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# November Newsletter

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## Santiago Exposome Symposium

### Exposomics: Getting to the other side of the Banbury Conference

Authors:  
Chirag Patel, PhD, NEXUS / [Harvard University](#) and Robert Wright, MD, [Mt Sinai Center for Exposomics](#)



Early mornings on the other side of the [Banbury Conference Center](#) in Cold Spring Harbor, New York (left); an early morning in Santiago, Chile (right).

Recently we spent two crisp – and one cold/rainy – *spring* days in Santiago (Sept 25–27, 2025) that framed an ambitious question: how do we integrate environmental exposures into Alzheimer’s disease and related dementias (AD/ADRD) research—and do so in ways that work across countries, cohorts, time and disciplines? The [Santiago Exposome Symposium](#) at Club Manquehue convened aging, neurology, and environmental health communities from Latin America, the U.S., and Europe to compare notes, share tools, and debate standards.

If Banbury was where a common definition took shape, Santiago was where that vocabulary met the reality of the world’s diverse practice and brought to bear new insights and where re-focusing or work needs to be done. The [Banbury Exposomics Consortium](#) (Cold Spring Harbor, 2023) set the table with a definition and a programmatic push to embed exposomics in biomedicine; Santiago asked in parallel how we actually do it in real settings, with different geographies, economies, cultures and populations with different resources and needs. While exposomics holds immense promise, there is a large need to communicate with each other across disciplines, across continents and even across time if we are to make the exposome real, ensuring that the operationalized definition from Banbury makes sense in all communities while ensuring populations are sufficient to extract generalizable signals from noise, particularly in the genetically and environmentally diverse settings in South America. Most importantly, how will we implement our findings to improve health?

Participants were wide ranging researchers from the South American continent and also included individuals from the US federal government, such as [Dr. Rick Woychik](#) and Dr. Richard Kwok (US NIH).

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## Spotlight

### Robert O. Wright, MD, MPH

Ethel H. Wise Professor and Chairman  
Department of Environmental Medicine and Public Health  
Co-Director, Institute for Climate Change, Environment and Exposomics  
Icahn School of Medicine at Mount Sinai



Dr Robert Wright is the Ethel H Wise Chair of the Department of Environmental Medicine at Mount Sinai School of Medicine and trained in pediatrics, toxicology, genetics and environmental epidemiology. He received his MD from the University of Michigan, his MPH from Harvard and completed pediatric residency at Northwestern University. He completed fellowships in Pediatric Emergency Medicine at Brown



Medical School and Medical Toxicology, Environmental Epidemiology and Genetics at Harvard. He has been on faculty at Brown, Harvard and the Mount Sinai School of Medicine which he joined in 2012 where he established the

Lautenberg Laboratory for Environmental Health. In 2017 he co-founded the Mount Sinai Institute for Exposomic Research with Dr Rosalind Wright which integrates the Lautenberg Lab with the Center for GeoMedicine that links maps of environmental factors (air pollution, temperature, green space, exposure biomarkers, built environment etc) with human health data and is co-funded by an NIEHS P30 Core Center grant and the Mount Sinai CTSA. Since 2015, he has directed the NIEHS Mount Sinai Human Health Exposure Analysis Resource Targeted Lab Hub and Mount Sinai's NIEHS P30 Core Center. He also established the Programming Research in Growth, Obesity and Social Stressors (PROGRESS) longitudinal birth cohort in 2007 based in Mexico City in which he integrates research on epigenetics, the developmental origins of health and disease and gene-environment interaction using an exposome life course approach. He has published over 500 research manuscripts and has served on numerous national, federal and international boards related to environmental health and exposomics. In partnership with NEXUS, he works to promote and disseminate exposomics internationally by co-directing an annual global exposome symposia which has been held in Europe, Latin America, Asia and North America with future symposia planned for Africa and Australia/New Zealand. At each symposia local researchers and U.S. based exposome researchers network, trade methodologies, learn about local infrastructure capabilities and needs, and methods to implement exposomics clinically, commercially and in public health. He also has been writing an exposome perspectives blog since 2021 that disseminates ideas and concepts on how to use exposomics in research, public health practice, clinically in medical practice and even in our daily lives.

