

Speaker and Panelist Biographies

Toby Athersuch, PhD, is a Lecturer in Environmental Toxicology and Biomarkers in the Department of Surgery and Cancer, Imperial College London, UK. His main research activities are the development and application of metabolic profiling (metabonomics/metabolomics) – primarily using NMR- and MS-based analytical platforms – to study aspects of human health and disease. A key research goal is to successfully deploy metabolic profiling within molecular epidemiological studies. To this end, he is involved in several large-scale projects focused on developing the concept of the exposome; these present new opportunities for metabolic research to help understand links between environmental exposures and human health outcomes. Dr. Athersuch is also interested in addressing the need to integrate population-level observations with hypothesis-driven mechanistic studies, and is currently involved in a number of related in vitro and in silico based projects within the field of toxicology. Dr. Athersuch received a PhD in biological chemistry from Imperial College London in 2007.

Erin Baker, PhD, is a bioanalytical chemist at Pacific Northwest National Laboratory with 12 years of experience utilizing ion mobility spectrometry in conjunction with mass spectrometry (IMS-MS) to study biological systems. Her research interests include separation and dynamic range enhancement of peptides from complex plasma mixtures, the development of HPLC methods and mass spectrometry instrumentation, and structural variations between biological molecules in the solution, solid, and gas phases. Dr. Baker's current work involves the development and evaluation of high-throughput LC-IMS-MS analyses to quickly study numerous samples in a short time period without losing valuable biological information. Her technical background includes evaluating short LC gradients for use with IMS-MS in proteomic analyses, as well as studying the number and quality of features detected with LC-IMS-MS and comparing them to existing LC-MS and LC-MS/MS instruments such as the LTQ-Orbitrap and LTQ Orbitrap Velos. Dr. Baker received her PhD in chemistry from the University of California, Santa Barbara.

David Balshaw, PhD, is a Program Director in the Center for Risk and Integrated Sciences at the National Institute of Environmental Health Sciences (NIEHS). He is responsible for planning and administration of NIEHS-funded research programs in bioengineering, integrated systems, and computational methods to understand complex systems; development of sensor technologies for environmental exposure assessment; discovery and validation of emerging biomarkers; and application of innovative "omics" research for reducing the risk of exposure and disease including development of databases. Dr. Balshaw is the primary NIEHS scientist overseeing the development of emerging technologies with particular emphasis on enabling innovative approaches to improving exposure and risk assessment. To this end, he has been a leading figure in the development of the Exposure Biology Program to develop a new generation of tools to characterize the personal environment integrating direct, personal assessment of multiple chemical factors, dietary intake, physical activity and psychosocial stress as well as assessment of the biological response to these factors on major biological pathways. Dr. Balshaw received training in pharmacology and biophysics from the University of Cincinnati and University of North Carolina at Chapel Hill.

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Benjamin Blount, PhD, is Chief of the Tobacco and Volatiles Branch of the Division of Laboratory Sciences, National Center for Environmental Health, Centers for Disease Control and Prevention (CDC) in Atlanta, Georgia. Over the last two decades, Dr. Blount has developed and applied numerous analytical methods for quantifying environmental toxicants and biomarkers of exposure and effect. Dr. Blount's recent research interests focus on assessing exposure to tobacco-related toxicants, volatile organic compounds, and toxic anions by measuring biomarkers of these chemicals in human matrices.

Elaine Cohen Hubal, PhD, is a senior scientist in EPA's National Center for Computational Toxicology. Currently, she leads ExpoCast, the EPA research program in exposure science to support chemical prioritization and toxicity testing. Dr. Cohen-Hubal's primary research interests are in characterizing human exposure and developing approaches for using human exposure metrics to inform health studies and public health policy. The current focus of her research is on applying a systems approach to characterize complex relationships between environmental factors and health outcomes with an emphasis on vulnerable populations. Previously, Dr. Cohen-Hubal was Acting Associate Director for Human Exposure Modeling in the Human Exposure and Atmospheric Sciences Division of the EPA's National Exposure Research Laboratory (NERL) where she worked to develop and direct NERL's human exposure modeling research program. Additionally, she has published in the areas of children's exposure and human health risk modeling. Dr. Cohen-Hubal received her PhD in chemical engineering from North Carolina State University.

