2010 Toxicology and Risk Assessment Conference

Computational Toxicology: Applications to Risk Assessment

April 26-29, 2010

Conference Co-chairs:
Fowler, Bruce A., Ph.D., Fellow A.T.S., Agency for Toxic Substances and Disease Registry, Senior Biomedical Research Service
Mattie, David R., Ph.D., DABT, Air Force Research Laboratory, 711 Human Performance Wing, Human Effectiveness Directorate

Monday, April 26, 2010

1:00 p.m. – 5:00 p.m.
Registration

1:00 p.m. – 5:00 p.m.
Workshops W-1

2:45 p.m. – 3:00 p.m.
Break

W-1. Crash Course in Risk Assessment

Presenters:
Lambert, Jason C., Ph.D., DABT, U.S. Environmental Protection Agency, Office of Research and Development, National Center for Environmental Assessment
Zhao, Jay, Ph.D., DABT, U.S. Environmental Protection Agency, Office of Research and Development, National Center for Environmental Assessment

This half-day course focuses on risk assessment for orally encountered chemicals. Chemical risk assessment is a complex and ever-evolving process. There are fundamental guiding principles and default methodologies that should be understood by those considering further activities in the area of risk assessment. The principles have been organized by the National Research Council in the Risk Assessment Paradigm. Several activities comprise the paradigm: Hazard identification, Exposure Assessment, Dose-Response Evaluation and Risk Characterization. This course is organized around these activities; examples from the literature will be used to communicate key concepts and calculations. This course will instruct the application of basic methodologies used by the U.S. EPA in estimating the cancer and noncancer risks for orally encountered substances. Classroom exercises may be used as instructional aides—participants should bring a calculator. A CD containing key U.S. EPA risk assessment guidance documents will be provided to students. Class limited to 20 participants.
Tuesday, April 27, 2010  
8:00 a.m. – 11:45 a.m.

Morning Session

8:00 a.m. – 8:15 a.m.  Opening Remarks
Conference Co-chairs:
Fowler, Bruce A., Ph.D., Fellow A.T.S., Agency for Toxic Substances and Disease Registry, Senior Biomedical Research Service
Mattie, David R., Ph.D., DABT, Air Force Research Laboratory, 711 Human Performance Wing, Human Effectiveness Directorate

8:15 a.m. – 9:00 a.m.  Toxicology and Molecular Design
Anastas, Paul, Ph.D., Assistant Administrator for the Office of Research and Development, Science Advisor to the EPA

9:00 – 11:30 a.m.  Computational Toxicology – State of the Science

10:15 a.m. – 10:45 a.m.  Break

1.  Computational Toxicology – State of the Science
Co-chairs:
Fowler, Bruce A., Ph.D., Fellow A.T.S., Agency for Toxic Substances and Disease Registry, Senior Biomedical Research Service
Lipscomb, John C., Ph.D., DABT, Fellow A.T.S., U.S. Environmental Protection Agency, Office of Research and Development, National Center for Environmental Assessment

9:00 a.m.  Multiple In Silico Computational Toxicology Modeling Methods to Predict Adverse Drug/Chemical Interactions with Cytochrome P450 Enzymes
McPhail, Brooks, Ph.D., Agency for Toxic Substances and Disease Registry, Oak Ridge Institute for Science & Education
Beger, Richard D., Ph.D., Center for Metabolomics, National Center for Toxicological Research, U.S. Food and Drug Administration

9:45 a.m.  Molecular Docking: the Structural Basis for Organophosphate Toxicity and Detoxification
Demchuk, Eugene, Ph.D., Agency for Toxic Substances and Disease Registry
Tie, Yunfeng (Tracy), Ph.D., Fellow, Agency for Toxic Substances and Disease Registry, Oak Ridge Institute for Science & Education

10:15 a.m.  Break

10:45 a.m.  QSAR
Ruiz, Patricia Ph.D., Agency for Toxic Substances and Disease Registry, Division of Toxicology and Environmental Medicine

11:15 a.m.  A QSAR Toolkit for Organophosphate Biologically-Based Dose-Response Modeling
Ruark, Christopher D. Air Force Research Laboratory, 711 Human Performance Wing, Human Effectiveness Directorate
Gearhart, Jeffrey M., Ph.D. Air Force Research Laboratory, 711 Human Performance Wing, Human Effectiveness Directorate
11:45 a.m. – 1:00 p.m.  Lunch

Tuesday, April 27, 2010  1:00 p.m. – 5:00 p.m.

