

SUBMITTED BY: STEPHEN M. LANIER, VICE PRESIDENT FOR RESEARCH
DIVISION OF RESEARCH CENTERS AND INSTITUTES HIGHLIGHTS - 2021

HIGHLIGHTS OF DIVISION OF RESEARCH CENTERS AND INSTITUTES

There are four Type II centers and institutes that report to the Vice President for Research. These large, multidisciplinary centers are engaged primarily in research, and include the Institute of Environmental Health Sciences/Center for Urban Responses to Environmental Stressors (<https://iehs.wayne.edu/>), the Institute of Gerontology (<https://iog.wayne.edu/>), the Merrill Palmer Skillman Institute for Child and Family Development (<https://mpsi.wayne.edu/>) and the Center for Molecular Medicine and Genetics (<https://www.genetics.wayne.edu/>), which has a dual reporting line to the Dean of the School of Medicine and the Vice President for Research..

These important units cut across traditional disciplinary boundaries by bringing faculty together from various schools and colleges to engage in research and activities that advance the mission of the University. All Centers/Institutes are chartered and incorporated in the Wayne State University Code Annotated (WSUCA). Centers/Institutes must follow the procedures for governance, operation and financial procedures and program review as stated in *WSUCA 2.23.01 Centers and Institutes - Establishment* and as standardized in each charter. All Center/Institute are required to undergo a structured comprehensive review every five years.

The following are highlights of each of these centers and institutes activities in 2021.

INSTITUTE OF ENVIRONMENTAL HEALTH SCIENCES/CENTER FOR URBAN RESPONSES TO ENVIRONMENTAL STRESSORS HIGHLIGHTS **MELISSA RUNGE-MORRIS, M.D., DIRECTOR**

Under the leadership of Dr. Melissa Runge-Morris, the mission of the Institute of Environmental Health Sciences (IEHS) is to apply advanced research approaches to understand and mitigate the deleterious effects of the urban industrial environment on human health. The IEHS is committed to building strong transdisciplinary research teams to meet the challenges of the changing urban environment. The ultimate goal of IEHS research is to benefit human health through the prevention or early detection of environmentally-induced disease.

The IEHS is home to the Center for Urban Responses to Environmental Stressors (CURES). CURES is a diverse team of scientists, clinicians, public health professionals, educators and community leaders working together to build a healthy living and working environment in the City of Detroit. Located in the heart of the “motor city” and situated on the Wayne State University urban campus, the CURES Center motto is “Gateway to a Healthy Detroit.”

The following are highlights of some of the many activities and accomplishments of the Institute of Environmental Health Sciences in 2021.

- The \$2.3 million Center for Urban Responses to Environmental Stressors (CURES) (P30 ES020957), funded by NIEHS since 2014, submitted its competitive renewal application and is pending funding decision. CURES focuses on the role of urban exposure to chemical and non-chemical environmental stressors as critical determinants of health and resilience in the City of Detroit. IEHS/CURES in IBio serves as the nerve center for the CURES transdisciplinary team of investigators, educators, and community partners. Since CURES' last competitive renewal in 2017, the CURES NIH funding base has grown ~3-fold, from \$1,371,672 in 2017 to \$3,963,399 in 2022. Return on investment for CURES NIEHS funding base during this past year amounts to 308%, and CURES pilot project funding return on P30 investment since 2017 is >20-fold.
- The \$13 million "Center for Leadership in Environmental Awareness and Research (CLEAR) (1P42 ES030991-01A1)" Superfund Research Program application is currently pending funding decision from NIH. This richly collaborative program, led by MPIs Drs. Runge-Morris and Carol Miller of CURES, applies biomedical and engineering research expertise, community engagement, training, and data and analytical support to investigate the role of exposure to volatile organic chemicals (VOCs) in the urban built environment as a key contributing factor to Detroit's persistently high rates of preterm birth and adverse birth outcomes.
- "Addressing Cardiometabolic Health Inequities by Early Prevention in the Great Lakes Region," (ACHIEVE GreatER; P50MD017351). ACHIEVE GreatER is an \$18 million translational research program that was recently funded by the National Institute on Minority Health and Health Disparities (PI, CURES member, Phillip Levy, MD; also includes CURES members Ghosh, Korzeniewski, and Kocarek). When recently reviewed, the decision to include environmental health objectives as a focus area in the ACHIEVE GreatER initiative was considered a major strength.
- CHECK-UP. Wayne State University recently approved the charter of a new "Community Knowledge in Urban Populations (CHECK-UP)" Center focused on furthering urban health equity, antiracism, and community education. Focus areas include 1) LGBTQ Health, 2) Middle Eastern and North African & Immigrant Health, 3) Racial Equity and Black Health, and 4) a Community Scholars Program (funded by a grant from the Total Health Care Foundation). Led by Dr. Hayley Thompson of the Karmanos P30 Comprehensive Cancer Center, CHECK-UP draws upon CURES leadership, resources, and experience; Dr. Carrie Leach of the CURES Community Engagement Core (CEC) is the Associate Director of Community Inclusion in CHECK-UP and CURES CEC Coordinator Rochelle Chapman is the integrative liaison to Detroit's faith-based communities.
- S10 Shared Instrument Grant Award (S10 OD030484-01). In response to CURES members' growing analytical needs, CURES Exposure Signatures Facility Core co-leader Dr. Paul Stemmer competed successfully for an S10 Shared Instrumentation Grant to purchase a new Orbitrap Eclipse. The Eclipse is the most advanced mass spectrometer for proteome analysis and provides enabling technology for the analysis of low abundance contaminants and VOC protein adducts produced after VOC exposure.

