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NEXUS Podcast

Science at Scale: Are We Ready for a Human Exposome Project?

Moderator: Clive Cookson of the Financial Times

Featuring: Gary Miller, PhD, Columbia University, Jana Klánová, PhD, Masaryk University, Thomas Hartung, MD, PhD, Johns Hopkins University

In this episode, leading experts in exposomics, Gary Miller, Jana Klánová, and Thomas Hartung, join Clive Cookson of the Financial Times to discuss the opportunities presented by exposome science. They outline a global roadmap for action and highlight key strategies needed to address future challenges in the field.

This podcast was recorded at the [2026 Annual AAAS Meeting](#), which brought together global leaders to address key scientific challenges. The panel "[How the Human Exposome Will Unlock Better Health and Medicine](#)" highlighted recent advances in exposomics and progress made since the signing of the 2025 Washington, D.C. Declaration on the Human Exposome at the Exposome Moonshot Forum.



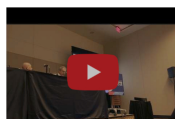
Listen to the episode on Spotify

Exposomics in focus at AAAS 2026 Annual Meeting

Watch the Panel Presentations

"[How the Human Exposome Will Unlock Better Health and Medicine](#)"

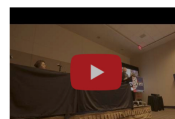
Dr. Gary Miller



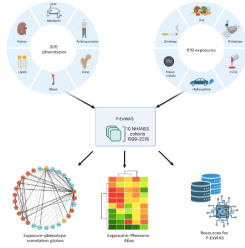
Dr. Jana Klánová



Dr. Thomas Hartung



NEXUS MPI Chirag Patel and colleagues publish “An atlas of exposome-phenome associations in health and disease risk” in Nature Medicine



In March 2026, NEXUS MPI and Data Science Hub Co-lead Chirag Patel, PhD, Harvard Medical School, published the paper “[An atlas of exposome-phenome associations in health and disease risk](#)” in Nature Medicine with co-authors [John PA Ioannidis](#), MD, D.Sc., Stanford University and [Arjun K Manrai](#), PhD, Harvard Medical School.

“An atlas of exposome-phenome associations in health and disease risk”

This is a pivotal publication in the field of exposomics and one of the largest studies to date examining the links between environmental exposures and health outcomes, testing more than 100,000 associations. This paper uses an Exposome-Wide Association Study framework (ExWAS) to systematically map and analyze 619 exposure indicators and 305 quantitative phenotypes across 10 independent waves of the US Centers for Disease Control and Prevention National Health and Nutrition Examination Survey (CDC NHANES) and compares the relationships between genetic indicators and disease from data in the [UK Biobank](#).

This paper highlights the significant role of the exposome in human health, demonstrating that specific combinations of environmental exposures can influence health outcomes as strongly as genetic factors. With more than 5,600 associations considered statistically significant, this paper highlights which exposures are most beneficial for disease risk assessment, population surveillance, exposure prioritization, and next-generation longitudinal exposomics.

Published alongside this paper, his team released [The Phenome-Exposome Atlas](#), which is an interactive R statistical package that allows users to browse data by phenotype and exposure group to identify associations. In addition, Patel’s team has developed a publicly available course, “[Conducting Exposome-Wide Association Studies](#)” which uses CDC NHANES data and the [Phenome-Exposome Atlas](#) to walk through ExWAS, including nine different modules, two assignments, and a course project which guides users through the material.

Chirag Patel comments “It is absolutely amazing how we can make inferences about the exposomic complexity of phenotypes using resources such as CDC NHANES and UK Biobank. A future that incorporates new measurements and developments in longitudinal personalized sampling, I believe will reap many fruits that will be helpful to so many and to advance exposomics for precision medicine and health. ”

Overall, this large-scale exposome study represents a shift in how we understand the relationship between the environment and human health by examining combinations of exposures rather than single exposures in isolation. Leveraging large datasets and analytical methods such as ExWAS can further identify associations that cannot be explained by genetics alone. This work greatly advances the field of exposomics and data-driven, systems-level public health research.

“People often ask for examples of a comprehensive exposome study. It has been difficult to point to individual papers because much of the analysis is spread over multiple papers and projects due to the complexity. This paper will serve as a template for the field of exposomics, and science and health more broadly,” noted Gary Miller, NEXUS MPI. He also remarked, “I have heard people state that the complexity of exposomics would prevent this sort of comprehensive analysis, that the number of potential associations could not surpass multiple comparison and false discovery thresholds. The naysayers were wrong. This works.”