[Read the Full Spotlight](#)

## NEXUS Podcast

### Season 1 | Episode 2 What is NEXUS?

In this episode NEXUS MPIs Gary Miller, PhD, Columbia University, Rima Habre, ScD, University of Southern California, and Chirag Patel, PhD, Harvard University discuss "What is NEXUS?" where they share the current state of the field of exposomics and the role of NEXUS to facilitate the future of the field.

The objective of the NEXUS Podcast is to bring together stakeholders of the field of exposomics to foster dialogue around key topics, further the understanding, facilitate the advancement of the field of exposomics along with identifying ways that exposomics can support other scientific fields.



[Visit the NEXUS Youtube Channel](#)

## NEXUS In the Scientific Community

### Genomics Meets Exposomics: Advancing Gene by Environment Science

Mendel Museum | Brno, Czech Republic



In October, leaders from the field of exposomics and genomics gathered to develop a strategic plan for the advancement of gene by environment studies to better understand human disease. Advances in sequencing technologies have revealed countless discoveries of the genetic drivers of human disease, but for most chronic disease genetics can only account for a portion of the variability.

This meeting was hosted and organized by Jana Klánová, the director of [RECETOX](#), the European Centre of Excellence for exposome research at Masaryk University in Brno. She also leads [EIRENE](#), the European research infrastructure on the human exposome. The meeting was organized in collaboration with Gary W. Miller (Columbia University, NEXUS), Robert Barouki (INSERM, EIRENE) and Chirag Patel (Harvard University, NEXUS).

The two day meeting featured presentations, panel discussions, and breakout sessions bringing together global leaders in genomics and exposomics. Topics discussed included cohort integration strategies, practical approaches for incorporating gene-by-environment (GxE) interactions into biomedical research, the technical foundations for understanding

Genetics relationships, and much more.

## Genomics meets Exposomics Meeting In the News



Genomics Meets  
Exposomics: Historic  
Meeting Ushers in a  
New Age of Human  
Health Discovery

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Setkání genomiky s  
exposomikou otevírá  
novou éru objevů v  
oblasti lidského zdraví

[Read Article Here](#)

This meeting brought together leaders in genetics and exposomics including: Rima Habre, ScD., University of Southern California; Gary Miller, PhD., Columbia University; Chirag Patel, PhD., Harvard University; Krystal Pollit, PhD., PEng., Yale University; Dimosthenis A. Sarigiannis, PhD., Aristotle University; Kári Stefánsson, Ph.D., Founder of deCODE genetics, University of Iceland; Shamil Sunyaev, PhD., Harvard Medical School; Anne Thessen, Ph.D., University of North Carolina Chapel Hill; Roel Vermeulen, PhD, Utrecht University as see in the photos above.

[Full list of attendees and bios](#)

## NEXUS Conversations

At the "Genomics Meets Exposomics: Advancing Gene by Environment Science" meeting at the Mendel Museum in Brno, Czech Republic, NEXUS had the opportunity to meet with key geneticists; Bogdan Pasiu, PhD., University of Pennsylvania; Shamil Sunyaev, PhD., Harvard Medical School; and Nilanjana Chatterjee, PhD., MS, Johns Hopkins University to discuss key takeaways and reflections from the meeting.

[Visit the NEXUS Youtube Channel](#)

## NEXUS in the Scientific Community

### "Building Bridges for Exposomics" Environmental Health Sciences Core Centers Annual Meeting



At the end of October, NEXUS MPI Rima Habre, delivered the keynote "Building Bridges for Exposomics" at this year's National Institute of Environmental Health Sciences (NIEHS) Environmental Health Sciences Core Centers meeting. The keynote discussed, what exposomics is, what an exposomics study involves, and how we can be open to integrating



knowledge from all the disciplines and domains of expertise needed to deeply characterize the external to internal exposome for improving health and preventing disease. The presentation highlighted key concepts to help scientists integrate exposomics into their own research and broaden their understanding of the field and extended an invitation to the P30 centers community to engage with NEXUS and share their work and expertise. The [NIEHS P30 Annual Meeting](#) was hosted by The University of Kentucky and the [UKCARES Center for Appalachian Research in Environmental Sciences](#) in Lexington, KY. The meeting brought together more than 20 [Environmental Health Sciences Core Centers](#) Grantees which are working to identify emerging issues that advance understanding about how pollutants and other environmental factors affect human biology and may lead to disease. The meeting also featured talks from Melissa Furlong, Donghai Liang and Michael Petriello on advancing studies of the internal exposome and multi-omics integration for understanding the mechanistic basis of disease.

