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June Newsletter

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The NEXUS Podcast

Advancing Exposomics at NIH with NIEHS Director Kyle Walsh



In this episode of the NEXUS Podcast, NEXUS MPI Gary Miller, PhD, Columbia University, sits down with Kyle Walsh, PhD, Director of the National Institute of Environmental Health Sciences, to discuss the future of Exposomics at NIH.

The NEXUS Podcast aims to bring together stakeholders across the field of exposomics to foster dialogue on key topics, advance the understanding of the exposome, support the growth of the field, and explore opportunities for integration with other scientific disciplines.

Listen on Spotify

Spotlight

Kyle Walsh, PhD Director of the National Institute of Environmental Health Sciences

Biography adapted from the National Institutes of Health (NIH) website



Kyle Walsh, Ph.D., became Director of the National Institute of Environmental Health Sciences (NIEHS), which is part of the National Institutes of Health, on October 10, 2025. NIEHS is the world's premier biomedical research organization focused on environmental health.

Walsh oversees the institute's nearly \$1 billion annual budget to advance a broad portfolio of intramural and grant-funded research into how the environment may affect human health. He also directs the National Toxicology Program, which is headquartered administratively at NIEHS.

Prior to assuming these leadership roles at NIEHS, Walsh led a pioneering research program at Duke University, studying how genetic, epigenetic, and environmental factors can interact to influence brain health, cancer risk, and aging. He is a renowned neuro-epidemiologist whose work on glial senescence and gliomagenesis has provided critical insight into how the interplay of environmental exposures and biological processes of aging can lead to human disease.

Continue Reading Dr. Kyle Walsh's Biography

NEXUS Leadership Reflections from the Global Exposome Summit 2026

By: NEXUS Leadership



At the end of April, the global exposomics community gathered in Sitges, Spain, just outside of Barcelona, for the [Global Exposome Summit](#), bringing together researchers, policymakers, public health leaders, and industry experts to advance the field of exposomics. The meeting was hosted by the International Human Exposome Network (IHEN) and the [Global Exposome Forum](#), and organized by [ISGlobal](#) and the [Global Exposome Summit Organizing Committee](#).

The theme of day three of the summit was “building the global exposome community.” It was organized by the Global Exposome Forum and provided the opportunity for greater discussion among attendees, building on ongoing and launching into new collaborations towards this goal. The first four parallel sessions were co-lead by NEXUS leadership, and were designed to mirror the areas of focus and expertise critical to advancing exposomics. These panels were a great opportunity to highlight the work of NEXUS and the international GEF working groups around these domains.

The panel “ExWAS and Big data / AI” highlighted both the transformative potential and major limitations of AI in exposome research. The anchoring prompt was, how would you define an exposome investigation? What are its key characteristics, and what role does AI play in this frontier? A major takeaway from the panel discussion was that the scientific community knows what the calibration layer needs to contain, and this is not limited to exposomics, but all of biomedical sciences.

The “Geospatial Methods and Applications” panel discussed the ever-growing need for scalability (in space and time) and for validation of large, multimodal geospatial models to predict and characterize the external exposome which continue to be challenged by computational demands, but also by the global imbalance in ground measurements which are necessary to train and improve these models to achieve performance metrics necessary for health research.

The “Wearables” panel discussion covered compliance and participant burden, cost versus scalability, and the need for rigorous validation frameworks as persistent translational barriers to moving emerging technologies from controlled validation studies into large longitudinal cohorts.

The “Chemical and biological analytics” panel discussed ensuing responses and discussion identified key gaps in communication of results of exposomics measurement findings to the consuming public and the need for thoughtful assessment of underlying financials and legislations.

Continue Reading the Reflections from the Global Exposome Summit

The Magnificent Structures Problem: AI, the Exposome, and What We Still Don't Know

A report from the Exposome Global Forum, Sitges, Spain
By: Chirag Patel

I had the privilege of moderating a panel on AI and the exposome with six colleagues whose vantage points span the field: Mingliang (Thomas) Fang (Fudan), John House (NIEHS), Arjun (Raj) Manrai (Harvard), Heidi Hanson (Oak Ridge National Laboratory), Marc Chadeau Hyam (Imperial College, UK), Vasilis Vasilou (Yale), and John Ioannidis (Stanford). We spent 70 minutes together in total.



The anchoring prompt was provocative: How would you define an exposome investigation? What are its key characteristics, and what role does AI play in this frontier? I wanted the panel to take the definition seriously before reaching for the tools. Twenty years in, the exposome field still argues about what counts as an exposome study, though the term recently has had a refreshing (ref Science 2021). AI, by lowering the cost of producing convincing-looking science, makes the definitional question urgent. What follows is my synthesis of where the panel landed, with the help of AI.