- Cultivating the Next Generation of Leaders in Environmental Health Science. As a direct result of CURES Career Enhancement mentoring, Integrative Health Science Facility Core team-science expertise, and pilot project funding opportunities, CURES has provided a fertile environment for introducing early-stage investigators to the field of environmental health science research and for expanding the research careers of those with previous environmental health training. For example:
- Dr. Tracie Baker is a molecular toxicologist with expertise in the zebrafish model. Dr. Baker benefitted from CURES pilot project funding and received her first R01 funding from NIEHS in 2019 (“Genetic and epigenetic mechanisms of infertility caused by endocrine disrupting chemicals,” R01 ES030722). Dr. Baker developed an international reputation as a consequence of CURES collaborations and was promoted to associate professor at Wayne State University in 2021. She recently accepted a new faculty position at the University of Florida but remains a committed CURES member and also serves as a project PI in the CLEAR Superfund Research Program application.
- Dr. Marianna Sadagurski is an assistant professor at Wayne State University with specialized training in the neuroscience of metabolic disease. She was attracted to environmental health science research by CURES. Dr. Sadagurski competed successfully for CURES pilot project funding and also benefitted from CURES Career Enhancement mentoring. In November 2021 Dr. Sadagurski’s NIEHS R01 application entitled, “Benzene Exposure Promotes Neuroinflammation and Metabolic Dysregulation” (R01 ES033171-01A1), which was based on her CURES pilot project, received a score of 1 percentile. As a consequence of collaborative bridges made possible by CURES, Dr. Sadagurski is a rising star in CURES and is also a project co-investigator in the pending CLEAR proposal.
- Dr. Michael Petriello is an assistant professor who was recruited to Wayne State University in 2019 from the University of Kentucky. He is a basic science toxicologist with expertise in metabolic disease and metabolomics. As a consequence of career mentoring, collaborative connectivity, and pilot project opportunities made possible by CURES, Dr. Petriello has expanded the translational direction of his research within a short timeframe. Dr. Petriello recently received competitive funding (2-year award of \$200,000) from the Environmental Influences on Child Health Outcomes (ECHO) program for a project entitled “Impacts of interactions between environmental chemical exposures and diet on gut microbiota and microbiota-derived metabolites in mothers and children.” A second translational research award grew out of a CURES pilot project proposal. It is a 1 year, \$41,000 competitive award from the Detroit Medical Center Foundation for a project entitled “Impact of PFAS pollutant exposures on cardiovascular disease markers in African American residents of Detroit and interventions with statins.” This work represents a collaboration between Dr. Petriello and physician-scientist Dr. Levy (ACHIEVE GreatER PI).

INSTITUTE OF GERONTOLOGY HIGHLIGHTS

PETER LICHTENBERG, PH.D.

Under the leadership of Dr. Peter Lichtenberg, the Institute of Gerontology at Wayne State University is a premier program that is intensively focused on research, advanced pre- and post-doctoral student training, community outreach and continuing education for health care providers. Their goal is to inform and empower older adults and those who serve them through discovery and learning. Their research mission is to advance understanding of age-related changes and age-related differences in neural, cognitive, economic and social processes with a goal of improving the community's health through the research that they do.

