Teratology Society 2019 Annual Meeting
Sea Changes in Birth Defects Research and Prevention
Sheraton San Diego Hotel and Marina
San Diego, California
June 22–26, 2019

Only sessions designated with ☑️ are eligible for Continuing Medical Education credit.

Friday, June 21, 2019

3:00 PM–6:00 PM  Registration Open  Harbor Island Foyer

Saturday, June 22, 2019

7:30 AM–6:00 PM  Registration Open  Harbor Island Foyer

8:00 AM–8:30 AM  Education Course Coffee and Pastries  Harbor Island 2
(Education Course Session 1 Registrants Only)

8:30 AM–12:00 Noon  Education Course Session 1  Harbor Island 2
The Embryology and Teratology of the Reproductive System
(Separate Registration Required)
Organized by the Education Committee
Chairperson: Amy L. Williams, Exponent, Inc.

8:30 AM–8:40 AM  Welcome
Teratology Society President, Dana L. Shuey, Incyte Corporation

8:40 AM–8:45 AM  Course Overview
Education Committee, Chairperson, Amy L. Williams, Exponent, Inc.

8:45 AM–9:30 AM  Prenatal Development and Teratology of the Reproductive System
John M. DeSesso, Exponent, Inc.

10:15 AM–11:15 AM  Normal and Abnormal Postnatal Development of the Female Reproductive System
Aileen F. Keating, Iowa State University

10:15 AM–10:30 AM  Break

10:30 AM–11:15 AM  Normal and Abnormal Postnatal Development of the Male Reproductive System
L. Earl Gray, Jr., US Environmental Protection Agency

11:15 AM–12:00 Noon  Clinical Management of Reproductive System Abnormalities
Kathy D. van Leeuwen, Phoenix Children’s Hospital

12:00 Noon–1:30 PM  Lunch on Your Own
<table>
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<tr>
<th>Time</th>
<th>Session</th>
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<tr>
<td>1:30 PM–5:00 PM</td>
<td><strong>Education Course Session 2</strong>&lt;br&gt;The Principles of Teratology&lt;br&gt;(Separate Registration Required)&lt;br&gt;Organized by the Education Committee&lt;br&gt;Chairperson: Amy L. Williams, Exponent, Inc.</td>
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<tr>
<td>1:30 PM–1:35 PM</td>
<td>Course Overview&lt;br&gt;<strong>Education Committee, Chairperson, Amy L. Williams, Exponent, Inc.</strong></td>
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<tr>
<td>1:35 PM–2:13 PM</td>
<td>Timeline of Important Events in Embryo-Fetal Development&lt;br&gt;<strong>Gary Schoenwolf, University of Utah</strong></td>
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<td>2:13 PM–2:51 PM</td>
<td>Direct and Indirect Developmental Toxicity: Maternal, Placental, and Fetal Considerations&lt;br&gt;<strong>John M. Rogers, US Environmental Protection Agency</strong></td>
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<td>2:51 PM–3:29 PM</td>
<td>Teratogenic Mechanisms, Pathways, and Processes&lt;br&gt;<strong>Elaine M. Faustman, University of Washington</strong></td>
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<td>3:29 PM–3:44 PM</td>
<td>Break</td>
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<td>3:44 PM–4:22 PM</td>
<td>Developmental and Reproductive Toxicity Assessments and Data Interpretation&lt;br&gt;<strong>Tacey E.K. White, Aclairo Pharmaceutical Development Group, Inc.</strong></td>
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<tr>
<td>4:22 PM–5:00 PM</td>
<td>Detecting Signals of Concern in the Human Population&lt;br&gt;<strong>Christina D. Chambers, University of California–San Diego</strong></td>
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2:00 PM–7:00 PM  Speaker Ready Room  Maritime Boardroom
5:00 PM–7:00 PM  Council 1 Meeting Committee Reports  Seabreeze

**Sunday, June 23, 2019**

7:00 AM–6:00 PM  Registration Open  Harbor Island Foyer
7:00 AM–4:00 PM  Speaker Ready Room  Maritime Boardroom
7:00 AM–8:00 AM  2020 Program Committee Meeting  Seabreeze
7:30 AM–8:00 AM  Morning Coffee (Joint with DNTS)  Harbor Island Foyer
8:00 AM–8:15 AM  President’s Welcome  Harbor Island 2<br>Teratology Society President, Dana L. Shuey, Incyte Corporation
8:15 AM–9:00 AM Josef Warkany Lecture
Harbor Island 2
Developmental Toxicity of Perfluorinated Compounds: A Voyage from Animal Studies to Transfected Cells (L1)
(Joint with DNTS and OTIS)

Chairperson: Dana L. Shuey, Incyte Corporation
Lecturer: Barbara D. Abbott, US Environmental Protection Agency (Retired)

9:05 AM–12:05 PM Graduate Student and Postdoctoral Fellow Platform Session 1
Harbor Island 2
Organized by the Student Affairs Committee
Chairperson, Ida M. Washington, West Virginia University

Presenting author is underlined.

9:05 AM–9:10 AM  Introduction
Ida M. Washington, West Virginia University

9:10 AM–9:30 AM  1 Elevated DNA Double-Strand Breaks Determined by Comet Assay in Fetal Brains of Brca1 Knockout Mice Exposed In Utero to Physiological or Ethanol-Enhanced Levels of Reactive Oxygen Species
Afsharian K1, Bhatia S1, Drake DM1, Wells PG1,2.
1Department of Pharmaceutical Sciences and the Centre for Pharmaceutical Oncology, University of Toronto, Toronto, ON, Canada, 2Department of Pharmacology and Toxicology, University of Toronto, Toronto, ON, Canada

Dandjinou M1,2, Sheehy O2, Vigod S3,4, Berard A1,2. 1Faculty of Pharmacy, University of Montréal, Montréal, QC, Canada. 2CHU Sainte-Justine Research Center, Montréal, QC, Canada. 3Women's College Hospital and Women's College Research Institute, Toronto, ON, Canada 4Faculty of Medicine, University of Toronto, Toronto, ON, Canada