Read the full article

The NEXUS Podcast

The Role of Policy in Advancing the Field of Exposomics with Rémi Quirion

At the Global Exposome Summit in April, NEXUS MPI Gary Miller, PhD, Columbia University, had the opportunity to sit down with the Chief Scientist of Quebec and President of INGSA, Rémi Quirion, to discuss the role of policy in advancing exposomics.



Connections at the Global Exposome Summit 2026

In addition, NEXUS had the opportunity to discuss with meeting attendees about their work in exposomics along with their reflections on the field and the Global Exposome Summit.

Hear from: Marc Chadeau-Hyam, Imperial College London; Sarah De Saeger, Ghent University; Adrian Covaci, University of Antwerp; Jeanette Stingone, Columbia University; Donghai Liang, Emory University; Alice Limonciel, Bruker; Lea Maitre, ISGlobal.



“Understanding Exposomics for Lifecourse Health and Ageing: An Indian perspective for a Viksit

Bharat"

By: [GEF event organizing committee](#) and NEXUS Leadership



On May 28th, the [Global Exposome Forum \(GEF\)](#) hosted a virtual town hall featuring the newly formed GEF India Regional Chapter centered on the theme "Understanding Exposomics for Lifecourse Health and Aging: An Indian perspective for a Viksit Bharat."

The event brought together more than 120 participants from around the world, including global leaders in exposomics alongside high-level scientists, clinical researchers, and policy makers from India, to discuss the role of exposomics as a determinant of human health towards building a healthy and developed India.

In recent years, several large population-scale environmental health-focused cohort studies have been initiated in India, with thousands of participants enrolled across multiple states and all stages of the life course. These studies include multiple fields of information on environmental, metabolic, socio-behavioral, and epigenetic determinants of human health and thus readily lend themselves to exposomics research. With strategic data harmonization and sharing, these studies can offer nuanced insights for regional and global human exposomics initiatives. With a view to catalyse momentum on exposomics in India, the Virtual Town Hall was organized jointly by [the event and organizing committee](#).

The Town Hall began with a presentation by NEXUS MPI Gary Miller, Columbia University, who provided an overview of the field of exposomics and an update on recent technological advances that are moving the field forward. Next, Fenna Sillé, Johns Hopkins University, presented an overview of the Global Exposome Forum. These introductions were followed by talks from senior scientific voices from India including Prof. Anurag Agrawal, Ashoka University who discussed opportunities in India for big data and human health, Ashoka University and Prof. Soumya Swaminathan, MS Swaminathan Research Foundation (MSSRF) who spoke about the challenges and opportunities for exposomics work in India. Subsequently, Kalpana Balakrishnan and Poornima Prabhakaran summarized the multiple exposomics initiatives currently underway in India.

The second half of the event was an engaging panel discussion on the "Challenges and Opportunities for Exposomics Research in India." The panel was moderated by Fenna Sillé and Areejit Samal, The Institute of Mathematical Sciences, and featured panelists: Shinjini Bhatnagar, Indian Council of Medical Research (ICMR); Rima Habre, NEXUS and University of Southern California; Vinay Nandicoori, CSIR-Centre for Cellular and Molecular Biology (CSIR-CCMB); Chirag Patel, NEXUS and Harvard University; Dorairaj Prabhakaran, Centre for Chronic Disease Control (CCDC). The guiding theme of this panel was the challenges and opportunities for exposomics research.

Overall, NEXUS was happy to be a part of this event, which builds on years of partnerships and collaborations with our colleagues in India, and marks the start of a new chapter for exposomics as a field and as a cornerstone for public health. Thank you to the organizing committee for such a successful and engaging event!

[Read the complete summary of the event](#)



The NEXUS Podcast

Building Environmental Health and Exposomics Research in India with Dr. Poornima Prabhakaran

In this episode, NEXUS MPI Rima Habre sits down with Dr. Poornima Prabhakaran to discuss her career and journey as a physician, epidemiologist, and public health leader, and her vision for the future of exposomics in India, given her long history of leadership in establishing cohort studies and biorepositories and training generations of scientists and future leaders across health sectors in India.



Exposomics in the Scientific Community

"Your Genes Load the Gun. Your Environment Pulls the Trigger. Here's What the Science Says"



NEXUS MPI Gary Miller, PhD, Columbia University, was interviewed for an episode of [The LIVING Room Podcast | Inside The WNDR Lab](#) where he discussed all things exposomics including "... what the science actually says about the exposome, and cuts through the fear and wellness noise to tell you where you should genuinely be concerned — and what you can do about it."

NEXUS MPI Gary Miller interviewed for Belgian Newspaper De Standaard, about his work in exposomics



[Read the article here](#)

Learn more about Gary Miller's Visiting Professorship in Belgium

Gary Miller has been awarded the [International Collen-Francouli Chair](#) in recognition of his longstanding leadership in exposomics.