[Read the full article](#)



Chirag Patel is a leader in the field of **Exposomics**

[Chirag Patel NEXUS Spotlight](#)

In the Press

Highlight of the Article in Nature Medicine
“An atlas to navigate environmental factors and health”
By: Chirag Patel, PhD

[Read the article](#)



“A Large-Scale Look at the Exposome”
By: Harvard Medical School

[Read the article](#)

Spotlight

Jana Klánová, PhD
Masaryk University



[Learn more](#)

Jana Klánová is a professor of environmental chemistry and director of RECETOX, the EU Centre of Excellence in Environmental Health Sciences at Masaryk University. She coordinates a human exposome research programme leveraging her experience in the fields of chemical exposure and risk assessment, development of passive sampling and analytical techniques, designing large environmental monitoring networks and population cohorts and building environmental information systems (www.pops-gmp.org).

Jana has developed a national research infrastructure providing open access to samples from the international air and water monitoring programmes and population cohorts, capacities of accredited laboratories for target and nontarget exposomics, metabolomics, proteomics and metagenomics, as well as to data collections and associated data management and processing tools. She also coordinates EIRENE, the European InfrastructurE for humaN Exposome research prioritised in the Roadmap of the European Strategic Forum on Research Infrastructures (ESFRI) since 2021. EIRENE brings together research infrastructures in 25 countries in and outside Europe to offer sufficient capacity and scalable tools for population-based research.

In the last two decades, Jana has led numerous European Structural and Investment Fund projects and European framework program projects in a total volume of 100 million euro. She participates in the Horizon Europe Partnership for Assessment of Risks from Chemicals (PARC) and the International Human Exposome Network (IHEN).

She has published more than 300 scientific papers (h-index of 56), but has also been active in translating scientific knowledge to policy. She works as an expert for the United Nations Environment Program and the World Health Organisation, and leads the Group on Earth Observations (GEO) initiative on the Global Observation System for Persistent Organic Pollutants (GOS4POPs) to enhance the availability and use of scientific data. Jana is an elected member of the Czech Learned Society and honorary doctor of Orebro University in Sweden.

Fun Fact: Is there a better place to advance exposomics than the city of Brno where Gregor Mendel conducted his pea plant experiments and laid a foundation of the modern science of genetics? Jana's latest passion is to bring exposomics to people's lives through the establishment of Brno Living Lab, a quadruple helix of scientists, companies, policy makers and citizens.

[Read the full spotlight](#)

Exposomics In the Scientific Community

NEXUS MPI Gary Miller appointed Visiting Professor at the Faculty of Pharmaceutical Sciences, Ghent University



NEXUS MPI Gary Miller, PhD, Columbia University, has been awarded the [International Collen-Francoqui Chair](#) in recognition of his longstanding leadership in exposomics. The chair is hosted by Ghent University along with four other Belgian partner universities (Antwerp University, KU Leuven, Hasselt University, and the University of Liège).

In this role, Dr. Miller will teach seven "Classes of Excellence" along with two workshops covering various facets of the exposome. He will also develop research collaborations with

covering various facets of the exposome. He will also develop research collaborations with Belgian scientists. These symposia aim to examine key developments in exposomics, with sessions focused on topics such as using exposomics to study a range of diseases, including Parkinson's disease, Alzheimer's disease, and cancer. Other lectures will focus on technological developments in the field, the feasibility of large biobank-scale studies, and commercialization opportunities.

Dr. Miller's visiting professorship aligns well with NEXUS, as enhancing collaboration with European scientists was one of the stated objectives of the project.

[Read the full article](#)

[Learn more](#)

Launch of the Exposome Alliance in the European Parliament



As stated by the Exposome Alliance, "European lawmakers, leading scientists and civil society organisations launch the Exposome Alliance to put prevention at the heart of EU policy Brussels, 24 February 2026 — Members of the European Parliament, leading researchers and major European health organisations today launched the Exposome Alliance at the European Parliament, marking a coordinated effort to tackle the environmental and social drivers of Europe's growing chronic disease burden and shift EU policy decisively towards prevention."

[Read the press release](#)



"The Exposome Alliance wants to put prevention at the heart of Europe's future health and research agenda by focusing on the exposome; the combined impact of environmental, social and lifestyle factors on health across a lifetime."

[Learn more about Exposome Alliance](#)

Upcoming Events

NEXUS Community Events



2026 NIH ECHO Science to Action Symposium

Registration is [now open](#) for the NIH Environmental Influences on Child Health Outcomes (ECHO) Translating Science to Action Symposium on May 6, 2026. This free event will bring together researchers, policymakers, health professionals, and advocates to examine how chemical exposures affect child health and development and how science is being translated into meaningful action.

[Register here](#)

Global Exposome Summit

April 27-29, 2026 | Sitges, Spain



The Global Exposome Summit 2026 will promote international research and coordination on the exposome. It will bring together researchers, policymakers, industry, funders, and other stakeholders working on advancing human health through exposome research and practice. The International Human Exposome Network ([IHEN](#)) and the Global Exposome Forum ([GEF](#)) are joining forces to organize the Global Exposome Summit 2026.

The full agenda is now available!

[Learn more](#)

[Full agenda](#)

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](#)

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