

Scientific Program Overview

THEMATIC APPROACH

Sunday CE course and Monday–Thursday session titles related to each theme are color-coded in this Program Overview.

Application of Systems Biology to Toxicology

Recent technological advances allow the study of multiple interacting networks in cellular application of genomics, proteomics, metabolomics, computational modeling, and bioinformatics to cell-specific and organ-specific toxicity, as well as to broader questions in toxicology to develop. Application of these technologies will provide for systems to improve predictive toxicity tools, enable more complete understanding of the mechanisms underlying the toxicity of pharmaceutical agents and environmental chemicals, and facilitate the interrogation of disease etiology and prevention.

Biomarkers for Exposure Assessment, Safety Evaluation, and Translational Medicine

The development of biomarkers that can be applied to assessing exposure, predicting toxicity, defining mechanisms of toxicity, and improving translation of preclinical and clinical toxicity has impacted how toxicology research is carried out. Developing the basic biology and analytical tools to support biomarker identification, development, and validation is critical to the successful incorporation of biomarkers in all areas of toxicology research.

Effects of Nanomaterials on Biological Systems

Research in the toxicology of nanomaterials has expanded along with the application of this technology in material science research and development. Factors that influence the potential for toxic responses and identification of relevant target organs for exposure and toxicity are critical to the development of cogent and reliable risk assessment for these materials. Basic, applied, and regulatory science must converge in order to address the needs for this class of materials that will advance understanding of potential impacts on human and environmental health.

Molecular Basis for Genetic Variability and Susceptibility to Toxicants

Many toxicants alter gene expression and many types of toxicities can be affected by variation in gene expression or genetic polymorphisms. Similarly, age-dependent gene expression can influence toxic responses and epigenetic perturbations influence heritable gene expression. Both genetic and epigenetic differences can influence the individual's response to pharmaceuticals and environmental chemicals. It is recognized that single nucleotide polymorphisms directly affect genetic differences on rates of metabolism, but for other responses, such as behavior, the connections are more complex. Linking genetic and environmental variables with exposure data is essential to accurately define potential beneficial or adverse effects of chemicals and to assess disease susceptibility and prevention.

Regulatory Science: Advancing New Approaches for Hazard Identification and Risk Assessment

Regulatory science encompasses the science(s) used to evaluate the safety, efficacy, quality, and performance of any product. Advancements in regulatory science will facilitate the development and evaluation of innovative new products. As we modernize the tools used to assess the potential risks from drugs, environmental chemicals, food, and other products, we must also consider the global applications of such methods and strategies to drive better risk-assessment decisions. This theme is intended to foster session content that will provide for perspective on ongoing efforts to improve hazard identification and risk assessment with emphasis on how best to coordinate these efforts for more consistent regulatory practices around the world.

A page reference follows the course or session information.

Sunday, March 10

7:00 AM–7:45 AM

SUNRISE CONTINUING EDUCATION COURSE

1. **A Refresher of Immunoglobulin and Fc-Receptor Biology and Advances Related to Therapeutic Antibody Development** (p104)

8:15 AM–12:00 Noon

MORNING CONTINUING EDUCATION COURSES

2. **Basic Principles of Human Risk Assessment** (p105)
3. **Recent Developments in Cardiovascular Physiology-Based Toxicology** (p105)
4. **Approval of Biosimilar Monoclonal Antibodies: Scientific, Regulatory, and Legal Challenges** (p105)
5. **The What, When, and How of Nonclinical Support for an IND Submission** (p106)
6. **The Practice and Implementation of Neural Stem Cell-Based Approaches to Neurotoxicology** (p107)
7. **Toxic Effects of Metals** (p107)

1:15 PM–5:00 PM

AFTERNOON CONTINUING EDUCATION COURSES

8. **Advances in Nanotoxicology—Challenges** (p108)
9. **Gonadal Development, Function, and Toxicology** (p108)
10. **The REACH Regulation and Safety Assessment Approaches for Chemicals That Come in Contact with the Skin** (p109)
11. **T4: Tools and Technologies in Translational Toxicology** (p109)
12. **Understanding Toxic Neuropathy in Drug Development: Both Clinical and Nonclinical Perspectives** (p110)
13. **Weighing in on Nutrition—Essential Concepts for Toxicologists** (p110)