Leedom VO1,2, Humphries B3, Zielke KC3, Kotagiri LM3. 1South Carolina Department of Health and Environmental Control, Columbia, SC, United States;2USC Arnold School of Public Health, Columbia, SC, United States;3SC Department of Health and Environmental Control, Columbia, SC, United States
<table>
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| 10:10 AM–10:30 AM | Determining the Impact of Maternal Antibiotic Use on Inflammation of the Fetal Brain  
|                  | Dawson EL¹, McDonald VA², Lebovitz Y², Theus MH², Hrubec TC¹₂. ¹Edward Via College of Osteopathic Medicine Virginia Campus, Blacksburg, VA, United States,²Virginia-Maryland College of Veterinary Medicine, Virginia Tech, Blacksburg, VA, United States |
| 10:30 AM–10:45 AM | Concordance of In Vitro and In Vivo Gene Expression Dynamics for Specific Pathways of Interest for Developmental Neurotoxicity  
|                  | Park JJ¹, Wegner SH¹, Workman T¹, Hermsen S², Wallace J¹, Stanaway IB¹, Kim HY¹, Griffith W¹, Hong S¹, Faustman EM¹. ¹University of Washington, Seattle, WA, United States,²Radboud University Medical Center, Nijmegen, Gelderland, The Netherlands |
| 10:45 AM–11:05 AM | Break—Harbor Island Foyer                                               |
| 11:05 AM–11:25 AM | Establishing a Link between Microbiota and AHR in Zebrafish Neurobehavioral Development  
|                  | Bertotto LB¹, Wehmas L², Wood C², Carswell G², Howey XM¹, Gaballah S¹, Kvaniscka A¹, Chorley B², Tal T². ¹ORISE/US EPA, Research Triangle Park, NC, United States,²US Environmental Protection Agency, Research Triangle Park, NC, United States |
| 11:25 AM–11:45 PM | Evaluation of Pre- and Postnatal Exposure to Boric Acid in the Hsd:Sprague Dawley SD Rat  
|                  | Watson A¹, Sutherland V¹, Cunny H¹, Miller L², Furr J², Collins B¹, Aillon K², Smith L³, Vinke T³, Waidyanatha S¹, McIntyre B¹. ¹Division of the National Toxicology Program, National Institute of Environmental Health Sciences, Research Triangle Park, NC, United States,²Southern Research, Birmingham, AL, United States,³MRIGlobal, Kansas City, MO, United States |
| 11:45 PM–12:05 PM | Multifactorial Inputs to Craniofacial Birth Defects  
|                  | Everson JL¹, Lipinski RJ², Eberhart JK¹. ¹University of Texas at Austin, Austin, TX, United States,²University of Wisconsin–Madison, Madison, WI, United States |
| 12:05 PM–1:30 PM | Lunch on Your Own                                                        |
| 12:05 PM–1:30 PM | Past Presidents’ and Honorees’ Luncheon (By Invitation Only)             |
| 12:30 PM–1:30 PM | Constitution and Bylaws Committee Meeting                                 |
| 12:30 PM–1:30 PM | Membership Committee Meeting                                              |

12:05 PM–1:30 PM  Lunch on Your Own  Seabreeze
12:05 PM –1:30 PM Past Presidents’ and Honorees’ Luncheon (By Invitation Only)  Seabreeze
12:30 PM–1:30 PM Constitution and Bylaws Committee Meeting  Room 514
12:30 PM–1:30 PM Membership Committee Meeting  Marina 2
1:30 PM–2:00 PM  F. Clarke Fraser New Investigator Award  Harbor Island 2
Environmental Chemicals and Developmental Effects: Translating Bench Science to Public Health
Chairperson: Nicole Churchill Kleinstreuer, NTP Interagency Center for the Evaluation of Alternative Toxicological Methods, NIEHS
Lecturer: Kembra L. Howdeshell, National Toxicology Program, NIEHS

2:00 PM–2:30 PM  James G. Wilson Publication Award  Harbor Island 2
Congenital heart disease complexity and childhood cancer risk
Chairperson: Brian Enright, AbbVie Inc.
Lecturer: R. Thomas Collins II, Stanford University School of Medicine

2:35 PM–5:30 PM  Ocean-Borne Risks to Pregnant Women and Their Babies  Harbor Island 2
Symposium (Joint with DNTS)
Chairpersons: Elaine M. Faustman, University of Washington and Edward D. Levin, Duke University Medical Center

2:35 PM–3:10 PM  S1  Organic Chemicals in the Marine Environment and Their Relevance to Human Health
Lihini I. Aluwihare, Scripps Institution of Oceanography

José F. Cordero, University of Georgia

3:45 PM–4:00 PM  Break—Harbor Island Foyer

4:00 PM–4:35 PM  S3  Domoic Acid Developmental Neurotoxicity: New Insights from Human and Animal Studies
Elaine M. Faustman, University of Washington

4:35 PM–5:10 PM  S4  What Can Fish Tell Us About Developmental Neurotoxic Risks of the Sea?
Edward D. Levin, Duke University Medical Center

5:10 PM–5:30 PM  Discussion

2:35 PM–5:30 PM  Environmental Exposures from Placenta to Birth: Harbor Island 1
Effects on Immunity Symposium
Chairpersons: Kristal A. Rychlik, Johns Hopkins Bloomberg School of Public Health and Fenna Sillé, Johns Hopkins Bloomberg School of Public Health

2:35 PM–3:10 PM  S5  The Placenta As a Driver of Early- and Later-Life Child Health
Rebecca C. Fry, University of North Carolina–Chapel Hill
3:10 PM–3:45 PM  S6  Can We Generalize to a Model of Teratogenic Actions of the Placenta, Using Lessons Learned from Established Viral and Other Teratogens? Jennifer J. Adibi, University of Pittsburgh Graduate School of Public Health

3:45 PM–4:00 PM  Break—Harbor Island Foyer

4:00 PM–4:35 PM  S7  How Prenatal Maternal Exposure to a Stressor Can Alter Placental Functions: The Role of Fetal Immune System Programming Cathy Vaillancourt, INRS-Institut Armand Frappier

4:35 PM–5:10 PM  S8  The Long-Term Impact of Prenatal Exposures on Vaccine Immunogenicity and Infectious Disease Risk Fenna Sillé, Johns Hopkins Bloomberg School of Public Health