Emory University [HERCULES](#) Exposome Research Center was also present at the meeting, and Community Engagement Core Director, Melanie Pearson, PhD, led a session focused on performing research that is responsive to community concerns, which featured a presentation by HERCULES member, Noah Scovronick, PhD, and community partner Anita Collins from Urbana Perry Park in Brunswick, GA describing their research on human exposure assessment of residents in Brunswick related to multiple Superfund designated sites in the area. HERCULES member Donghai Liang, PhD, presented in the session on innovations in mass spectrometry for Environmental Health regarding his use of multi-omic analyses to profile the exposome and its relationship to adverse birth outcomes. HERCULES early career investigator, Longxiang Li, ScD, presented a poster about his innovative use of remote sensing technologies to understand a broad array of environmental exposures across the country.



Dr. Donghai Liang presented in the session on innovations in mass spectrometry for Environmental Health



HERCULES Director Carmen Marsit, PhD, Emory University

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### HHEAR Exposomics Webinar Series



In October, the 19th [Human Health Exposure Analysis Resource \(HHEAR\)](#) webinar series took place and featured the presentation "Exposure Assessment

and Exposomics for Environmental Health" by [Weihsueh Chiu](#), PhD, Texas A&M University. Dr. Weihsueh Chiu is the Chair of the "[Cumulative Impacts Assessment](#)" [NASEM Earth & Life Sciences](#) consensus study, on which NEXUS MPI Rima Habre, ScD, University of Southern California served along with an exceptional committee and NASEM program officers and study team. The committee closely engaged with a diverse community liaison group to inform its work. Dr. Chiu's presentation discussed how exposomics can help inform Cumulative impact assessments (CIA) and advance risk assessment and policy for protecting communities. He specifically discussed how exposomic tools and approaches can be currently used to bolster scientific evidence and support for regulatory environmental health decision making.

The [Human Health Exposure Analysis Resource \(HHEAR\)](#) is a centralized network of exposure analysis services and expertise available to eligible researchers who want to add or expand exposure analysis to their studies of human health. HHEAR hosts a [HHEAR Exposomics Webinar Series](#) which discusses a wide variety of Exposome and exposome related topics.

### Upcoming HHEAR Exposomics Webinar Series "Deep learning approaches for structure elucidation using tandem mass spectrometry"

**Date/Time:** Monday, November 17, 2025, from 2:00 to 3:00 PM ET

**Location:** Virtual

**Presenter:** Dr. Runzhong Wang, Massachusetts Institute of Technology

The use of AI in the analysis of mass spectral data has its roots in the 1960s with the DENDRAL program. While many of the high-level goals have not changed, increased availability of curated datasets and the modern machine learning toolbox have enabled significant advances in capability and performance. We have developed a variety of machine learning strategies for both the forward (structure-to-spectrum) and inverse (spectrum-to-structure) tasks in ESI-MS/MS. Using standard benchmarking datasets to compare methods, including the NIST20 databases and MassSpecGym, we demonstrate state-of-the-art performance in our ability to predict fragmentation patterns, retrieve structure annotations from virtual libraries, and generate de novo annotations of fully unknown molecular structures. This talk will highlight how the incorporation of domain knowledge into deep learning frameworks leads to superior performance over expert/heuristic strategies and black box neural models. Prospective case studies of elucidation in various applications (human health, synthetic organic chemistry, and environmental chemistry) will be highlighted.