Monday, March 11

8:00 AM to 9:00 AM

PLENARY OPENING LECTURE

Genetic Analysis of Innate Immune Sensing
Lecturer: Bruce A. Beutler, University of Texas Southwestern Medical Center (p138)

9:15 AM to 12:00 Noon

SYMPOSIUM SESSIONS

- **Genetic and Epigenetic Determinants of Susceptibility to Environmental and Occupational Toxicants** (p139)
- **Predictive Toxicology Paradigms for Understanding Carbon Nanotube Toxicity in the Lung** (p139)
- **Translatable Indicators of Testicular Toxicity: Inhibin B, microRNAs, and Sperm Signatures** (p140)

WORKSHOP SESSIONS

- **Biology of Low-Dose Response for DNA-Reactive Chemicals** (p140)
- **Incorporation of Exposure Data and Chemical Properties into Early *In Vitro* Screening Studies: Putting Early Hazard Identification into Appropriate Context** (p141)
- **Inhaled Mixtures: A Mode-of-Action Framework Applied to the Criteria Air Pollutants** (p142)

REGIONAL INTEREST SESSION

- **Toxicological Challenges in Food Production in Texas and the Gulf Coast** (p142)

PLATFORM SESSIONS

- **Advances in Neurobehavioral and Neuropathology Assessment of Chemicals** (p143)
- **Inhalants and Metabolic Disorders** (p143)

9:30 AM to 12:30 PM

POSTER SESSIONS

- **Bioinformatics and Computational Toxicology: Systems and Strategies** (p147)
- **Biotransformation/Cytochrome P450** (p159)
- **Carcinogenesis** (p149)
- **Cardiovascular Toxicity: Telemetry and *In Vitro* Systems** (p144)
- **Chemical and Biological Weapons** (p163)
- **Developmental Toxicity—Nonmammalian** (p162)
- **Ecotoxicology** (p158)
- **Endocrine Disruptor Screening** (p146)
- **Inflammation and Disease** (p156)
- **Inhalants and Cardiopulmonary** (p154)
- **Medical Devices** (p153)
- **Pharmacogenomics/Genetic Polymorphisms** (p152)

12:10 PM to 1:30 PM

ROUNDTABLE SESSIONS

- **A Decade of Nanotoxicology: Where Do We Stand Now?** (p167)
- **Predicting Human Thorough QT (TQT) Study Outcomes with Nonclinical Data—How Good Are We and How Good Do We Need to Be?** (p168)

HISTORICAL HIGHLIGHT SESSION

- **Diesel and Gasoline Exhaust and Cancer** (p168)

EDUCATION-CAREER DEVELOPMENT SESSION

- **From New Submissions to Competitive Renewals: Different Phases of Grant Writing** (p169)

12:30 PM to 1:20 PM

MERIT AWARD LECTURE

Bioactivation, Covalent Binding, and Toxicity: A Personal Odyssey
Lecturer: Frederick Peter Guengerich, Vanderbilt University Medical Center (p169)

1:00 PM to 3:30 PM

SPECIAL SYMPOSIUM

Meet the Directors (p169)

1:00 PM to 4:30 PM

POSTER SESSIONS

- **Animal Models of Disease** (p194)
- **Animal Models—Measurements and Validation** (p195)
- **Biological Modeling: Target Tissues and Toxicants** (p186)
- **Chemical Mixtures** (p183)
- **Epidemiology: Exposures and Associations** (p176)
- **Epigenetics** (p180)
- **Gene Expression and Signal Transduction** (p190)
- **Immunotoxicity** (p170)
- **Liver** (p187)
- **Nanotoxicology—Carbonaceous Materials** (p173)
- **Pesticide Toxicology** (p184)
- **Pharmacokinetics and Disposition** (p177)
- **Risk Assessment I: Advances in Approaches and Technologies** (p192)
- **Systems Biology and Toxicology** (p182)

2:00 PM to 4:45 PM

SYMPOSIUM SESSIONS

- **Human Health and Environmental Concerns around Natural Gas Production Using Hydraulic Fracturing** (p197)
- **Role of Metabolic Syndrome and Perivascular Adipose in Exposure-Induced Vascular Dysfunction** (p198)