5:10 PM–5:30 PM  Discussion

5:35 PM–6:00 PM  Patricia Rodier Mid-Career Award for Research and Mentoring Mentors, Mentorship, and How You Got Here (L2) (Joint with DNTS)
Chairpersons: Nicole Churchill Kleinstreuer, NTP Interagency Center for the Evaluation of Alternative Toxicological Methods, NIEHS and Sonya K. Sobrian, Howard University College of Medicine
Lecturer: Terry C. Hrubec, E. Via Virginia College of Osteopathic Medicine

6:00 PM–8:00 PM  Welcome Reception, Poster Session 1, and Exhibits Attended (Joint with DNTS)
Teratology Society Posters P1–P39
DNTS Posters TBA

8:00 PM–8:30 PM  New Associate and Regular Member "Sundae" Night Social (By Invitation Only)

Monday, June 24, 2019

7:00 AM–6:00 PM  Registration Open

7:00 AM–4:00 PM  Speaker Ready Room

7:00 AM–8:00 AM  Breakfast with the Teratology Mentors (Advance Signup Is Required)

7:00 AM–8:00 AM  Nominations and Elections Committee Meeting

7:00 AM–8:00 AM  Publications Committee Meeting

7:00 AM–8:00 AM  Science Committee Meeting
7:30 AM–8:00 AM  Morning Coffee  Harbor Island Foyer  (Joint with DNTS)

8:00 AM–9:00 AM  Keynote Lecture  Harbor Island 2  Environmental Influences on Child Health Outcomes (ECHO): A National Research Program (L3)  (Joint with DNTS and OTIS)

Chairperson: Christine Perdan Curran, Northern Kentucky University
Speakers: Carol J. Blaisdell, Environmental Influences on Child Health Outcomes, NIH and Amy Elliott, Avera Research Institute

9:05 AM–12:00 Noon  Perinatal Choline Supplementation and Risk of Neurodevelopmental Disorders Symposium  Harbor Island 2  (Joint with DNTS)

Chairpersons: Carl L. Keen, University of California–Davis and Helen J. K. Sable, University of Memphis

9:05 AM–9:15 AM  Introduction

9:15 AM–9:45 AM  S9 Choline and Brain Development: An Overview  Steven H. Zeisel, University of North Carolina–Chapel Hill


10:15 AM–10:30 AM  Break

10:30 AM–11:00 AM  S11 Can Choline Ameliorate the Neurodevelopmental Effects of Prenatal Exposure to Alcohol?  Christina D. Chambers, University of California–San Diego

11:00 AM–11:30 AM  S12 Perinatal Choline Supplementation Improves Social Behavior in Rodent Models of Autism  Tiffany J. Mellot, Boston University School of Medicine

11:30 AM–12:00 Noon  S13 How Targeted Choline Supplementation Reverses the Negative Neurocognitive and Genomic Impacts of Early-Life Iron Deficiency  Michael K. Georgieff, University of Minnesota

9:05 AM–12:00 Noon  Birth Defects Outcomes Across the Lifespan: Perspectives from Health Services Research Symposium  Harbor Island 1  (CME)

Chairpersons: Russell S. Kirby, USF College of Public Health and Philip Lupo, Baylor College of Medicine

9:05 AM–9:25 AM  S14 Overview of Health Services Research for Birth Defects  Russell S. Kirby, USF College of Public Health
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<th>Time</th>
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<th>Title</th>
<th>Presenter</th>
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<tr>
<td>9:25 AM–9:55 AM</td>
<td>S15</td>
<td>Opportunities for Economic Analysis of Birth Defects Outcomes and Health Services</td>
<td><em>Cynthia H. Cassell, Center for Global Health, CDC</em></td>
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<td>9:55 AM–10:25 AM</td>
<td>S16</td>
<td>Surveillance of Congenital Heart Defects among Children, Adolescents, and Adults</td>
<td><em>Ali N. Zaidi, The Mount Sinai Children’s Heart Center</em></td>
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<td>10:25 AM–10:40 AM</td>
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<td>Break—Harbor Island Foyer</td>
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<td>10:40 AM–11:10 AM</td>
<td>S17</td>
<td>The National Spina Bifida Patient Registry: Data on Procedures and Outcomes among Children and Adults with Spina Bifida</td>
<td><em>Beth Ward, National Center on Birth Defects and Developmental Disabilities, CDC</em></td>
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<td>11:10 AM–11:40 AM</td>
<td>S18</td>
<td>Co-occurrence of Birth Defects and Pediatric Cancer: A Population Perspective</td>
<td><em>Jeremy Schraw, Baylor College of Medicine</em></td>
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<td>11:40 AM–12:00 Noon</td>
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<td>Discussion</td>
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<td>12:00 Noon–2:00 PM</td>
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<td>Lunch on Your Own</td>
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<td>12:00 Noon–1:30 PM</td>
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<td>BDR Editorial Board Meeting</td>
<td><em>Marina 2</em></td>
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<td>12:00 Noon–2:00 PM</td>
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<td>Professional Development Workshop</td>
<td><em>Harbor Island 2</em></td>
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<td>12:00 Noon–2:00 PM</td>
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<td>Irresponsible Conduct of Research: What Happens When Things Go Wrong</td>
<td><em>(Separate Registration Required, Boxed Lunch Provided)</em></td>
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<td>12:00 Noon–12:10 PM</td>
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<td>Boxed Lunch Pick-Up</td>
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<td>12:10 PM–12:40 PM</td>
<td>W1</td>
<td>Social Responsibility, Unintentional Bias, Diversity, and Inclusion: The Important Role of Mentorship</td>
<td><em>Terry C. Hrubec, E. Via Virginia College of Osteopathic Medicine</em></td>
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<td>12:40 PM–1:10 PM</td>
<td>W2</td>
<td>Data Management, Publication/Authorship, and Peer Review</td>
<td><em>Thomas B. Knudsen, National Center for Computational Toxicology, US EPA</em></td>
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<td>1:10 PM–1:40 PM</td>
<td>W3</td>
<td>Financial Management/Collaboration: Conflict of Interest</td>
<td><em>Christina D. Chambers, University of California–San Diego</em></td>
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1:40 PM–2:00 PM  W4  Human Subjects, Animal Subjects: Working with the IRB and IACUC  
Ida M. Washington, West Virginia University