Afternoon Session

1:00 p.m. – 5:00 p.m.  Dermal Toxicity Risk Assessment

3:00 p.m. – 3:30 p.m.  Break

2.  Dermal Toxicity Risk Assessment
   Co-chairs:
   Snawder, John E., Ph.D., National Institute for Occupational Safety and Health, Biological Monitoring Laboratory Section
   Dotson, Scott G., Ph.D., CIH, National Institute for Occupational Safety and Health, Education and Information Division

1:00 p.m.  Overview of Dermal Hazards: Systemic, Direct, and Sensitizing Effects of Skin Contact
Snawder, John E., Ph.D., National Institute for Occupational Safety and Health, Biological Monitoring Laboratory Section

1:40 p.m.  Identifying and Understanding the Hazards of Skin Contact with Chemicals in the Workplace
Dotson, Scott G., Ph.D., CIH, National Institute for Occupational Safety and Health, Education and Information Division

2:20 p.m.  The Toxicological Basis for Weight of Evidence Decisions in Assigning Skin Hazard Notations
Gadagbui, Bernard, Ph.D., DABT, Toxicology Excellence for Risk Assessment

3:00 p.m.  Break

3:30 p.m.  Trends and Technologies Driving the Growing Role of Dermal Risk Assessment in the Workplace
Maier, Andrew, Ph.D., CIH, DABT, Toxicology Excellence for Risk Assessment

4:10 p.m.  Addressing Research Gaps in the NIOSH Skin Notation Project: The Example of 1-Bromopropane
Frasch, Frederick H., Ph.D., National Institute for Occupational Safety and Health, Health Effects Laboratory

Tuesday, April 27, 2010  5:45 p.m. – 7:45 p.m.

Evening Session

Poster Session and Reception
Poster Session Co-chairs:
Lambert, Jason C., Ph.D., DABT, U.S. Environmental Protection Agency, Office of Research and Development, National Center for Environmental Assessment
Morning Session

8:00 a.m. – 11:45 a.m.  Toxicity and Risk Assessment of Bio-Based Alternative Fuels

9:30 a.m. – 10:00 a.m.  Break

3.  Toxicity and Risk Assessment of Bio-Based Alternative Fuels
   Co-chairs:
   Harvey, Lana D., M.S.,  U.S. Air Force School of Aerospace Medicine, Technical Support Branch
   Reddy, Gunda, Ph.D., DABT, U.S. Army Public Health Command, Health Effects Research Program
   LCDR Stockelman, Michael, Ph.D., U.S. Navy, Naval Health Research Center Detachment, Environmental Health Effects Laboratory

8:00 a.m.  Alternative Aviation Fuels: Changes in Hydrocarbon Composition Relative to Current Fuels
   Edwards, Tim, Ph.D., Air Force Research Laboratory, Propulsion Directorate, Fuels Branch

8:30 a.m.  Analysis and Comparison of Alternative and Bio-Based Fuels
   Wagner, Mike, 1LT, Air Force Research Laboratory, 711 Human Performance Wing, Human Effectiveness Directorate

9:00 a.m.  Toxicity Assessment of an Alternative Jet Fuel
   Mattie, David R., Ph.D., DABT, Air Force Research Laboratory, 711 Human Performance Wing, Human Effectiveness Directorate

9:30 a.m.  Break

10:00 a.m.  Health Hazard Assessment for Synthetic Paraffinic Kerosene
   Hinz, John P., Air Force Research Laboratory, 711 Human Performance Wing, Health Risk Assessment Support

10:30 a.m.  PBPK Modeling and Kinetics of JP-8 and S-8
   Fisher, Jeffrey W., Ph.D., Fellow, A.T.S., University of Georgia, Interdisciplinary Toxicology Program, Department of Environmental Health Science College of Public Health

