Drew Nassal, PhD

Yuta Nihongaki, PhD
Jill Rafael-Fortney, PhD
Harpreet Singh, PhD
Matthew Stratton, PhD
Nuo Sun, PhD
Dmitry Terentyev, PhD
Jing Zhao, MD, PhD
Yutong Zhao, MD, PhD
Mark Ziolo, PhD

Psychiatry and Behavioral Health

Tamar Gur, MD, PhD

Radiology

Arunark Kolipaka, PhD
Orlando Simonetti, PhD

Surgery | Cardiac

Mona El Refaey, PhD
Matthew Gorr, PhD
Bryan Whitson, MD, PhD
Loren Wold, PhD
Lufang Zhou, PhD
Hua Zhu, PhD

Surgery | General

Julia Coleman, MD, MPH
Kristin Stanford, PhD

Surgery | Transplant

Ginny Bumgardner, MD, PhD

Surgery | Vascular

Matthew Corriere, MD
Bryan Tillman, MD, PhD

Veterinary Biosciences

Estelle Cormet-Boyaka, PhD

Celebrating Over 20 Years of Research at the DHLRI

2024
 DHLRI creates the 4th pillar of the Institute - Diversity, Equity, and Inclusion. Followed by a 5-month training series with representation from all labs, the DEI Committee is created whose mission is to foster an inclusive environment that empowers all faculty, staff and trainees to pursue impactful research sharing from an inclusive pool of experience and knowledge.

2023
 Kristin Stanford, PhD named Associate Director of DHLRI.
 DHLRI expands its footprint as an anchor on the 5th floor of the Pelotonia Research Center with the addition of several labs.
 Research funding at The Ohio State University College of Medicine experienced double-digit growth during the 2023 fiscal year, setting a new record at \$421.4 million.

2022
 Thomas J. Hund, PhD is named Director of DHLRI
 DHLRI received a \$5.5 million gift from the Dorothy M. Davis Foundation to support a new research chair and sponsor a floor in the new Pelotonia Research Center

The Ohio State University Wexner Medical Center and College of Medicine set a new record for research awards. With many DHLRI investigators and members contributing to this increase, the year closed with a 22% increase over Fiscal Year 2021. The FY22 research portfolio included 98 new \$1+ million awards and more than 3,000 active awards, a 6.2% increase over FY21.

2021
 At the forefront of the global COVID-19 response, DHLRI continued to play an active role in fighting COVID-19. Repurposing lab space for COVID testing, countless numbers of samples from around the State were processed.
 Personnel volunteered to create almost 400,000 virus transport media (VTM) tubes which were used throughout Ohio and nationwide.
 DHLRI administration assists in the herculean effort to help process public vaccination for those 80 and older.

2020
 DHLRI celebrates their 20th Anniversary, virtually. Due to the COVID-19 pandemic, the event was held through Zoom.

2019
 Joe and Linda Chalpaty make a \$15 million commitment to further Atrial Fibrillation research.

2018
 The 35,000 square foot Bob and Corrine Frick Center for Heart Failure and Arrhythmia is opened; the first-of-its-kind center in the nation.

2017
 The DHLRI expands adding 6 additional sites with a total space footprint of >200,000 square feet.
 Philanthropic support grows 90% since 2013.
 Thomas J. Hund, PhD named Associate Director of DHLRI.

2016
 DHLRI encompasses over 700 faculty, staff, and trainees from nine different colleges of 26 departments and divisions.
 500 articles on basic and translational research appear in top-tier journals, spanning subjects from molecules to humans resulting in more than 200 clinical research trials in cardiovascular and pulmonary medicine.

DHLRI expands to over 600 faculty, staff, and trainees.
 Connor Senn Memorial Soccer Match and Symposium on Sudden Cardiac Death; proceeds benefitting DHLRI (raised over a quarter million dollars over past 2 decades).

2007
 Dr. Thomas Ryan joined the Ohio State University Heart Center on July 1, 2007 as director. He was also the John G. and Jeanne Bonnet McCoy Chair in Cardiovascular Medicine and held appointments as professor of internal medicine and physician-scientist leader for the Medical Center's heart signature program - which unites the Davis Heart and Lung Research Institute and the Ross Heart Hospital.

2013
 TriFit challenge begins with event proceeds going directly to DHLRI for research into early detection of heart disease.

2011
 Peter J. Mohler, PhD is hired as Director

2003
 An OSURF satellite office is established in the DHLRI.

2005
 For the first time, OSU heart and lung programs are ranked among "America's Best" by U.S. News and World Report's Hospitals list.