2:00 PM–2:30 PM  Harbor Island 2
Agnish Fellowship Lecture  
Healthy Gametes for a Healthy Life  
Chairperson, Amy L. Williams, Exponent, Inc.  
Speaker: Barbara Hales, McGill University

2:35 PM–5:50 PM  Harbor Island 2
Differences in Sex Development Symposium  
Organized by the Public Affairs Committee  
Chairpersons: Susan L. Makris, National Center for Environmental Assessment, US EPA and Marcia L. Feldkamp, University of Utah

2:35 PM–2:40 PM  Introduction

2:40 PM–3:20 PM  S19 Normal Genital Development, Endocrine Disruptors and Hypospadias  
Laurence S. Baskin, University of California–San Francisco

3:20 PM–4:00 PM  S20 Improving Outcomes in People with Disorders of Sex Development  
Amy Wisniewski, University of Oklahoma Health Sciences Center

4:00 PM–4:15 PM  Break—Harbor Island Foyer

4:15 PM–4:55 PM  S21 Shared Decision-Making in Females with Disorders of Sex Development  
Kathleen D. van Leeuwen, Phoenix Children’s Hospital

4:55 PM–5:35 PM  S22 The Potential Role of Xenobiotics in Disorders of Sex Development: Translational Aspects of Research in Animal Models  
L. Earl Gray, National Health and Environmental Effects Research Laboratory, US EPA

5:35 PM–5:50 PM  Discussion

2:35 PM–5:50 PM  Harbor Island 3
Integration of Human and Animal Data to Inform Medication Use in Pregnant Women: From Drug Labeling to Clinical Trials Symposium  
(Joint with OTIS)  
Chairpersons: Christina D. Chambers, University of California–San Diego and Marcy Stephens Powell, GlaxoSmithKline

2:35 PM–2:40 PM  Introduction

Keele Elise Wurst, GlaxoSmithKline
3:20 PM–4:00 PM S24  Integration of Animal and Human Data into Pregnancy and Lactation Risk Assessment: US FDA Perspective
Leyla Sahin, US Food and Drug Administration

4:00 PM–4:15 PM  Break—Harbor Island Foyer

4:15 PM–4:55 PM S25  Gaps in the Integration of Human and Animal Data and Inclusion of Women in Clinical Trials
TBA

4:55 PM–5:35 PM S26  Case Examples: Interpretation of Label Data and How Much Weight Is Placed on the Nonclinical and Clinical Information
TBA

5:35 PM–5:50 PM  Discussion

6:00 PM–8:00 PM Poster Session 2 and Exhibits Attended
(Joint with DNTS and OTIS)

Teratology Society Posters P37–P70
DNTS Posters TBA
OTIS Posters 1–8

8:00 PM–10:00 PM Teratology Society and MARTA Graduate Students and Postdoctoral Fellows Career Event
(Open to Teratology Society, DNTS, and OTIS Graduate Students and Postdoctoral Fellows)

Tuesday, June 25, 2019

7:00 AM–5:00 PM Registration Open
Harbor Island Foyer

7:00 AM–4:00 PM Speaker Ready Room
Maritime Boardroom

7:00 AM–8:00 AM Communications Coordination Committee Meeting
Marina 6

7:30 AM–8:00 AM Morning Coffee
(Joint with DNTS)
Harbor Island Foyer

8:00 AM–9:00 AM Robert L. Brent Lecture—Teratogen Update
Congenital Heart Defects Research: Finding the Hidden Crossroads between Genetics and Environment (L4)
(Joint with OTIS)
Chairperson: Dana L. Shuey, Incyte Corporation
Lecturer: Cheryl Maslen, Oregon Health Sciences University
9:05 AM–12:00 Noon Establishing Scientific Confidence in Alternate Approaches Symposium
(Harbor Island 2)
(Joint with DNTS)
Organized by the Teratology Society Science Committee
Chairpersons: Nicole Churchill Kleinstreuer, NTP Interagency Center for the Evaluation of Alternative Toxicological Methods, NIEHS and Jessica A. Palmer, Stemina Biomarker Discovery, Inc.

9:05 AM–9:45 AM S27 Federal Agency Activities to Identify and Implement Alternatives
Nicole Churchill Kleinstreuer, NTP Interagency Center for the Evaluation of Alternative Toxicological Methods, NIEHS

9:45 AM–10:25 AM S28 In Vitro to In Vivo Extrapolation Using Maternal-Fetal Models
Annie Lumen, US Food and Drug Administration

10:25 AM–10:40 AM Break—Harbor Island Foyer

Timothy J. Shafer, US Environmental Protection Agency

11:20 AM–12:00 Noon S30 Integrated Testing Strategies for Developmental Neurotoxicity Testing
Mamta Behl, National Toxicology Program, NIEHS

9:05 AM–12:00 Noon Determining Causality in Teratology Symposium
(Harbor Island 3)
(Joint with OTIS)
Chairpersons: Nelson Pace, Exponent, Inc. and Sonja A. Rasmussen, University of Florida

9:05 AM–9:15 AM Introduction

Sonja A. Rasmussen, University of Florida

9:50 AM–10:25 AM S32 A Smoking Gun that Faced Opposition: The Causal Agent of Fetal Alcohol Spectrum Disorders
Kenneth Lyons Jones, UCSD, CA MotherToBaby

10:25 AM–10:40 AM Break—Harbor Island Foyer

10:40 AM–11:15 AM S33 The Application of Clinical Evidence in the Assessment of Teratogenicity
John C. Carey, University of Utah
11:15 AM–11:50 AM S34 Directed Acyclic Graphs (DAGs) for Better Study Design and Causal Thinking in Teratology
Nelson Pace, Exponent, Inc.

