

**CHEMICAL TOXICOLOGY IN ACTION  
APRIL 12, 2008 - SATURDAY  
THE GEORGE WASHINGTON UNIVERSITY  
1957 E ST. BUILDING  
Room 213, Harding Auditorium  
1957 E St. NW, Washington, DC**

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**PROGRAM ABSTRACTS**

**Introduction to Toxicology**

**Nicholas T. Lappas, PhD, Department of Forensic Sciences, GWU**

Toxicology is the scientific study of the adverse effects of drugs and the mechanism by which these adverse effects are produced. It is an interdisciplinary and applied science that utilizes the foundations of chemistry and biology. This presentation will provide an overview of the essentials of toxicology employed in the identification of these effects and mechanisms and will serve as an introduction to the methods of several different types of toxicologists. Types of toxic exposures, drug disposition, factors that influence toxicology and an overview of toxicity testing will be discussed.

**What Is a Food Additive Toxicologist and What Does He Do?**

**David Hattan, PhD, Food and Drug Administration, Center for Food Safety and Applied Nutrition, Office of Food Additive Safety**

FDA Center for Food Safety and Applied Nutrition is responsible for establishing the safety of food and ingredients added to food in the US. During much of 2007, several scientific and compliance organizations of the FDA were involved in sustained efforts to discover the cause of an outbreak of poisonings in cats, dogs, pigs and fish. Was the source of the toxicity a virus or bacteria or was it the result of chemical contamination or due to some other mistake or unlawful act? Chemists within the FDA and other organizations provided key information in helping to solve the mystery. This presentation will describe the interactions of chemists with other scientific disciplines within the FDA to understand the source of the problem and to define the potential threat to consumers of food in the US.

**Clinical Pharmacology - Toxicology**

**Cynthia L. Morris-Kukoski, Pharm.D., DABAT, Department of Justice FBI Laboratory and United States Navy**

Chemistry? I thought I was a healthcare professional. Did you ever think chemistry would apply to consulting on an overdosed or agitated patient? Clinical pharmacology (the study of drugs applied to patients) and clinical toxicology (the study of poisons applied to patients) utilize chemistry on a daily basis to uncover and unfold the clues provided to us by the unconscious or uncooperative patient. Discover the A,B,C, and D's used to triage this endeavor. Learn the chemical principles used to bind up poisons, alter excretion of poisons, and eliminate poisons from the body. Discuss which poisons can be detected by x-ray or color tests, and which poisons can alter blood chemistries while waiting on analytical toxicology results. Explore how antidotes work to counteract poisons. Begin to understand the importance of chemistry in this human game of clue called life.

## **"ELEMENTary, my dear Watson." : Chemist as sleuth in Environmental Toxicology**

**Sarah Gerould, PhD, Bureau Program Coordinator, Contaminant Biology Program, US Geological Survey, Reston, VA**

Dr. Gerould will discuss the many parts that chemists play in studying environmental toxicology problems. Chemists not only identify and measure the amounts of chemicals, they invent techniques for sampling chemicals that are in water and air, help determine the source of the chemical, its fate, and how it will change along the way. Learning how to distinguish chemicals that are closely related, but toxicologically distinct, is the first step to enabling scientists to study them in other ways. Chemistry and chemists play a critical role in discovering, analyzing and resolving many toxicology problems, including PCBs in West Virginia caves, fate and effects of mercury in the environment, and the buildup of flame retardants in fish and wildlife.

## **What is Forensic Toxicology?**

**Jason E. Schaff, PhD, Federal Bureau of Investigation, Laboratory Division**  
**Nicholas T. Lappas, PhD, Department of Forensic Sciences, The George Washington University**

Forensic toxicology is the application of toxicology for the purposes of the law. Forensic toxicologists are concerned with determining whether the adverse effect suffered by an individual was caused by either the presence of an undesirable drug or the absence of a necessary drug. This requires the analysis of the appropriate biological specimens to identify and possible quantitate any drugs that are present, the interpretation of these findings and the reporting of the results and opinions, frequently by testifying in court. This presentation will discuss these duties of the forensic toxicologist and present case studies that exemplify them.

## **A Toxicologist Looks at Cancer Risk**

**Joseph V. Rodricks, PhD, DABT, ENVIRON International Corporation, Arlington, VA**

The first evidence that substances in the environment could induce malignancies in humans was uncovered in the late 18<sup>th</sup> century. As methods for identifying chemical carcinogens improved, a large increase in the number of such substances has been observed, with many widespread in the environment and in many types of consumer products. Research into biological mechanisms underlying the induction of cancer by chemicals gave rise to the multi-stage model, which included the assumption that any exposure could increase the probability (risk) of cancer development. Probabilistic models used to assess cancer risks are controversial, but have come into wide use to guide decision-making (risk management). Cancer-causing chemicals are thought to cause harm through mechanisms that do not apply to other forms of toxicity, and which may make them unusually dangerous. Some recent research challenges this thinking. Chemists have made important contributions to our understanding of cancer mechanisms and the risks of specific carcinogens in the environment.