Pieter Dorrestein, PhD, is Professor at the University of California - San Diego. He is the Director of the Collaborative Mass Spectrometry Innovation Center and a Co-Director, Institute for Metabolomics Medicine in the Skaggs School of Pharmacy & Pharmaceutical Sciences, Departments of Pharmacology, Chemistry and Biochemistry. Since his arrival to UCSD in 2006, Dr. Dorrestein has been pioneering the development of (spatial) mass spectrometry methods to study the chemical ecological crosstalk between population of organisms for agricultural, diagnostic, ocean science, build environment, forensic and therapeutic applications. One particular recent effort is to increase the rate with which microbial metabolomics information can be collected and analyzed. Because it became clear that the volume of metabolomics data could no longer be analyzed by a single person or lab, Dorrestein, together with the Bandeira lab set up a crowd source analysis platform. This is a shared knowledge space is called Global Natural Products Social Molecular Networking (GNPS) at <http://gnps.ucsd.edu>, and is designed to integrate world-wide contributions of natural product tandem mass spectrometry (MS/MS) data into a single, useful living repository and make it accessible to the entire microbiology community and to make it useful for people that do not know how to collect mass spectrometry information.

William Farland, PhD, ATS, is the Senior Advisor to the Executive Vice President, Colorado State University and a professor in the Department of Environmental and Radiological Health Sciences, School of Veterinary Medicine and Biomedical Sciences. Formerly, Dr. Farland served as Vice President for Research from 10/2006-9/2013. Dr. Farland holds a Ph.D. (1976) from UCLA in cell biology and biochemistry. In 2006, Dr. Farland was appointed Deputy Assistant Administrator for Science in the U.S. Environmental Protection Agency's Office of Research and Development (ORD). He had served as the Acting Deputy Assistant Administrator since 2001. In 2003, Dr. Farland was also appointed Chief Scientist in the Office of the Agency Science Advisor. He served as the EPA's Acting Science Advisor throughout 2005. Prior to that, he was the Director of the ORD's National Center for Environmental Assessment. Dr. Farland's 27 year federal career was characterized by a commitment to the development of national and international approaches to the testing and assessment of the fate

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and effects of environmental agents. Dr. Farland has continually served on a number of executive-level committees and advisory boards within the Federal government. In 2005-2006, he chaired the Executive Committee of the National Toxicology Program (NTP). He was also a member of the Scientific Advisory Council of the Risk Sciences and Public Policy Institute, Johns Hopkins University School of Hygiene and Public Health; a public member of the American Chemistry Council's Strategic Science Team for its Long-Range Research Initiative, and a member of the Programme Advisory Committee for the WHO's International Programme on Chemical Safety. Dr. Farland served as Chair of an External Advisory Group for the National Institute of Environmental Health Sciences (NIEHS) regarding the future of the Superfund Basic Research Program. In 2013, Dr. Farland was appointed to the Board on Environmental Studies and Toxicology (BEST) of National Research Council (NRC). He also chairs a standing committee on Emerging Science for Environmental Health Decisions of the NRC and was a member of a NRC Committee to Develop a Research Strategy for Environmental, Health, and Safety Aspects of Engineered Nanomaterials. In 2002, Dr. Farland was recognized by the Society for Risk Analysis with the "Outstanding Risk Practitioner Award," and in 2005 was appointed as a Fellow of the Society. In 2006, he received a Presidential Rank Award for his service as a federal senior executive. In 2007, he was elected as a Fellow, Academy of Toxicological Sciences. Dr. Farland continues to teach, publish and serve as a reviewer in environmental toxicology and risk assessment.