Registration for November 17th Webinar

Learn more about HHEAR Program





On October 17th, NEXUS Collaborator Dillon Lloyd, PhD, Harvard University and NEXUS MPI Chirag Patel, PhD, Harvard University presented a spotlight talk at American Society of Human Genetics 2025 Annual Meeting.

This distinction is awarded to the top 10 percent of submissions. Their presentation entitled "Mapping the Exposome: An integrative meta-reference across Child and Parent diverse cohorts from Human Health and Exposure Resource (HHEAR)" discussed their work to build a combined cohort spanning 18,000 individuals using the Human Health Exposure Analysis Resource. They assessed the variation in exposure levels across geography and sociodemographics in 158 targeted chemical exposomic measures across categories such as phthalates, volatile organic compounds, trace elements, pesticides, and flame retardants. Additionally, they built dynamic reference intervals for measuring the exposome after adjusting for demographic factors, and created an aggregate exposure score to understand an individual's exposure profile. They found that geography was the primary driver of variation in the chemical exposome, with sociodemographics contributing a smaller, but still substantial, amount to the variation. Exposomics holds promise of a more precise definition of the complex phenomenon of human exposure, encapsulating large variation, across and within social groups, such as individuals with different education, income, and race. This new cohort of exposure variation provides a guide to develop, benchmark, and contextualize biomarkers across the exposome.

[Learn more about the session](#)



## Upcoming Events

### Save-the-date

#### Global Exposome Summit

The **Global Exposome Summit**, organized by [IHEN](#) in collaboration with NEXUS and the Global Exposome Forum, will take place from **27-29 April 2026** in **Sitges (Barcelona), Spain**

Additional information forthcoming.

## NEXUS Community Events

### AAAS Meeting: How the Human Exposome Will Unlock Better Health and Medicine

February 14, 2026 | Phoenix, AZ



At the AAAS Annual Meeting, the Exposome will be featured during a discussion panel "How the Human Exposome Will Unlock Better Health and Medicine" organized by NEXUS Collaborator Thomas Hartung, MD, PhD, Johns Hopkins University. Co-organized by Aidan Gilligan, SciCom - Making Sense of Science, and the discussion will be moderated by Clive Cookson, Financial Times Kingdom. Panelists include NEXUS MPI Gary Miller, PhD, Columbia University, NEXUS Collaborator Fenna Sillé, PhD, Johns Hopkins University and Rémi Quirion, PhD, Chief Scientist of Québec. This panel brings together architects of the Exposome Moonshot Forum, an event setting the foundation for The Human Exposome Project, to give a mapping progress update. Speakers will discuss how newly established exposomic committees are maximizing science at scale via inherent advantages such as the convergence of artificial intelligence, advanced sensors, metabolomics, and big data analytics. They will show how this consortium is embracing the challenge of implementing science and policy at scale for the benefit of society. Speakers will also discuss the craft of feeding in complex advice into policymaking on hotly contested new technologies.

[Learn more](#)

### Advancing Exposome Research in Neurological Disorders and Stroke

January 13-14, 2026 | Rockville, MD



This workshop hosted by The National Institute of Neurological Disorders and Stroke will center on understanding the interaction of exposome factors and their composite effect across the lifespan on neurological disorders and on neurological resilience. It will also provide a platform for idea exchange, collaboration, and networking. Keynote speakers include Robert O. Wright, M.D., M.P.H., Icahn School of Medicine at Mount Sinai and NEXUS MPI Gary W. Miller, Ph.D., Columbia University.

[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.

Travel Awards Available for Early Career Researchers and Trainees.

[Learn more](#)

[Visit the NEXUS Calendar](#)

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## Community Podcasts

**Mendelspod Podcast:  
Remembering Atul Butte  
with Marina Sirota, Chirag  
Patel and Mike Snyder**

[Listen to the Episode](#)

"In this special tribute episode, Mendelspod honors the life and legacy of Dr. Atul Butte (1969-2025), a towering figure in big data and precision medicine who passed away earlier this year. Atul was more than a pioneer in translational bioinformatics—he was a mentor, a builder, and a boundless source of ideas. He sought to 'lift all boats in the harbor.'"

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