11:00 a.m.  Biofuels Research at EPA
   Boyes, William K., Ph.D., U.S. Environmental Protection Agency, Office of Research and Development, National Health and Environmental Effects Research Laboratory, Toxicity Assessment Division

11:45 a.m. – 1:00 p.m.  Lunch
Afternoon Session

1:00 p.m. – 5:00 p.m. Computational Toxicology - Application to Risk Assessment

3:00 p.m. – 3:30 p.m. Break

4. Computational Toxicology - Application to Risk Assessment
   Co-chairs:
   Fowler, Bruce A., Ph.D., Fellow A.T.S., Agency for Toxic Substances and Disease Registry, Senior Biomedical Research Service
   Roszell, Laurie E., Ph.D., DABT, U.S. Army Public Health Command

1:00 p.m. Chemical Mixtures
   Mumtaz, Moiz Ph.D., Agency for Toxic Substances and Disease Registry, Division of Toxicology and Environmental Medicine

2:00 p.m. Bioinformatics
   Tong, Weida, Ph.D., U.S. Food and Drug Administration, National Center for Toxicological Research, Center for Toxicoinformatics

3:00 p.m. Break

3:30 p.m. Interpreting of Chemical Biomonitor Data from the NHANES Database
   Ruiz, Patricia Ph.D., Agency for Toxic Substances and Disease Registry, Division of Toxicology and Environmental Medicine

4:10 p.m. Risk Assessment Overview
   Ila Cote, Ph.D., DABT, U.S. Environmental Protection Agency, Immediate Office of the Director, National Center for Environmental Assessment

4:50 p.m. Closing Remarks
   Fowler, Bruce A., Ph.D., Fellow A.T.S., Agency for Toxic Substances and Disease Registry, Senior Biomedical Research Service
   Roszell, Laurie E., Ph.D., DABT, U.S. Army Public Health Command

Thursday, April 29, 2010
8:00 a.m. – 12:00 p.m.

Morning Workshops
(separate registration required)

W-2. Workshop: New Developments in Occupational Risk Assessment
   Presenters:
   Brueck, Scott, M.S., CIH., National Institute for Occupational Safety and Health, Health Hazard Evaluation Program
   Dankovic, David, Ph.D., National Institute for Occupational Safety and Health, EID
   Maier, Andrew, Ph.D., CIH, DABT, Toxicology Excellence for Risk Assessment
   Talaska, Glenn, Ph.D., University of Cincinnati
This workshop focuses on special issues for application of the basic steps in the NAS risk assessment paradigm to the unique needs of occupational settings. The workshop will include targeted lecture materials addressing unique and evolving aspects of occupational risk assessment, a case study exercise and in-class discussions to reinforce key points, and resource links that will provide attendees information on a variety of tools and approaches for addressing key topics in worker-health risk assessment. Highlighted technical topics will address: 1) current issues in developing a sampling strategy and interpreting the validity of exposure monitoring data; 2) traditional and advanced methods for developing occupational exposure limits, including the latest developments in assigning hazard notations and hazard bands for chemicals with limited data; and, 3) hot topics in occupational risk characterization – including refinements to the traditional hazard index approach to address mixtures, biological monitoring approaches, and methods for addressing non-traditional exposure scenarios.

W-3. Workshop: Cumulative Risk Assessment: Concepts, Methods and Resources

Presenters:
Rice, Glenn E., Ph.D., U.S. Environmental Protection Agency, Office of Research and Development, National Center for Environmental Assessment
Lambert, Jason C., Ph.D., DABT, U.S. Environmental Protection Agency, Office of Research and Development, National Center for Environmental Assessment
Teuschler, Linda K., U.S. Environmental Protection Agency, Office of Research and Development, National Center for Environmental Assessment
Wright, J. Michael, Ph.D., U.S. Environmental Protection Agency, Office of Research and Development, National Center for Environmental Assessment

