SOT FDA Colloquia on Emerging Toxicological Science
Artificial Intelligence Applications in Food and Cosmetic Safety

Speaker Biographies

Jim Riviere, DVM, PhD; Chair

Jim Riviere is a Distinguished Professor Emeritus from both North Carolina State University (NCSU) and Kansas State University (KSU). He is an elected member of the National Academy of Medicine and an active Fellow of the Academy of Toxicological Sciences. At KSU, he held the McDonald Chair of Veterinary Medicine, was a University Distinguished Professor, a Kansas Bioscience Authority Eminent Scholar and Director of the Institute of Computational Comparative Medicine, a Certara Center of Excellence in Pharmacometrics where he co-founded the 1DATA consortium. Prior to joining the KSU faculty, Dr. Riviere was a faculty member at NCSU for 31 years, retiring both as an Alumni and Burroughs Wellcome Fund Distinguished Professor. At NCSU, he was the founding director of the Center for Chemical Toxicology Research and Pharmacokinetics and a past Director of NCSU's Graduate Program in Biomathematics. His research focusses on developing computational models for predicting biological interactions of nanomaterials, the risk assessment of complex chemical mixtures, absorption of drugs and chemicals across skin, and the food safety and pharmacokinetics of tissue residues in food producing animals. The common theme is to define quantitative approaches including artificial intelligence (AI) and machine learning approaches to link model systems of different scales, that is from *in silico* to *in vitro* to *in vivo* to *population* endpoints in one species, and then to extrapolate across species. He was the co-founder of the Food Animal Residue Avoidance and Depletion (FARAD) program supported by USDA from 1981 to the present. Riviere holds six patents, has authored/edited 22 books and over 600 scholarly publications in pharmacokinetics, toxicology and food safety; and received over $21 million as principal investigator on extramural research grants. Among his honors are the 1991 Ebert Prize from the American Pharmaceutical Association, the Harvey W. Wiley Medal and FDA Commissioner's Special Citation, the University of North Carolina system's O. Max Gardner Award, John Doull Award, Lloyd E. Davis Award, Lifetime Achievement Awards from both the American and European Associations of Veterinary Pharmacology, as well as being selected as the first honorary fellow in the American College of Veterinary Clinical Pharmacology.

Dr. Riviere earned his bachelor's degree in biology *summa cum laude* and a master's degree in endocrinology with distinction from Boston College. He earned a DVM and a PhD in pharmacology from Purdue University and was awarded an honorary DSc from Purdue in 2007. Currently Dr. Riviere lives in Raleigh with his wife and fellow toxicologist Dr. Nancy Ann Monteiro-Riviere. He serves as Science Advisor to FARAD and the 1DATA programs, is an active consultant with the FDA and continues collaborations with colleagues in pharmacokinetic and AI research topics.

Ernest Kwegyir-Afful, PhD, RAC; Co-chair

Ernest K. Kwegyir-Afful is Data Scientist in the Office of Food Additive Safety (OFAS) at the Center for Food Safety and Applied Nutrition, FDA. He is the current Acting Lead for the Informatics and Information Systems Team in OFAS. He is also an Executive Committee member of FDA's Artificial Intelligence and Machine Learning Strategy group, and the Lead for the Center's AI interest group. Dr. Kwegyir-Afful has previously led the Center's efforts in designing an AI engine, "Emerging Chemical Hazard Intelligence Platform," to assist the pilot Chemical Signals Program in detecting and predicting the emergence of potential chemical hazards of concern in the food supply. This work was publicized by a KM World publication and the Harvard Business Review. Dr. Kwegyir-Afful has advised various government organizations on the use of effective and appropriate tools to successfully implement AI powered applications that address specific challenges. He is currently leading an effort to build an intelligent analytic and knowledge discovery engine that will help streamline some of the Office's horizon scanning activities related to premarket submissions and post market surveillance.

Dr. Kwegyir-Afful received his PhD in Neuroscience from the University of Maryland, Baltimore, and a Certificate in Data Science from Georgetown University. His graduate work and subsequent postdoctoral work at the University of Pittsburgh School of Medicine focused on signal transformation in neuronal networks involved in somatosensory perception and memory consolidation. In 2010, he joined the US Food and Drug Administration as Commissioner's Fellow where he served as the technical lead on quantitative risk assessment projects.