## **SPEAKER BIOGRAPHIES**

### **Sarah Gerould, Ph.D., Bureau Program Coordinator, Contaminant Biology Program, US Geological Survey, Reston, VA**

Dr Sarah Gerould is a toxicologist with the U.S. Geological Survey in Reston, Virginia. She leads the Contaminant Biology Program, a research program of approximately 100 scientists, which investigates environmental exposure and the effects of contaminants in fish and wildlife. Dr. Gerould earned her Ph.D. from Cornell University, and her M.S. from the University of Wisconsin, Madison. Her research at the Savannah River Ecology Laboratory and Cornell University focused on the fate of chemicals in stream systems, and the influence of biota on chemical fate in aquatic environments. After her Ph.D., she worked with the U.S. Fish and Wildlife Service as staff toxicologist, providing advice to FWS field personnel on the cause of wildlife dieoffs and other contaminant issues.

### **David Hattan, Ph.D., FDA, Center for Food Safety and Applied Nutrition, Office of Food Additive Safety**

Dr. Hattan was trained as a pharmacist and pharmacologist and has worked for the US Food and Drug Administration in the Center for Food Safety and Applied Nutrition for over 25 years. During those years he has served as a reviewer, supervisor, and division director of toxicology review. During his career with the Center, Dr. Hattan has worked closely on a number of prominent food additives, including: aspartame, sucralose, monosodium glutamate, caffeine, cyclamates, saccharin, olestra, FD&C Red No. 3. He has served on various government interagency committees (ICCVAM, EDMVAC); and international committees (Joint Expert Committee on Food Additives) More recently Dr. Hattan has been responsible for coordinating early disposition of clinical studies within CFSAN for review.

### **Nicholas T. Lappas, Ph.D., Department of Forensic Sciences, GWU**

Dr. Lappas is an Associate Professor and Director of Graduate Studies in the Department of Forensic Sciences and a member of the graduate faculty of George Washington University. He teaches several graduate courses including Forensic Toxicology, Medicinal Chemistry and Analytical Toxicology. Prior to his position at GW, Dr. Lappas was a forensic toxicologist with The Allegheny County Coroner's Office in Pittsburgh, PA. His research interests include an evaluation of factors which influence the interpretation of analytical toxicology results, the effects of sample storage conditions on drug concentrations and the development of analytical toxicology methods. He is a member of several professional organizations including The American Academy of Forensic Sciences, The International Association of Forensic Toxicologists, The Society of Forensic Toxicology and The Forensic Science Society. He has been a consultant in more than 300 criminal and civil cases and has testified as an expert witness in more than 100 cases.

**Cynthia L. Morris-Kukoski, Pharm.D., DABAT, Department of Justice FBI Laboratory and United States Navy**

Dr. Cynthia L. Morris-Kukoski is a Forensic Examiner in the Chemistry Unit Toxicology Subunit Department of Justice FBI Laboratory Quantico VA and a Clinical Pharmacist/Toxicologist in the United States Navy Reserves. She received her B.S. in Pharmacy (1988) and her Doctor of Pharmacy (1991) from Mass College of Pharmacy (Boston, Ma). She completed a Clinical Toxicology Residency from Hennepin County Medical Center (Mpls, Mn) and is a Diplomat of the American Board of Applied Toxicology (ABAT) since 1996. She is a member of the American Academy of Clinical Toxicology (AACT), SOFT, and TIAFT. She is the Co-Chairman for AACT Medico-Legal Interest Group since 2000 and an ABAT elected board member since 2003. Dr. Morris-Kukoski has authored many scientific articles, has served as a research investigator, and has provided numerous lectures for a variety of audiences.

**Joseph V. Rodricks, Ph.D., DABT, ENVIRON International Corporation, Arlington, VA**

Joseph V. Rodricks was a Founding Principal of ENVIRON International Corporation in 1982. He is an internationally recognized expert in the field of toxicology and risk analysis, and in their uses in regulation and in the evaluation of toxic tort and product liability cases. Since 1980, he has consulted for manufacturers, for government agencies and the World Health Organization, and he has served on twenty Committees of the National Academy of Sciences; he is currently a member of the NAS Board on Environmental Studies and Toxicology. Dr. Rodricks was formerly Deputy Associate Commissioner, Health Affairs, and Toxicologist, U.S. Food and Drug Administration (1965-1980); and is a Visiting Professor, The Johns Hopkins University School of Public Health. He has been certified as a Diplomate, American Board of Toxicology, since 1982, and has received Distinguished Service Awards from three professional societies.

**Jason E. Schaff, PhD, Federal Bureau of Investigation, Laboratory Division**

Dr. Schaff has worked for the last nine years as a forensic toxicologist with the Chemistry Unit of the Federal Bureau of Investigation Laboratory. There he analyzes a wide variety of specimens submitted by various federal, state, and local agencies, supporting investigations of product tampering, drug-facilitated sexual assaults, public corruption, suspicious deaths of U.S. citizens overseas, and various other crimes. Dr. Schaff received a B.S. in chemistry in 1991 from Yale University and a Ph.D. in analytical chemistry in 1997 from the University of Minnesota. After completing his doctorate, he spent two years on a fellowship at the Indiana University Medical Center developing methods of analysis for anabolic steroids in an IOC-accredited testing laboratory.