11:50 AM–12:00 Noon Discussion

9:05 AM–12:00 Noon Platform Session 2 Harbor Island 1
Chairpersons: Elise Madison Lewis, Charles River Laboratories and Ida M. Washington, West Virginia University

9:05 AM–9:15 AM Introduction

9:15 AM–9:30 AM 9 Using Whole Embryo Culture to Address Risk to Patients Taking Dolutegravir
Posobiec LM¹, Chapman SP¹, Murzyn S¹, Rendemonti JE¹, Stanislaus DJ¹, Romach B².¹GlaxoSmithKline Pharmaceuticals, Collegeville, PA, United States, ²Glaxosmithkline, Research Triangle Park, NC, United States

9:30 AM–9:45 AM 10 Plausible Causative Mechanism for Developmental Toxicity of Human Immunodeficiency Virus Integrase Inhibitor Dolutegravir
Cabrera RM, Souder JP, Tukeman G, Gorelick D, Finnell RH. Baylor College of Medicine, Houston, TX, United States

9:45 AM–10:00 AM 11 Unraveling Mechanisms of tris(1,3-dichloro-2-propyl) phosphate-Induced Epiboly Arrest in Zebrafish
Dasgupta S¹, Cheng V¹,², Mitchell CA¹,², Volz D¹.¹Department of Environmental Sciences, University of California–Riverside, Riverside, CA, United States;²Environmental Toxicology Graduate Program, University of California–Riverside, Riverside, CA, United States

10:00 AM–10:15 AM 12 Cell-Specific Responses to Hyperglycemic Levels Underlie Phenotypic Variability in Maternal Diabetes Associated Congenital Heart Defects
Mansfield C¹,², Manivannan S¹,², Cameron EM¹,², Garg V¹,²,³, Basu M¹,²,³.¹Center for Cardiovascular Research, Nationwide Children’s Hospital, Columbus, OH, United States;²Heart Center, Nationwide Children’s Hospital, Columbus, OH, United States;³Department of Pediatrics, The Ohio State University, Columbus, OH, United States
  Tinker SC1, Gilboa SM1, Moore CA1, Waller DK2, Simeone RM1, Kim SY1, Jamieson DJ3, Botto LD4, Fisher S5, Reefhus J1. 1Centers for Disease Control and Prevention, Atlanta, GA, United States;2The University of Texas Health Science Center at Houston, Houston, TX, United States;3Emory University School of Medicine, Atlanta, GA, United States;4University of Utah School of Medicine, Salt Lake City, UT, United States;5New York State Department of Health, Albany, NY, United States

10:30 AM–10:45 AM Break—Harbor Island Foyer

10:45 AM–11:00 AM 14 Genetic and Bioinformatic Approaches to Characterize Ethanol Teratogenesis
  Sidik A1, Dixon GB2, Eberhart JK1. 1The University of Texas at Austin, Austin, TX, United States;2The University of Texas at Austin, Austin, TX, United States

11:00 AM–11:15 AM 15 Ethanol-Initiated Brca1 Protein Reductions and Macromolecular Damage in the Brains of Brca1 Knockout Mice Contributing to Postnatal Behavioural Deficits
  Drake DM1, Wells PG1,2. 1Department of Pharmaceutical Sciences and the Centre for Pharmaceutical Oncology, University of Toronto, Toronto, ON, Canada;2Department of Pharmacology and Toxicology, University of Toronto, Toronto, ON, Canada

11:15 AM–11:30 AM 16 Neonatal Cord Blood miRNAs As Biomarkers of Neonatal Opioid Withdrawal Syndrome
  Mahnke AH1, Leeman L2, Luo L2, Abdelfattah A1, Shrestha S2, Miranda RC1, Bakhireva LN2. 1Texas A&M University Health Science Center, Bryan, TX, United States;2University of New Mexico Health Sciences Center, Albuquerque, NM, United States
11:30 AM–11:45 AM 17 The Impact of *In Utero* Prescription Opioid Exposure on Congenital Malformations  
*Straub L*¹, *Huybrechts KF*¹, *Hernandez-Diaz S*², *Mogun H*³, *Bateman BT*³,⁴, ¹Division of Pharmacoepidemiology and Pharmacoeconomics Brigham and Women’s Hospital, Harvard Medical School, Boston, MA, United States,²Department of Epidemiology, Harvard T.H. Chan School of Public Health, Boston, MA, United States,³Division of Pharmacoepidemiology and Pharmacoeconomics, Department of Medicine, Brigham and Women’s Hospital and Harvard Medical School, Boston, MA, United States,⁴Department of Anesthesiology, Perioperative and Pain Medicine, Brigham and Women’s Hospital and Harvard Medical School, Boston, MA, United States

11:45 AM–12:00 Noon 18 The Effects of Prenatal Stress on Postnatal Maternal Psychological Well-Being in Substance Using Populations  
*Beauchamp KG*¹, *Shrestha S*¹, *Garrison LM*¹, *Lowe J*¹, *Stephen JM*², *Bakhireva LN*¹. ¹University of New Mexico Health Sciences Center, Albuquerque, NM, United States,²Mind Research Network, Albuquerque, NM, United States

12:00 Noon–1:30 PM  
**Lunch and Learn Mini Course**  
*Adverse Outcome Pathways (AOPs)*  
(Separate Registration Required)  
*Organized by the Education Committee*  
*Chairperson: Amy L. Williams, Exponent, Inc.*

12:00 Noon–12:10 PM  
Boxed Lunch Pick-Up

12:10 PM–12:35 PM  
An Introduction to Adverse Outcome Pathways  
*Dan Villeneuve, US Environmental Protection Agency*

12:35 PM–1:00 PM  
Application of AOPs to Developmental Outcomes  
*Thomas B. Knudsen, US Environmental Protection Agency*

12:35 PM–1:30 PM  
AOP Interactive Exercise

12:00 Noon–1:30 PM  
**Lunch on Your Own**
## Wiley Symposium
### Maternal Morbidity and Mortality: Causes, Disparities, and Solutions

Chairpersons: Suzan L. Carmichael, Stanford University and Mary Alice Smith, University of Georgia