Speakers

Tim Allen, PhD

Tim Allen is a Research Associate at the MRC Toxicology Unit, University of Cambridge. He completed his PhD in 2016 on Molecular Initiating Events (MIEs) and how computational methods can be used to predict them in the group of Professor Jonathan Goodman at the Department of Chemistry in Cambridge. Since then he has undertaken postdoctoral work in the Department of Chemistry in Cambridge and at the US EPA in North Carolina. This has included work using quantum chemistry density functional theory calculations to predict the mutagenicity of alpha-beta unsaturated carbonyls and understand their reactions with DNA, using 3D Quantitative Structure Activity Relationships to quantitatively predict MIEs and explore the chemical-biological interactions in several cases, and developing in-house computational tools for use by his industrial partners at Unilever's Safety and Environmental Assurance Centre for use in safety decision making. Dr. Allen has also served as a member of ILSI Europe's expert group on the application of Adverse Outcome Pathways (AOPs) in food ingredient risk assessment and has presented his research at over 20 national and international conferences. In 2019 Dr. Allen moved to the MRC Toxicology Unit to continue his work in predictive toxicology, including new investigations into how we can use and understand state-of-the-art machine learning approaches such as deep learning neural networks.

Steve Bennett, PhD

As the Director of the Public Sector and Financial Services Practice, Steve Bennett is passionate about helping governments around the world put their data to work for the citizens they serve, and helping financial services firms maximize revenue and improve their customers' experience. In his current role, he drives strategic industry positioning and messaging in global public sector and financial services markets. A thought leader in decision science and the application of analytics, Steve works to ensure that analytics solutions at SAS deliver maximum value for the public and financial sectors around the world.

Prior to SAS, Dr. Bennett held several leadership positions during his 12 years in the US Department of Homeland Security. Following the events of September 11, 2001, he led the design and application of quantitative analysis to inform some of the United States' most challenging security decisions, most recently as the Director of the National Biosurveillance Integration Center. Over the course of his career in government, he led numerous efforts to provide analytic decision support to senior officials in the White House and across the US government. He is relentless in his commitment to helping governments improve decision making, and pursues better organization, management, and use of data as critical to that endeavor.

Dr. Bennett holds a doctorate in computational biochemistry from Stanford, as well as undergraduate degrees in biology and chemistry from Caltech. He has authored a number of publications. When not supporting improved analytics in government and financial services, he is coaching youth soccer, leading children's ministry at church, or building something in his workshop.

Nicholas Watson, MEng, PhD

Nicholas Watson has a MEng in Mechanical Engineering (University of Hull, 2005) and a PhD in Chemical Engineering (University of Leeds, 2010). From 2010 to 2014 he was a Postdoctoral Research Assistant in the School of Food Science and Nutrition at the University of Leeds. In 2013 Dr. Watson became a chartered engineer and he is a member of the Institute of Mechanical Engineers and an Associated Member of the Institute of Chemical Engineers. In 2014 he was appointed as an Assistant Professor of Chemical Engineering at the University of Nottingham. In 2015 he became a fellow of the Higher Education Academy. In addition, he is a member of the Engineering and Physical Sciences Research Council (EPSRC) Early Career Forum in Manufacturing the Future and on the Food Standards Agency Register of Experts.

Dr. Watson's research is focused on developing industrial digital technologies, such as in process sensors and data analytical methods, for the food and drink manufacturing sector. He has led numerous research projects funded via the EPSRC and Innovate UK, tackling challenges such as optimizing industrial cleaning processes, detecting allergens within production environments, and real time monitoring of food product quality attributes. He collaborates extensively with industrial partners ranging from subject matter experts to multinationals.

Chaoyang (Joe) Zhang, PhD

Chaoyang Zhang is a Professor in the School of Computing Sciences and Computer Engineering at the University of Southern Mississippi (USM). He served as the Director of School of Computing from 2008 to 2014 at USM. His research focuses on data mining, machine

learning, big data analytics and their applications in bioinformatics, and medical informatics and toxicology. His research has been supported by NSF, NIH, DOD and NAS. His studies resulted in more than one hundred peer-reviewed publications. Dr. Zhang was the co-founder and Program Committee Chair of the International Joint Conferences on Bioinformatics, Systems Biology, and Intelligent Computing (IJCBS'09), 2009. He also served as the Steering Committee Co-Chair of the 2010 ACM Bioinformatics and Computational Biology International Conference (ACM-BCB). Dr. Zhang was elected as President of the US Midsouth Computational Biology and Bioinformatics Society (MCBIOS) in 2014-2015. He received his PhD in Computational Modeling and Analysis from Louisiana Tech University.