WORKSHOP SESSIONS

- **Environmental Factors in Neurodegenerative Diseases** (p198)
- **Life-Course Models for Ensuring Children's Health Protection** (p199)
- **Nanoinformatics: Computational Challenges for Nanomaterial Hazard Assessment** (p199)
- **Scientific and Regulatory Advances in Genetic Toxicology Safety Assessment** (p200)

PLATFORM SESSIONS

- **Biomonitoring: Emerging Markers and Methods** (p200)
- **Mode of Action and Human Relevance of Rodent Tumors** (p201)
- **Toxicity of Nanoparticles—Cerium Oxide** (p201)

4:45 PM to 6:00 PM

SOT/EUROTOX DEBATE

In the Near Foreseeable Future, Much of Toxicity Testing Can Be Replaced by Computational Approaches (p203)

Tuesday, March 12

8:00 AM to 8:50 AM

LEADING EDGE IN BASIC SCIENCE AWARD LECTURE

Human Organs on Chips As Replacements for Animal Testing
Lecturer: Donald E. Ingber, Harvard University (p205)

9:00 AM to 11:45 AM

SPECIAL SYMPOSIUM

- **Frontiers for Toxicology Session: Systems and Computational Biology As Foundations for Toxicology Research** (p206)

SYMPOSIUM SESSIONS

- **From Inhaled Particles to Cardiovascular Disease and Toxicity: Evidence from Studies in Volunteers, Experimental Animals, and Cell-Based Systems** (p206)
- **The Dynamics of Neuroinflammation and Inflammatory Cell Responses in Neurologic Disease** (p207)

WORKSHOP SESSIONS

- **Advances in Carcinogenic Risk Assessment of Low-Level Genotoxic Impurities in Pharmaceuticals** (p207)
- **Health Risks of Sodium (Salt) Intake: Too Much or Too Little?** (p208)
- **Unique Challenges in Biologic Drug Development: Separating Mechanism of Action from Mechanism of Toxicity** (p208)

9:00 AM to 12:30 PM

POSTER SESSIONS

- Alternative Models—Eye and Skin (p216)
- Biomarkers I: Preclinical and Translational Approaches (p213)
- Carcinogenesis: Models and Mechanisms (p224)
- Cardiovascular Toxicity and Hemodynamics (p227)
- Computational Toxicology: Liver and Life Stage Characterizations (p211)
- Data Integration and Decision Support: Databases, Tools, and Ontologies (p209)
- Developmental Basis of Adult Disease (p218)
- Developmental Toxicity (p219)
- Liver and Model Systems (p222)
- Metals I (p229)
- Neurotoxicology: General (p212)
- Skin (p221)

9:30 AM to 4:30 PM

RESEARCH FUNDING SESSION

Research Funding Information Room (p231)

12:00 Noon to 1:30 PM

RESEARCH FUNDING SESSION

Strategies for Submitting Successful Grants: Brown Bag Luncheon (p233)

NETWORKING TIME

You are encouraged to connect and engage with your colleagues today between sessions as only networking events and Exhibit Hall activities are scheduled during this time.

12:30 PM to 1:30 PM

TOXEXPO TIME

ToxExpo is an important component of the SOT Annual Meeting. The Scientific Program Committee has therefore allotted this dedicated time for attendees to visit the Exhibit Hall C–D to stay abreast of the latest advances in technology, equipment, and services available to the toxicologist.

1:00 PM to 4:30 PM

POSTER SESSIONS

- Alternative High-Throughput Models I (p251)
- Autoimmunity and Hypersensitivity (p250)
- Developmental Neurotoxicity (p246)
- Exposure Assessment: New Characterizations, Methods, and Models (p237)
- Genotoxicity Testing (p254)
- Metals II (p255)
- Nanotoxicology—Silver and Gold (p243)
- Natural Products—*In Vivo* Safety Assessment (p241)
- Neurotoxicology: Pesticides (p248)
- Pharmaceutical Safety Assessment: Drug Development II (p235)
- Receptor-Mediated Toxicity (p239)
- Regulatory Policy: Programs and Approaches (p259)
- Safety Assessment: Nonpharmaceuticals (p257)
- **Stems Cells: Emerging Applications in Toxicology** (p234)