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Speaker/Institution</th>
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<tbody>
<tr>
<td>1:30 PM–1:45 PM</td>
<td>Introduction</td>
<td>Emma Roberts, Northeastern University, Bouve College of Health Sciences</td>
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<tr>
<td>2:20 PM–2:55 PM</td>
<td>S36 Quality Improvement Initiatives to Improve Maternal Health in California</td>
<td>Elliott K. Main, Stanford University</td>
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<td>2:55 PM–3:10 PM</td>
<td>Break—Harbor Island Foyer</td>
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<tr>
<td>3:10 PM–3:45 PM</td>
<td>S37 Cardiovascular Disease and Preeclampsia: Impact on Maternal and Fetal Health</td>
<td>Afshan B. Hameed, University of California–Irvine</td>
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<tr>
<td>3:45 PM–4:20 PM</td>
<td>S38 Maternal Genotype and Fetal Sex Impact the Developmental Origins of Stress-Induced Hypertension</td>
<td>Terry K. Morgan, Oregon Health &amp; Science University</td>
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<tr>
<td>4:20 PM–4:30 PM</td>
<td>Discussion</td>
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## Current Topics and Updates for Pregnancy Registries Workshop
(Joint with OTIS)

Chairpersons: Deborah Covington, Pharmaceutical Product Development, Inc. and Lewis B. Holmes, MassGeneral Hospital for Children

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<tr>
<th>Time</th>
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<tr>
<td>1:30 PM–1:35 PM</td>
<td>Introduction</td>
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<tr>
<td>1:35 PM–2:00 PM</td>
<td>W5 Detection of an Early Signal for Neural Tube Defects with Exposure to Dolutegravir in Botswana</td>
<td>Rebecca Zash, Beth Israel Deaconess Medical Center</td>
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<tr>
<td>2:00 PM–2:25 PM</td>
<td>W6 Management of Neural Tube Defect Signals in the Antiretroviral Pregnancy Registry: Efavirenz vs. Dolutegravir</td>
<td>Angela Scheuerle, University of Texas Southwestern Medical Center</td>
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<td>Time</td>
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<td>2:25 PM–2:50 PM</td>
<td>W7</td>
<td>The Xolair Pregnancy Registry (EXPECT): Perinatal Outcomes among Pregnant Women with Asthma Treated with Omalizumab (Xolair) Compared against Those of a Cohort of Pregnant Women with Moderate-to-Severe Asthma</td>
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<td>2:50 PM–3:05 PM</td>
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<td>Break—Harbor Island Foyer</td>
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<td>3:05 PM–3:30 PM</td>
<td>W8</td>
<td>First Cases in Small Cohorts: Random Error Playing Games with Us</td>
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<td>3:30 PM–3:50 PM</td>
<td>W9</td>
<td>Safety of Tetanus, Diphtheria, and Acellular Pertussis Vaccination in a Cohort of Pregnant Active Duty US Military Women</td>
</tr>
<tr>
<td>3:50 PM–4:10 PM</td>
<td>W10</td>
<td>Five-Year Survival of Infants with Major Congenital Anomalies: A Registry-Based Study</td>
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</table>
4:35 PM–6:00 PM  Multidisciplinary Research Needs Workshop (W12)  Harbor Island 2

Chairpersons: Dana L. Shuey, Incyte and William Slikker, Jr., National Center For Toxicological Research, US FDA

4:35 PM–4:50 PM  Overview of Workshop Goals and Progress from 2018

4:50 PM–5:30 PM  Concurrent Breakout Sessions
  • Opioid Research
  • In Vivo and In Vitro Placenta Models
  • Modeling and Bioinformatics
  • Recommendations from Task Force on Research Specific to Pregnant and Lactating Women (PRGLAC)

5:30 PM–6:00 PM  Reassemble to Discuss Progress from Breakout Sessions

Wednesday, June 26, 2019

6:30 AM–7:30 AM  Teratology Society 38th Annual Volleyball Game  Lanai Lawn

7:30 AM–2:30 PM  Registration Open  Harbor Island Foyer

7:30 AM–2:00 PM  Speaker Ready Room  Maritime Boardroom

7:30 AM–8:00 AM  Morning Coffee  (Joint with DNTS)  Harbor Island Foyer

8:00 AM–9:00 AM  Teratology Society and European Teratology Society Exchange Lecture  Harbor Island 2
  The New 3-Rs: Reproducibility and Rigor in Reproduction Studies
  Chairpersons: Manon Beekhuijzen, Charles River and Susan L. Makris, National Center for Environmental Assessment, US EPA

European Teratology Society
  The Academic Perspective (L5)
  Seamus Giles, University College, Dublin, Ireland

Teratology Society
  The Industrial and Contract Research Perspective (L6)
  Donald G. Stump, Charles River

9:05 AM–12:00 Noon  HESI Symposium  Harbor Island 2
  Thyroid Hormone Assessments: Implications for Developmental and Reproductive Toxicology
  Chairpersons: Pragati Sawhney Coder, Charles River and Susan L. Makris, National Center for Environmental Assessment, US EPA

9:05 AM–9:20 AM  Introduction
  Susan L. Makris, National Center for Environmental Assessment, US EPA
9:20 AM–9:55 AM  S39  The Thyroid Axis: Overview of Anatomy, Physiology, Regulation in Mammalian Systems  
Mary E. Gilbert, National Health and Environmental Effects Research Laboratory, US EPA

9:55 AM–10:30 AM  S40  Thyroid Homeostasis and Disruption in Humans  
T.I.M. Korevaar, Erasmus University

10:30 AM–11:00 AM  Warkany Tea—Harbor Island Foyer

11:00 AM–11:30 AM  S41  HESI DART-ETS Thyroid Hormone Survey: Results and the Path Forward  
Pragati Sawhney Coder, Charles River

11:30 AM–11:00 AM  S42  Thyroid Hormone Perturbation and Neurodevelopmental Toxicity in Animal Studies  
Aldert H. Piersma, National Institute for Public Health and the Environment (RIVM)

9:05 AM–10:30 AM  Hot Topic Symposium  Harbor Island 3

What Do We Need to Know about Climate Change and Effects on Maternal-Fetal Health?  
Chairpersons: Christine Perdan Curran, Northern Kentucky University and Janet R. Hardy, ECC Population Health Group LLC

9:05 AM–9:10 AM  Welcome and Overview

9:10 AM–9:30 AM  S43  Temperature and Adverse Birth Outcomes in California: Compiling the Current Evidence  
Rupa Basu, California EPA/Office of Environmental Health Hazard Assessment

9:30 AM–9:55 AM  S44  The Risk of Congenital Heart Effects As a Result of Our Changing Climate  
Marcia L. Feldkamp, University of Utah