Mapping the Exposome: A Conversation with Gary Miller, a Pioneer in the Field By Columbia University Mailman School of Public Health

[Learn more](#)

[Read the article](#)

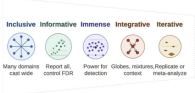
Center for Innovative Exposomics at Columbia University, Director of Exposome Epidemiology [Vrinda Kalia](#), PhD, has recently been awarded the Calderone award for Junior Faculty Development and a Career Development Award from the P30 Center for Environmental Health in Northern Manhattan. These awards will fund Dr. Kalia's research into the role of iron metabolism in the relationship between environmental drivers of Alzheimer's Disease. Using a population-based study, Dr. Kalia will determine whether dyshomeostasis in iron handling, which is known to occur with age, can influence susceptibility to chemical neurotoxins. Complementary to this approach, Dr. Kalia will leverage the nematode model *C. elegans* to understand the mechanisms through which altered iron metabolism can influence the neurotoxicity of co-exposure to heavy metals.

Haotian (Howie) Wu, PhD, Assistant Professor, Environmental Health Sciences, and Director of Education for the Center for Innovative Exposomics, was also awarded the 2026-2027 Calderone Junior Faculty Awards for "Brain-specific Extracellular Vesicles as Biomarkers of Children's Health."

[Learn more about the Calderone Junior Faculty Awards](#)

Recent Publications in the Field of Exposomics

Vision for Exposomics-Scale Investigation: A Heuristic for Exposure-Wide Association Studies (ExWAS)



Published by Chirag J. Patel, Gary W. Miller, Alison A. Motsinger-Reif in Environmental Science & Technology.

In this paper, the authors "...propose a heuristic framework for ExWAS based on the 5 I's: Inclusive, Informative, Immense, Integrative, and Iterative. We distinguish ExWAS from the broader enterprise of exposomics: high-resolution personal sensor studies, high-throughput screening in model systems, targeted biomonitoring, and single-exposure causal studies are essential and complementary. We operationalize each 'I' as a set of graded thresholds rather than absolute gates, so that smaller groups and under-resourced cohorts can participate through federated and meta-analytic designs. Mirroring the systematic rigor of genomics, these criteria provide a roadmap for minimizing spurious associations while preserving discovery power and supporting the eventual creation of an "Exposome-Phenome Catalog" analogous to the GWAS Catalog."

[Read the paper](#)

Upcoming Events

NEXUS Community Events

Exposomics crosses the Rubicon

June 15, 2026 | Hybrid



The Luxembourg Institute of Health will host a hybrid lecture with Dr. Gary Miller to discuss how exposomics is transforming our understanding of health—revealing how environmental factors play a major role in disease. Join us for a lecture by an internationally renowned expert on this pivotal shift in health research.

[Learn more](#)

Bordeaux Exposome Symposium

June 17–19, 2026 | Bordeaux, France



The Bordeaux Symposium hosted and organized by Mount Sinai Icahn School of Medicine Institute for Exposomic Research will convene leading scientists and trainees dedicated to advancing the integration of environmental exposures into research on Alzheimer's Disease and Related Dementias (AD/ADRD). Drawing on a global network of researchers with complementary expertise in exposomics, data science, and neurodegenerative disease, the meeting provides a powerful foundation for discovery.

[Learn more](#)

Exposome Boot Camp

July 30-31, 2026 | New York, New York



The Exposome Boot Camp is a two-day intensive boot camp of seminars and hands-on analytical sessions to provide an overview of concepts, techniques, and data analysis methods used in studies of the exposome. This boot camp integrates the principle concepts of exposomics and the untargeted approaches of measuring endogenous and exogenous chemical exposures on an omic scale as we step through the tools and techniques currently available to analyze the exposome. Led by a team of expert scientists in the rapidly growing field of exposomics, the boot camp will integrate seminar lectures with hands-on computer lab sessions to put concepts into practice. Emphasis will be given to leveraging existing resources from ongoing studies and initiating new investigations. The afternoon lab sessions will provide an opportunity to work hands-on with real data. Participants will learn and practice data handling, cleaning, and basic analysis of exposomics data.

[Register here](#)

ISES 2026 Annual Meeting

October 4–8, 2026 | Vancouver, Canada



Join the global exposure science community for the ISES 2026 Annual Meeting. Researchers, practitioners, and leaders from across sectors will come together and share new findings, spark collaboration, and translate science into real-world impact.

[Learn more](#)

Urban Transitions 2026

November 10- 12, 2026 | Sitges, Spain



Urban Transitions 2026 aims to promote healthy urban development by bringing together different disciplines working within cities. Meet world leading experts on housing, urban and transport planning, architecture, environmental exposure assessment, environmental epidemiology, physical activity, climate change, public health, circular economy and governance to discuss current challenges and solutions.

[Learn more](#)

[The NEXUS Calendar](#)

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