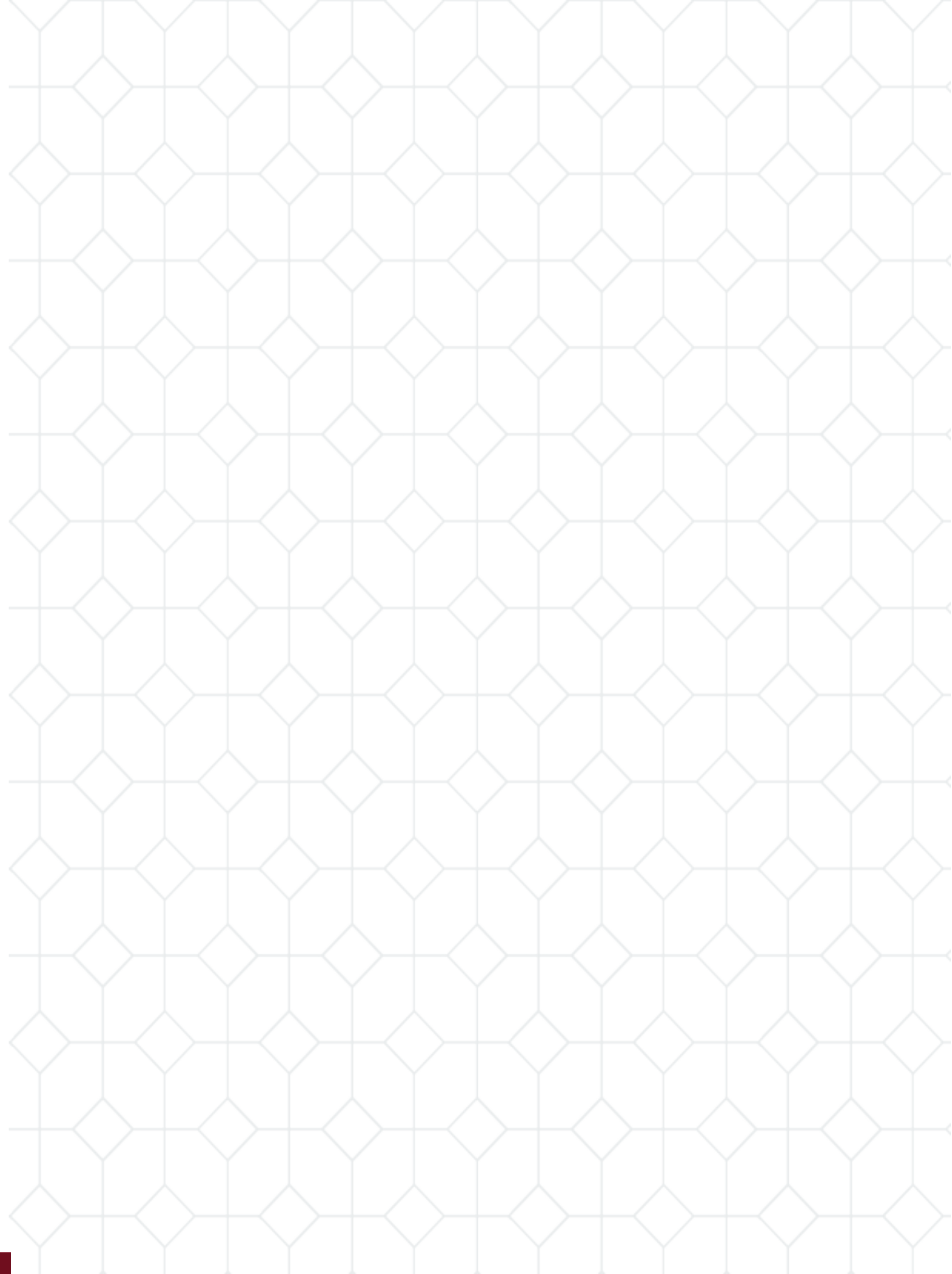
2002
 The OSU Department of Surgery and the Davis Heart and Lung Research Institute host the first conference in the United States to address the potential role of oxygen in wound care. This international conference focuses on oxygen sensing, oxidant signaling, oxygen therapeutics, gene therapy, angiogenesis, inflammation, and clinical care.
 Jay Zweier, MD, PhD is hired as Director.
 Broke ground on the Richard M. Ross Heart Hospital, clinical arm of the HVC and direct partner in DHLRI research and translational care.

2001
 The OSU Heart & Lung Research Institute is renamed Dorothy M. Davis Heart and Lung Research Institute, as approved by the Board of Trustees upon receiving a \$1,000,000 endowment and \$10 million gift.

2000
 The OSU Heart and Lung Research Institute opens its doors to a 96,000 square foot free-standing building, one of the largest and most comprehensive Institutes/Centers at The Ohio State University and dedicated institutes in the country devoted to cardiovascular, pulmonary, renal, and metabolic disease.



Notes



**With cooperation by contributors, this annual report was created
and edited by Isabelle Colvin, DHLRI.**



**THE OHIO STATE
UNIVERSITY**

**DOROTHY M. DAVIS HEART AND
LUNG RESEARCH INSTITUTE**