The Institute of Gerontology has formed strong collaborations across the university, within the City of Detroit, across the state and with national and international scientific communities in an effort to stimulate research and teaching of gerontology. The Institute of Gerontology is respected for its long-standing expertise and engagement with local, national and international communities of scholars and practitioners, and are known as innovators in conceptual, methodological and translational aspects of gerontological research and practice.

The following are highlights of some of the many activities and accomplishments of the Institute of Gerontology in 2021.

- The Institute of Gerontology received approval to search for a new faculty member and they are now interviewing candidates.
- The Institute of Gerontology has now trained close to 100 Ph.D. candidates in its Pre-Doctoral Training Program in Aging & Health.
- The Institute of Gerontology trained nearly 26,000 professionals in the past two years through 165 online programs – now reaching across eight states.
- The Institute of Gerontology has connected to 6,285 older adults by hosting 43 online conferences and workshops in the past year.
- Peter Lichtenberg, Ph.D., ABPP, director of the Institute of Gerontology at Wayne State University, was installed as 78th President of the Gerontological Society of America. The Gerontological Society of America is the leading interdisciplinary gerontology research organization in the world, with a membership of 5,300. Dr. Lichtenberg is the first Wayne State University member of GSA to be elected president.
- The Institute of Gerontology continued the development of Older Adult Nest Egg website and efforts toward licensing are in process. OlderAdultNestEgg.com provides free online training, screenings and interviews to assess financial decision-making ability of older adults and identify exploitation risks. The tools are designed for easy use by a long list of professionals who work with older adults.
- Fund Development – The Institute of Gerontology's endowment is now over \$2 million—their goal was raised to \$2.5 million. The Institute of Gerontology has also had an increase in grant funding over the past two years.

- Jessica Robbins, Ph.D., assistant professor of anthropology and in the Institute of Gerontology, has published *Aging Nationally in Contemporary Poland: Memory, Kinship, and Personhood* (Rutgers University Press, 2021). The book examines how the recent concept of “active aging” interacts with the health-promoting behaviors of older Poles who lived through major social, economic and political upheaval as the country transitioned from socialism to capitalism. Dr. Robbins has won awards for her book and article on aging nationally.

MERRILL PALMER SKILLMAN INSTITUTE HIGHLIGHTS

PETER LICHTENBERG, PH.D.

Under the leadership of Dr. Peter Lichtenberg, the Merrill Palmer Skillman Institute for Child & Family Development has been improving the welfare of children and their families for 100 years. Founded in 1920 as the Merrill-Palmer Motherhood and Home Training School, it has served Detroit's children through research and formal academic programs in child development, disciplines then in their infancy. The Institute has trained generations of parents, teachers, students and researchers in areas important for infants, children and adolescents across the nation and world. The Institute remains at the cutting edge of research and training in child development, ever responsive to the pressures of modern society on urban families and young children.

The Institute is committed to leadership, innovation and excellence in scholarship, and training and community involvement across Wayne State University, Detroit, Southeastern Michigan, and the nation. It is responsive to rapidly emerging social, biological, environmental, and other challenges and opportunities faced by urban families and children of all ages, and works to nurture collaboration and creativity in integrative, transdisciplinary scholarly inquiry and knowledge translation that capitalizes on combined academic strengths, and fosters community partnerships within Detroit for mutual benefit. The Merrill Palmer Skillman Institute provides outstanding training opportunities to diverse undergraduate and graduate students and postdoctoral fellows in programs that are seamlessly integrated with our research and community outreach activities to prepare the next generation of leaders in child and family development.

The following are highlights of some of the many activities and accomplishments of the Merrill Palmer Skillman Institute in 2021.

- Faculty in the Merrill Palmer Skillman Institute had 20 major media articles or media appearances over the past two years including MSN, the Detroit Free Press, NBC News and National Geographic.
- A major historical exhibit marking Merrill Palmer Skillman Institute's centennial was installed at the Reuther Library. Founded in 1920 as the Merrill-Palmer Motherhood and Home Training School, the Merrill Palmer Skillman Institute has played a vital part in the history of Detroit and the nation. From the beginning, its innovative approach to education and science has served the interests of children and their families. The vision of its founding benefactor and namesake, Lizzie Merrill Palmer, has guided the school for a century, a vision nurtured and re-imagined by many prominent Detroiters, dedicated scientists and teachers. From its earliest days, Merrill-Palmer has been closely associated with Detroit. The King of Siam told American visitors in 1928 that he knew of Detroit because that was the home of the Merrill-Palmer School. Merrill-Palmer's relationship to Detroit helps explain how the school developed as an institution deeply engaged with its many communities. The city grew and changed through two world wars, the Great Depression, the Civil Rights movement, the Great Society and de-industrialization. So too did the people of Merrill-Palmer change their attitudes toward community. This exhibit explores Merrill-Palmer's history primarily from the perspective

of the women who shaped, led and supported it. Each believed Merrill-Palmer was a community maker.