1:30 PM to 4:15 PM

SYMPOSIUM SESSIONS

- **Application of Systems Biology to Identify Molecular Mechanisms and Biomarkers of Lead (Pb) Neurotoxicity: Implications in a Developmental Origin of Alzheimer's Disease** (p260)
- Bone As a Target Tissue for Environmental Toxicants (p260)
- **Nonmonotonic Dose-Response Curves and Endocrine-Disrupting Chemicals: Fact or Falderal?** (p261)
- **Understanding Toxicities of Abnormal Lipid Metabolism: Alcoholic, Nonalcoholic, and Toxicant-Induced Fatty Liver Disease** (p262)

WORKSHOP SESSIONS

- **"Air"-ing on the Side of Caution: Anticipating Impacts of Emerging Issues in the Health Effects of Air Pollution** (p262)
- **Breaking the Routine: Is There Room for Modern Techniques of Neuropathology Assessment in Routine Preclinical Safety Studies?** (p263)
- **Drug Safety Assessment and Regulatory Landscape in Emerging Markets** (p263)

PLATFORM SESSION

- Bioinformatics: Pathways, Profiles, and Predictions (p264)

4:30 PM to 5:50 PM

EDUCATION-CAREER DEVELOPMENT SESSION

- The Symbiosis of Mentoring: Getting the Most out of the Mentor-Mentee Relationship (p265)

4:30 PM to 6:00 PM

SPECIAL MEMBER SESSION

SOT Annual Business Meeting (p266)

Wednesday, March 13

8:00 AM to 9:00 AM

KEYNOTE MEDICAL RESEARCH COUNCIL (MRC) LECTURE

Phenotyping the Patient Journey: Making Systems Medicine Work in the Real World
Lecturer: Jeremy K. Nicholson, Imperial College London (p267)

9:00 AM to 11:45 AM

SYMPOSIUM SESSIONS

- **Role of Systems Biology in Characterizing Risk of Developmental Origins of Disease** (p267)
- **Toxicopigenomics, Disease Susceptibility, and Implications for Risk Assessment** (p268)

WORKSHOP SESSIONS

- Dietary Arsenic—Forms, Hazards, and Risks (p268)
- **Pulmonomics, the Exposome, and Microbiomes in Immunotoxicology** (p269)
- **Standard and Nonstandard Animal Models for Evaluation of Drug Abuse Potential for Pharmaceutical Compounds with Novel Mechanisms** (p269)
- The Placenta in Toxicology: Target or Travel Agent? (p270)

INFORMATIONAL SESSIONS

- K–12 Toxicology Outreach Activities: Regional Chapter Successes and Resources (p270)
- **The Regulatory Framework for Cosmetics: Current Status, Recent Science, and Future Prospects** (p271)

PLATFORM SESSION

- Validation and Application of Neurotoxicology *In Vitro* Methods (p271)

SOT Mobile Event App or Event Website

Use these new planning and networking tools to access the latest meeting information, build your own schedule, view presentation details and abstracts (including late-breaking), access featured speaker bios, connect with attendees, and provide your feedback for sessions using the survey tool. Download the app from your favorite app marketplace or access it via the SOT website. Scan this QR code for additional instructions.

Scan Me!



If found, please return to:

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Contact Telephone: _____

9:00 AM to 12:30 PM

POSTER SESSIONS

- **Biomarkers II: Preclinical and Translational Approaches** (p285)
- Cell Death/Apoptosis (p274)
- **Children's Health and Juvenile Toxicity** (p282)
- Endocrine Toxicology (p288)
- Genetic Toxicology and DNA Repair (p272)
- Manganism, Parkinson's, and Other Neurodegenerative Diseases (p283)
- Nanotoxicology—*In Vitro* (p275)
- Natural Products—*In Vitro* (p279)
- Oxidative Injury and Redox Biology (p294)
- Persistent Organic Pollutants (p293)
- Pharmaceutical Safety Assessment: Drug Development I (p280)
- Risk Assessment II: Critical Considerations and Characterizations (p290)

9:30 AM to 4:30 PM

RESEARCH FUNDING SESSION

Research Funding Information Room (p297)

12:00 Noon to 1:20 PM

ROUNDTABLE SESSION

- Skeptically Examining the Limits of Toxicology Evidence in the Courtroom (p299)

INFORMATIONAL SESSION

- **Harnessing Electronic Standards and Informatics to Transform the Use of Regulatory Toxicological Data** (p299)