Oliver Fiehn, PhD, is Professor and Principal Investigator at the Fiehn Laboratory at the University of California, Davis. The Fiehn research laboratory develops improved methods in analytical chemistry and bioinformatics to capture and utilize metabolomic data. These tools are employed to understand, which parts of larger biochemical networks respond to genetic perturbation or environmental stress. Dr. Fiehn received his PhD in analytical chemistry from Technical University of Berlin, Germany.

Dean Jones, PhD, is Professor of Medicine and Biochemistry and Director of the Clinical Biomarkers Laboratory at Emory University. His current work applies new high-resolution metabolic profiling capabilities that he developed in collaboration with Tianwei Yu, to develop new strategies for fighting malaria. Dr. Jones is also trained in medical biochemistry and has several years of experience in predictive health and personalized medicine research. Additionally, he has an extensive research career in physiological chemistry and metabolism, including clinical research and established collaborations in primate research and infectious disease. Dr. Jones also has an active independent NIH-funded research program in redox biology and clinical metabolomics. Dr. Jones received his PhD in biochemistry from Oregon Health Sciences University.

Anthony Macherone, PhD, currently holds a dual appointment as a Senior Scientist with Agilent Technologies and a Visiting Scientist at the Johns Hopkins School of Medicine. Anthony's current research is focused on the exposome and he is actively collaborating in this field with researchers at UC, Berkeley and is chairing the newly created Exposome Interest Group within the American Society for Mass Spectrometry. Anthony is an expert in liquid and gas phase single and tandem quadrupole mass spectrometry and time-of-flight mass spectrometry with industry experience in drug discovery and forensic toxicology. The mastering of these skills has afforded him unique insight into experimental design and analytical methods development to explore the exposome.

Ana Navas-Acien, MD, PhD, is Associate Professor in the Department of Environmental Health Sciences at Johns Hopkins Bloomberg School of Public Health. She is a physician-epidemiologist with a specialty in preventive medicine and public health, and a long-term

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interest in the health consequences of widespread environmental exposures. Based on an epidemiologic approach, her research investigates chronic health effects of arsenic, selenium, lead, cadmium, and other trace metals. Dr. Navas-Acien has served as an expert witness to the Baltimore City Council and she has served as a member of the 2010 National Toxicology Program Workshop on the Role of Environmental Chemicals in the Development of Diabetes and Obesity. She earned an MD from the University of Granada, School of Medicine in Spain and a PhD in epidemiology from Johns Hopkins School of Public Health.

Chirag Patel, PhD, is an Assistant Professor at Harvard Center for Biomedical Informatics within Harvard Medical School. Dr. Patel's long-term research goal is to conduct bioinformatics research to enable inter-disciplinary investigations integrating epidemiology, environmental health sciences, and genomics to identify gene-by-environment interactions that are informative for chronic disease diagnosis and eventual prevention. He has an advanced degree in bioinformatics with significant training in statistics and analysis of genomic data. He completed his BA at UC Berkeley and his MS and PhD at Stanford University. His professional interests include developing translational, computational, and integrative methods to study and model the role of the environment on human health and disease. Specifically, Dr. Patel's research involves addressing problems in biomedicine by developing computational methods to infer over human genomic and environmental information with the tools of translational bioinformatics and data science.

Andrew Patterson, PhD, is Assistant Professor of Molecular Toxicology, Director of the Patterson Research Group, and Director of Penn State's Metabolomics Core Facility. His research focuses on dietary influences on health and disease, and specifically on how xenobiotic exposure manipulates gut bacteria and how that affects metabolism. Dr. Patterson's lab utilizes mass spectrometry-based metabolomics, metagenomics/metatranscriptomics, and conventional and gnotobiotic transgenic mice, to facilitate its study of these pathways and understand their impact on human health and disease. Multivariate statistics and bioinformatics significantly inform the lab's work, and collaborations with the statistics and bioinformatics department are under way to develop new tools and approaches to combine these large, multidimensional -omics datasets. Dr. Patterson received his PhD in genetics from George Washington University.