- The Merrill Palmer Skillman Institute's Early Childhood Center was re-accredited by the National Association for the Education of Young Children.
- In 2021, the Merrill Palmer Skillman Institute received \$882,852 in donations.
- The Merrill Palmer Skillman Institute has an active search for a director.

CENTER FOR MOLECULAR MEDICINE AND GENETICS HIGHLIGHTS

LAWRENCE GROSSMAN, PH.D.

Under the leadership of Dr. Lawrence Grossman, the Center for Molecular Medicine and Genetics is comprised of basic researchers, physician-scientists, computational scientists and genetic counselors that have the common goal of excellent in molecular genetics, molecular medicine and genomics to increase the understanding, diagnosis, treatment and prevention of human disease.

The Center features four main areas of research focus: inflammation, metabolism, neurogenetics, and functional genomics. These are linked by core bridging disciplines such as computational biology, molecular biology, translational medicine, and genetics/genomics. The genetic counseling program also provides a critical bridge between basic sciences and translational research. The Center for Molecular Medicine and Genetics offers a Ph.D. program in Molecular Genetics and Genomics that attracts top students interested in intensive research training and education in the foundation of modern genetics and genomics research. The Center also trains MS and Ph.D. students from other programs including biochemistry and molecular biology, and also cancer biology.

The following are highlights of some of the many activities and accomplishments of the Center for Molecular Medicine and Genetics in 2021.

- CMMG researchers received 22 new or continuing grants for the calendar year 2021.
- CMMG researchers published in dozens of peer-reviewed publications, some in very top ranked journals. They also published a number of book chapters.
- Dr. Ren Zhang's lab previously discovered the long-sought mitochondrial NAD kinase (MNADK), which plays a crucial role in fat metabolism and antioxidant protection.
- Dr. Lobelia Samavati submitted a new Patent application: Autoantibodies against cytoskeletons and lysosomal trafficking in sarcoidosis.
- Dr. Maik Hüttemann - US Patent 11,020,604; role: primary inventor; publication date: 06/01/2021; title: "Light therapy treatment", filed 06/27/2018.
- Multiple Center members serve as editors or on editorial boards of professional journals.
- Dr. Kezhong Zhang was awarded four patents/licenses in 2021
- New Courses through CMMG:
 - Dr. Kezhong Zhang initiated a new course, "Molecular Organelle Physiology," in 2021
 - This course, which addresses the hot topics of integrated signal transduction and stress responses, was developed and initiated in 2021 to cover the advanced topics and learning demands from graduate and MD students, postdoc fellows, and junior faculty in the newly emerging field of molecular and cellular organelle physiology. It is the first of its kind at WSU.

- Dr. Tiffany Cook and Dr. Alexander Gow
 - Initiated the undergraduate course NEU6470: Preclinical and Clinical Assessments of Neurologic Disease II.
- Dr. Alexander Gow initiated an Accelerated Graduate Enrollment (AGRADE) in the Master of Science (MS) Program in the Center for Molecular Medicine and Genetics (MS-MGG) in Collaboration with the College of Liberal Arts and Sciences Bachelor of Science (BS) Program.
- Community outreach through CMMG:
 - Dr. Francesca Luca’s team – “Silly Science @Home” – Online science outreach program. Maire Elementary School, Grosse Pointe, MI. Science experimental activities with 1st-5th grade students. **Role:** Organizer and Speaker
 - Prof. Angela Trepanier served as co-chair of the Michigan Cancer Genetics Alliance.
- Faculty service accomplishments in CMMG:
 - Prof. Angela Trepanier served as section editor for the Journal of Genetic Counseling (for Professional and Workforce Issues, Special Issue on Covid 19).
 - Dr. Lawrence Grossman is on the editorial board of the journal *Mitochondrion*.
 - Dr. Stephen Krawetz is editor-in-chief of *Systems Biology in Reproductive Medicine*.