9:55 AM–10:15 AM  S45  TBA  
Lisa A. Miller, UC Davis School of Veterinary Medicine

10:15 AM–10:30 AM  Discussion

10:30 AM–11:00 AM  Warkany Tea—Harbor Island Foyer  
(Joint with DNTS)
Chairperson: Nicole Churchill Kleinstreuer, NTP Interagency Center for the Evaluation of Alternative Toxicological Methods, NIEHS

11:00 AM–11:20 AM 19 Bypassing the Brain Barriers: Identification of Serum microRNAs Reflective of Developmental Neurotoxicity
O'Shaughnessy KL1,2, Bell KS1,2, Gilbert ME1. 1US Environmental Protection Agency, Research Triangle Park, NC, United States, 2Oak Ridge Institute for Science and Education, Oak Ridge, TN, United States

11:20 AM–11:40 AM 20 Computational Synthesis and Integration: Reconstructing Complex Systems for In Silico Testing
Knudsen TB1, Spencer R2, Zurlinden TJ3, Sallie KS4, Baker NC4. 1US EPA/ORD/NCCT, Research Triangle Park, NC, United States, 2ARA, Research Triangle Park, NC, United States, 3US EPA/ORD/NCCT, Research Triangle Park, NC, United States, 4Leidos, Research Triangle Park, NC, United States

11:40 AM–12:00 Noon 21 Exome Sequencing Identifies ID1 As a Possible Risk Factor for Sacral Agenesis
Pitsava G1, Feldkamp ML2, Pankratz N3, Lane J3, Kay DM4, Shaw GM5, Jenkins MM5, Almli LM6,7, Olshan AF8, Pangilinan F9, Brody LC9, Canfield M10, Romitti PA11, Mills JL12, UW Center for Mendelian Genomics12, NISC Comparative Sequencing Program13, The National Birth Defects Prevention Study14. 1NICHD, NIH, Bethesda, MD, United States, 2University of Utah, Salt Lake City, UT, United States, 3University of Minnesota, Minneapolis, MN, United States, 4New York Department of Health, Albany, NY, United States, 5Stanford University, Stanford, CA, United States, 6NCBDDD, CDC, Atlanta, GA, United States, 7Carter Consulting Inc., Atlanta, GA, United States, 8University of North Carolina, Chapel Hill, NC, United States, 9NHGRI, NIH, Bethesda, MD, United States, 10DHS, Austin, TX, United States, 11University of Iowa, Iowa City, IA, United States, 12University of Washington, Seattle, WA, United States, 13National Institutes of Health, Rockville, MD, United States, 14Centers for Disease Control and Prevention, Atlanta, GA United States

12:00 Noon–1:30 PM Lunch on Your Own

12:30 PM–1:30 PM Awards Committee Meeting
Room 514

12:30 PM–1:30 PM Education Committee Meeting
Marina 2
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<td>12:30 PM–1:30 PM</td>
<td>Finance Committee Meeting</td>
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<td>Public Affairs Committee Meeting</td>
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<td>Student Affairs Committee Meeting</td>
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<td>1:30 PM–4:30 PM</td>
<td>Leveraging Zebrafish to Unravel Mechanisms of Harbor Island 2</td>
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<td>Developmental Toxicity Symposium</td>
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<td>Chairpersons: Tamara L. Tal, US Environmental Protection Agency and</td>
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<td>David C. Volz, University of California–Riverside</td>
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<td>1:30 PM–1:35 PM</td>
<td>Introduction</td>
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<td>1:35 PM–2:10 PM</td>
<td>S46 The Developing Pancreas Is a Sensitive Target Organ of Toxicant</td>
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<td>Exposures</td>
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<td>Alicia R. Timme-Laragy, University of Massachusetts–Amherst</td>
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<td>2:10 PM–2:45 PM</td>
<td>S47 Endocrine Disruptors Cause Malformations and Functional Defects</td>
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<td>in the Zebrafish Heart via Membrane-Associated Receptor Pathways</td>
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<td>Daniel A. Gorelick, Baylor College of Medicine</td>
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<td>2:45 PM–3:00 PM</td>
<td>Break—Harbor Island Foyer</td>
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<td>3:00 PM–3:35 PM</td>
<td>S48 Triclosan-Resistant Host-Associated Microbiota Perform Xenobiotic</td>
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<td>Biotransformations in Larval Zebrafish</td>
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<td>Tamara L. Tal, US Environmental Protection Agency</td>
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<td>3:35 PM–4:10 PM</td>
<td>S49 Dynamic Alterations in DNA Methylation Precede Tris(1,3-dichloro-2-</td>
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<td>propyl)phosphate-Induced Delays in Zebrafish Epiboly</td>
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<td>David C. Volz, University of California–Riverside</td>
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<td>4:10 PM–4:30 PM</td>
<td>Discussion</td>
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<td>1:30 PM–4:30 PM</td>
<td>Platform Session 4</td>
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<td>Chairpersons: Nicole Churchill Kleinstreuer, NTP Interagency Center for</td>
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<td>the Evaluation of Alternative Toxicological Methods, NIEHS and Nelson</td>
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<td>D. Pace, Exponent, Inc.</td>
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<td>1:30 PM–1:45 PM</td>
<td>Introduction</td>
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12:30 PM–1:30 PM | Finance Committee Meeting Room 518                                      |
12:30 PM–1:30 PM | Public Affairs Committee Meeting Marina 6                                |
12:30 PM–1:30 PM | Student Affairs Committee Meeting Room 515                               |
1:45 PM–2:00 PM 22 Copper Associates with Differential Methylation in Placentae from Two US Birth Cohorts
Kennedy EM1, Everson TM1, Punshon T2, Jackson BP3, Hao K4, Lamberti L5, Chen J5, Karagas MR6,7, Marsit CJ1,7. 1Department of Environmental Health, Rollins School of Public Health, Emory University, Atlanta, GA, United States, 2Department of Biological Sciences, Dartmouth College, Hanover, NH, United States, 3Department of Earth Sciences, Dartmouth College, Hanover, NH, United States, 4Department of Genetics and Genome Sciences, Icahn School of Medicine at Mount Sinai, New York, NY, United States, 5Department of Environmental Medicine and Public Health, Icahn School of Medicine at Mount Sinai, New York, NY, United States, 6Department of Epidemiology, Geisel School of Medicine, Dartmouth College, Lebanon, NH, United States, 7Children’s Environmental Health and Disease Prevention Research Center at Dartmouth, Dartmouth College, Lebanon, NH, United States