Stephen Rappaport, PhD, is Director and Principal Investigator of the Berkeley Center for Exposure Biology, a multidisciplinary program that brings together Berkeley researchers from public health, chemistry, and electrical engineering to develop a new generation of biomarkers and biosensors for environmental epidemiology. He is a pioneer in the emerging field of exposure biology and a prominent advocate of the concept of the exposome as a new paradigm for environmental health. Much of his current research involves the development and application of blood protein adducts as biomarkers of exposure to toxic chemicals arising from inhalation, ingestion, and endogenous processes. This has led to the concept of the protein adductome, representing signatures of people's exposures to toxic chemicals. By comparing adductomes across populations, Dr. Rappaport hopes to identify important biomarkers of chronic diseases. He has also used environmental measurements and biomarkers to elucidate the human metabolism of several toxic chemicals, notably benzene, and to quantify interindividual variability in biomarker levels due to genetic, environmental and lifestyle factors. Additionally, Dr. Rappaport has published extensively in areas related to the assessment of long-term chemical exposures for purposes of controlling hazards and of investigating exposure-response relationships, including more than 200 peer-reviewed publications, and has collaborated extensively with investigators throughout the world. Dr. Rappaport received his PhD in air and industrial hygiene from the University of North Carolina, Chapel Hill.

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Ivan Rusyn, MD, PhD, is Professor in the Department of Veterinary Integrative Biosciences in the College of Veterinary Medicine and Biomedical Sciences at Texas A&M University. Prior to joining Texas A&M University, Dr. Rusyn was professor of Environmental Sciences and Engineering at the University of North Carolina at Chapel Hill. Dr. Rusyn's laboratory has an active research portfolio with a focus on the mechanisms of chemical toxicity, the genetic determinants of the susceptibility to toxicant-induced disease, and computational toxicology. His studies on health effects of chemical agents resulted in over 150 peer-reviewed publications. He has served on several US National Academies of Sciences/National Research Council committees and is currently a member of the Committee on Emerging Science for Environmental Health Decisions, Committee on Toxicology, and Committee on Incorporating 21st Century Science in Risk-Based Evaluations. He participated in WHO/IARC monographs 96, 100, 101, and 106, as well as chaired "Mechanistic and Other Relevant Evidence" sub-group for Monographs 101, 106, and 112. He is also serving on the Science Advisory Board for the North Carolina Department of Environment and Natural Resources. Dr. Rusyn received his MD from Ukrainian State Medical University in Kiev and his PhD in toxicology from the University of North Carolina-Chapel Hill.

Susan Sumner, PhD, serves as Director of the Systems and Translational Sciences Center at RTI, and in this capacity she oversees a team of 20 senior and junior level staff who conduct research using cells, biological fluids, and tissues in a wide range of disease and therapeutic areas. She has more than 25 years of experience in developing and applying nuclear magnetic resonance (NMR), and gas- (GC) and liquid-chromatography (LC) coupled mass spectrometry to address biological questions, and many years of experience using ¹³C labels to elucidate metabolism in animal models for extrapolation to human studies. Dr. Sumner also serves as the Administrative Core Leader and as the Principal Investigator (PI) of the NIH Eastern Regional Metabolomics Research Center at RTI International, which serves as one of six centers in the United States working in an NIH Common Fund (C-F) U24 consortium to establish our nation's standards for metabolomics, and to increase our national capacity for clinical and translational research. Our metabolomics core is experienced in using NMR, GC- and LC- mass spectrometry to provide targeted and broad spectrum metabolomics. Dr. Sumner is a co-investigator in the newly funded NIEHS Center for Human Health and the Environment at North Carolina State University and in the NIDDK U25 CureGN Consortium. She also directs the metabolomics core for the North Carolina Translational Sciences Institute at the University of North Carolina at Chapel Hill, and is the PI of an RO1 in the NIEHS U19 consortium for nanoparticle research. Dr. Sumner holds adjunct appointments in the Department of Nutrition at the University of North Carolina at Chapel Hill, and in the Brody School of Medicine at East Carolina University. She serves on the editorial boards for *Metabolomics* and *Journal of Applied Toxicology*, and is on the Board of Directors for the Metabolomics Society. Dr. Sumner received a B.S. and PhD from the Department of Chemistry at North Carolina State University, and conducted a postdoctoral fellowship at the National Heart Lung and Blood Institute.