Public interest in the health effects of environmental exposures continues to grow as information increases about cumulative impacts from multiple chemical and nonchemical (e.g., microbes, noise) stressors, resulting in community concerns. Initiating factors that could raise the need for conduct of a cumulative risk assessment (CRA) include: contaminants in air, water and soil from multiple pollutant sources, from factories to farmlands; environmental quality metrics such as air pollution levels; exposure metrics, including biomonitoring data; effect metrics such as low birth weights, high cancer rates; and effects on ecosystem function and services such as declining fish populations. CRA has been defined as “an analysis, characterization, and possible quantification of the combined risks to human health or the environment from multiple agents or stressors” (U.S. EPA, 2003). In addition, population and individual vulnerability factors are being recognized as important issues to be considered in a CRA, such as diet/nutritional status, behaviors, genetic traits, socio-economic status, sensitivities, and psychosocial stress. Ongoing research efforts are characterizing multiple chemical and nonchemical stressors, environmental fate across exposure settings, and effects of concern to vulnerable communities. CRA provides the integrating foundation for linking these factors across space and time, to produce an overall population-based risk picture and better inform health protection programs.

This workshop highlights concepts, methods, and resources for scoping and conducting a population-based CRA. A central theme is the integration of exposure information and population characteristics during the planning and scoping phase of a CRA based on initiating factors. Then, chemicals or non-chemical stressors are grouped by exposure and toxicity factors for risk evaluation. These chemical/stressor groups can then be linked with vulnerability factors characteristic of the exposed population for use in developing risk characterization information. Methods for estimating human health risks are discussed, including epidemiologic approaches and methods based on existing chemical mixtures risk assessment guidance and toxicological data. This workshop targets individuals who are interested in developing a basic knowledge of CRA concepts, methods, and resources. Teaching methods include lectures and hands-on exercises. Participants are asked to bring a calculator.
W-4. Workshop: Physiologically Based Pharmacokinetic (PBPK) Models in Risk Assessment
Presenters:
Gargas, Michael L., Ph.D., Environmental Health Effects Laboratory, Wright Patterson AFB
Lipscomb, John C., Ph.D., DABT, Fellow A.T.S., U.S. Environmental Protection Agency, Office of Research and Development, National Center for Environmental Assessment
Sweeney, Lisa M., Ph.D., DABT, Toxicology Excellence for Risk Assessment

Physiologically based pharmacokinetic (PBPK) models have been developed and used in risk assessment applications since the 1980’s. As the applications of these models in risk assessment have grown, the criteria for judging the usefulness, appropriateness, and applicability of using these models has become necessary. The primary focus of this workshop will be on the use and interpretation of appropriate PBPK data in risk assessment applications. Current approaches used to evaluate the suitability of a PBPK model for use in risk assessment will be presented; including information described in government guidance documents (e.g., USEPA and IPCS) as well as selected articles from the scientific literature. Specific examples will be used during this workshop to illustrate key concepts in the use of PBPK data, including the effect of various disease states on model parameters and model output, as well as several chemical-specific case studies on risk assessments that relied on PBPK data. The goal of this workshop is to have attendees leave better equipped to evaluate the qualities and characteristics of PBPK models intended for use in risk assessment applications.

W-5. Workshop: Introduction to the Use of Computational Toxicology in Risk Assessment
Presenters:
Judson, Richard, Ph.D., U.S. Environmental Protection Agency, National Center for Computational Toxicology
Karyala, Saikumar V., University of Cincinnati Medical Center, Genomics and Microarray Lab,
Thomas, Russell, Ph.D., The Hamner Institutes

This workshop introduces how computational toxicology methods may be applied to complex risk assessment situations to provide high quality, scientifically-defensible data and answers. It will begin with a survey of the methods used, focusing on the underlying biology, computational approaches to “omics” technology, as well as systems biology concepts. The class will learn how to interpret results from gene arrays, protein arrays, and metabolomics analyses, including issues to consider and potential pitfalls, and case studies of the applications of ‘omics’ data in mode of action evaluation and dose-response assessment. Efforts from the National Center for Computational Toxicology will be discussed, including ToxCast™ and the virtual organ program. Course participants would develop a broad understanding of these methods, with the goal of understanding how the methods are used in risk assessment and key issues for consideration in such applications.

CERTIFICATION/MAINTENANCE CREDITS

Application has been approved for Certification Maintenance Credits from the American Board of Industrial Hygiene (ABIH) for conference attendees. A sign-up sheet for ABIH credits will be available at the Conference Registration Desk.