2:00 PM–2:15 PM 23 Evaluation of the Available Male Reproductive Data for Nickel and Nickel Compounds
Williams AL, DeSesso JM. Exponent, Inc., Alexandria, VA, United States

2:15 PM–2:30 PM 24 Prenatal Exposure to Sodium Arsenite: Effects on Macrophages
Rychlik KA, Illingworth E, Attreed S, Kashiwagi C, Howard T, Sillé FC. Johns Hopkins University Bloomberg School of Public Health, Baltimore, MD, United States

2:30 PM–2:45 PM 25 Effects of Trimester-Specific Prenatal Fluoride Exposure and Childhood IQ in a Canadian Birth Cohort
Green RR1, Lanphear BP2, Flora D1, Hornung R3, Ayotte P4, Muckle G5, Martinez-Mier EA5, Till C1. 1York University, Toronto, ON, Canada, 2Simon Fraser University, Burnaby, BC, Canada, 3Cincinnati Children’s Hospital Medical Center, Cincinnati, OH, United States, 4Laval University, Quebec City, QC, Canada, 5Indiana University, Indianapolis, IN, United States

2:45 PM–3:00 PM Break—Harbor Island Foyer
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<td>3:00 PM–3:15 PM</td>
<td>26</td>
<td>Gestational Exposure to GenX Induces Adverse Responses in Maternal Weight Gain and Placental Health in CD-1 Mice</td>
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<td>Blake BE¹,², Cope H¹, Elmore S³, Mahler B³, Scott B³, Fenton SE¹,². ¹National Toxicology Program Laboratory, Division of the National Toxicology Program, NIEHS, Research Triangle Park, NC, United States;²Curriculum in Toxicology and Environmental Medicine, University of North Carolina at Chapel Hill, Chapel Hill, NC, United States;³National Toxicology Program Pathology Group, NIEHS, Research Triangle Park, NC, United States</td>
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<td>3:15 PM–3:30 PM</td>
<td>27</td>
<td>Differential Transcript Usage in the Placenta Is Associated with Aberrant Fetal Growth</td>
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<td>Gaballah S¹, Swank A²,³, Howey XM¹, Schmid J³, Sobus J⁴, Strynar M⁴, Hines E⁵, Catron T¹, McCord J¹, Tal T⁶. ¹ORISE/US EPA, Research Triangle Park, NC, United States;²US EPA, Research Triangle Park, NC, United States;³US EPA/ORD/NHEERL/RCU, Research Triangle Park, NC, United States;⁴US EPA/ORD/NERL/EMMD, Research Triangle Park, NC, United States;⁵US EPA/ORD/NCEA, Research Triangle Park, NC, United States;⁶US EPA/ORD/NHEERL/ISTD, Research Triangle Park, NC, United States</td>
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<td>3:30 PM–3:45 PM</td>
<td>28</td>
<td>Identification of Shared Toxicity Phenotypes in Zebrafish Exposed to Structurally Similar PFAS</td>
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<td>Gaballah S¹, Swank A²,³, Howey XM¹, Schmid J³, Sobus J⁴, Strynar M⁴, Hines E⁵, Catron T¹, McCord J¹, Tal T⁶. ¹ORISE/US EPA, Research Triangle Park, NC, United States;²US EPA, Research Triangle Park, NC, United States;³US EPA/ORD/NHEERL/RCU, Research Triangle Park, NC, United States;⁴US EPA/ORD/NERL/EMMD, Research Triangle Park, NC, United States;⁵US EPA/ORD/NCEA, Research Triangle Park, NC, United States;⁶US EPA/ORD/NHEERL/ISTD, Research Triangle Park, NC, United States</td>
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<td>3:45 PM–4:00 PM</td>
<td>29</td>
<td>Oral Fluconazole Use in Pregnancy and the Risk of Birth Defects</td>
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<td>Zhu Y¹, Bateman BT¹, Hernandez-Diaz S², Gray KJ¹, Mogun H¹, Huybrechts KF¹. ¹Brigham and Women’s Hospital and Harvard Medical School, Boston, MA, United States;²Harvard T. H. Chan School of Public Health, Boston, MA, United States</td>
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</table>
4:00 PM–4:15 PM  30  Development after Prenatal Antiepileptic Drug Exposure: Nature, Nurture, or Both?  
Huber-Mollema Y¹, Rodenburg R², Oort FJ², Lindhout D³. ¹Stichting Epilepsie Instellingen Nederland, Heemstede, Noord-Holland, The Netherlands, ²University of Amsterdam, Amsterdam, Noord-Holland, The Netherlands, ³University Medical Center Utrecht, Utrecht, The Netherlands

4:15 PM–4:30 PM  31  Innovative High-Throughput Screens in Embryonic Stem Cells Report Stress-Forced Increased First Differentiated Lineage and Decreased Second Lineage, Stemness, and Warburg Anabolic Metabolism  
Rappolee DA¹, Dutta S¹, Abdulhasan M², Gurdziel K¹, Li Q¹, Ruden D¹, Puscheck E¹. ¹Wayne State University, Detroit, MI, United States, ²Reproductive Stress Inc, Grosse Pointe Farms, MI, United States

4:35 PM–6:30 PM  Annual Meeting Awards Presentation and Business Meeting  
Graduate Student and Postdoctoral Fellow Travel Awards  
Wilson Presentation Awards  
Marie Taubeneck Award  
FASEB DREAM Awards  
James C. Bradford Memorial Student Poster Awards  
Edward W. Carney Trainee Awards  
Teratology Society Innovator Award  
Birth Defects Research Distinguished Scholar Award  
Edward W. Carney Distinguished Service Award  
Recognition of Other Awards Presented throughout the Week  
Annual Business Meeting

7:00 PM–9:00 PM  Closing Celebration  
Thursday, June 27, 2018

7:00 AM–9:30 AM  Council 2 Meeting  
Marina 2