Roel Vermeulen, PhD, is Associate Professor at the Environmental Epidemiology Division of the Institute for Risk Assessment Sciences and Adjunct Professor in molecular epidemiology at the University Medical Centre at Utrecht University in the Netherlands. His research focuses on occupational and environmental risk factors for cancer, asthma, and neurological diseases. Dr. Vermeulen uses novel molecular and statistical approaches to assist in exposure assessment for epidemiological research and risk assessment. He has an extensive international portfolio of

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research projects in the field of chemical exposures in the workplace and is currently involved in studies on the health effect of asbestos, benzene, diesel, dioxins, electromagnetic fields, formaldehyde, nanomaterials, PAHs, PCBs, pesticides, perfluorinated compounds and trichloroethylene. Dr. Vermeulen is a member of the Dutch Health Council, has served on multiple international committees and editorial boards, is an Associate Editor of the *Annals of Occupational Hygiene* and *Frontiers in Cancer Epidemiology and Prevention*, consults for national and international funding organizations and scientific projects, and has lectured at multiple national and international scientific meetings. Additionally, he has co-authored over 225 peer-reviewed papers.

David Wishart, PhD, is Professor in the Departments of Biological Sciences and Computing Science at the University of Alberta and Senior Research Officer and Director of the Nano Life Science program at the National Research Council Canada's National Institute for Nanotechnology (NINT). He maintains active research programs in structural biology, nanobiology, synthetic biology, prion biology, bioinformatics and metabolomics. Some of his laboratory's most significant contributions have been in the area of protein chemical shift analysis and the prediction of protein structure. Dr. Wishart has directed a number of core labs at the University of Alberta over the years including the Faculty of Pharmacy's mass spectrometry core, the Polyomx bioinformatics core, the PENCE bioinformatics core facility, and the Genome Canada Bioinformatics Help Desk. From 2006-2009, Dr. Wishart led the Human Metabolome Project, a multi-university, multi-investigator project that catalogued all of the known metabolites in human tissues and biofluids.

Lauren Zeise, PhD, is Chief, Reproductive and Cancer Hazard Assessment Branch, of the California Environmental Protection Agency's (Cal/EPA) Office of Environmental Health Hazard Assessment. In that role she oversees a variety of scientific activities concerning risk assessment, including chemical hazard and dose response assessment and development of improved methods for risk assessment. As part of Cal/EPA's environmental justice work, her group is also developing the Agency's approach to cumulative impact assessment – for characterizing the impact on communities of multiple sources of pollution and non-chemical stressors in the presence of community vulnerability. Her group works with other departments in California government in operating Biomonitoring California, the state's biomonitoring program. She co-lead the team that developed California's Green Chemistry Hazard Trait regulation. Dr. Zeise has served on numerous national and international science advisory committees and boards focusing on environmental public health and improving the way chemicals are tested or evaluated for health risk. She has coauthored a number of National Academy of Science (NAS) reports, including "Science and Decisions: Advancing Risk Assessment" (2009), "Toxicity Testing in the 21st Century: A Vision and Strategy" (2007), "Sustainability and the US EPA" (2011), and "Understanding Risk: Informing Decisions in a Democratic Society" (1996). She is currently a member of the NAS committees including the Committee on Use of Emerging Science for Environmental Health Decisions. She is member, fellow, former editor and former councilor of the Society of Risk Analysis and was the 2008 recipient of the Society's Outstanding Risk Practitioner Award. She is a lifetime NAS National Associate. She received her doctorate from Harvard University.