EDUCATION-CAREER DEVELOPMENT SESSION

- **Regulatory Science and Risk Assessment: Lessons for Early-Career Scientists on What to Expect and How to Pursue This Career Path** (p300)

12:30 PM to 1:20 PM

DISTINGUISHED TOXICOLOGY SCHOLAR AWARD LECTURE

Mitochondria: Crossroads of Cell Survival, Death, and Transformation
Lecturer: John J. Lemasters, Medical University of South Carolina (p300)

1:00 PM to 4:30 PM

POSTER SESSIONS

- Alternative High-Throughput Models II (p314)
- Arsenic (p316)
- **Clinical and Translational Toxicology** (p301)
- Food Safety and Nutrition (p319)
- Immunotoxicity Methods (p302)
- Immunotoxicity—Biochemical/Molecular (p303)
- Inflammation: Methods and Mechanisms (p322)
- Kidney (p310)
- Male Reproductive Toxicology (p306)
- Metal Neurotoxicity: Methylmercury, Lead, Aluminum, and Iron (p307)
- Nanotoxicology—*In Vivo* (p322)
- Pharmaceutical Safety Assessment: Drug Discovery (p309)
- Reproductive Toxicity (p304)
- Risk Assessment III: New Derivations and Updated Estimates (p312)
- Toxicology Education (p312)

1:30 PM to 4:15 PM

SYMPOSIUM SESSIONS

- **Biomarkers of Disease and Toxicity: Exploiting the Interconnections** (p326)
- Mechanistic Role(s) of Cytochrome(s) P450 in Oxidative Stress and Inflammation: New Opportunities for Drug Discovery (p326)
- **Molecular Basis of Age-Related Susceptibility to Chemicals and Environmental Hazards: From Model Systems to Humans** (p327)

WORKSHOP SESSIONS

- **Challenging the Limits of Nonclinical Safety Assessment of Pediatric Medicines** (p327)
- **Nanotoxicology: Computational Strategies, Advances, and Challenges** (p328)
- **Toxicogenomics in Risk and Safety Assessment: Recent Advances and Continuing Challenges** (p328)

REGIONAL INTEREST SESSION

- Assessment of Environmental, Dietary, and Biological Risk Factors Impacting Liver Cancer Incidence in Texas (p329)

PLATFORM SESSIONS

- New and Integrated Approaches for Genetic Toxicity Evaluation (p329)
- New Insights into Organophosphate-Induced Neurotoxicity: Pathology, Mode of Action, Modulation, and Protection (p330)
- Risk Analysis: Refining Predictions and Systematic Approaches (p331)

4:30 PM to 5:50 PM

ROUNDTABLE SESSION

- Nonhuman Primate Sexual Maturity: What Is the Capacity to Endure Uncertainty? (p332)

INFORMATIONAL SESSION

- **Regulatory-Based Nanotoxicology: Evolving National Strategies and Research to Address Engineered Nanomaterial Health Risk Assessments** (p333)

LATE-BREAKING INFORMATIONAL SESSION

- Exposure Science in the 21st Century: Perspectives from the NAS and What It Means for Toxicology (p332)

EDUCATION-CAREER DEVELOPMENT SESSION

- Toxicological Writing for Industrial and Regulatory Audiences (p333)

Thursday, March 14

8:30 AM to 12:00 Noon

POSTER SESSION

- Late-Breaking Poster Session

9:00 AM to 11:45 AM

SYMPOSIUM SESSIONS

- **From Immunotoxicity to Nanotherapy: The Effects of Nanomaterials on the Immune System** (p335)
- **Modeling Human Genetic Variability and Susceptibility in the Laboratory** (p335)
- **Role of Air Pollution As a Risk Factor for Central Nervous System Diseases and Disorders** (p336)
- Translational Methods to Assess the Safety of Natural Health Products, Including Traditional Medicines and Dietary Supplements (p336)

WORKSHOP SESSIONS

- **Are We Like Rodents, Rabbits, or Something Else? Mechanisms of Developmental and Reproductive Toxicity across Species** (p337)
- **Cumulative Risk: Toxicity and Interactions of Physical and Chemical Stressors** (p338)
- **Mechanistic, Occupational, and Clinical Aspects of Lead Exposure** (p338)
- Ocular Medical Devices and Ocular Drug Delivery Systems: Challenges and Opportunities (p339)