

**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 **CME** 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.

9:30 AM–10:15 AM Normal and Abnormal Postnatal Development of
the Female Reproduction 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., National Health and
Environmental Effects Research Laboratory, US
EPA*

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

1:30 PM–5:00 PM

**Education Course Session 2
The Principles of Teratology**
(Separate Registration Required)

Harbor Island 2

Organized by the Education Committee

Chairperson: Amy L. Williams, Exponent, Inc.

1:30 PM–1:35 PM

Course Overview
Education Committee, Chairperson, Amy L. Williams, Exponent, Inc.

1:35 PM–2:13 PM

Timeline of Important Events in Embryo-Fetal Development
Gary Schoenwolf, University of Utah

2:13 PM–2:51 PM

Direct and Indirect Developmental Toxicity: Maternal, Placental, and Fetal Considerations
John M. Rogers, US Environmental Protection Agency

2:51 PM–3:29 PM

Teratogenic Mechanisms, Pathways, and Processes
Elaine M. Faustman, University of Washington

3:29 PM–3:44 PM

Break

3:44 PM–4:22 PM

Developmental and Reproductive Toxicity Assessments and Data Interpretation
Tacey E.K. White, Aclairo Pharmaceutical Development Group, Inc.

4:22 PM–5:00 PM

Detecting Signals of Concern in the Human Population
Christina D. Chambers, University of California–San Diego

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
Teratology Society President, Dana L. Shuey, Incyte Corporation

Harbor Island 2

8:15 AM–9:00 AM

Josef Warkany Lecture
Developmental Toxicity of Perfluorinated Compounds: A Voyage from Animal Studies to Transfected Cells (L1)

Harbor Island 2

(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 K*¹, *Bhatia S*¹, *Drake DM*¹, *Wells PG*^{1,2}.

¹*Department of Pharmaceutical Sciences and the Centre for Pharmaceutical Oncology, University of Toronto, Toronto, ON, Canada,* ²*Department of Pharmacology and Toxicology, University of Toronto, Toronto, ON, Canada*

9:30 AM–9:50 AM

2

Prevalence and Trends in Depression/Anxiety, Antidepressant Use and Key Maternal Conditions during Pregnancy, 1998–2015

Dandjinou M^{1,2}, *Sheehy O*², *Vigod S*^{3,4}, *Berard A*^{1,2}. ¹*Faculty of Pharmacy, University of Montréal, Montréal, QC, Canada.* ²*CHU Sainte-Justine Research Center, Montréal, QC, Canada.*

³*Women's College Hospital and Women's College Research Institute, Toronto, ON, Canada* ⁴*Faculty of Medicine, University of Toronto, Toronto, ON, Canada*

9:50 AM–10:10 AM

3

Exploratory Data Linkage of Active Surveillance Data to Healthcare Administrative Data to Enhance Case Finding of Critical Congenital Heart Defects in South Carolina, 2007–2017

Leedom VO^{1,2}, *Humphries B*³, *Zielke KC*³, *Kotagiri LM*³. ¹*South Carolina Department of Health and Environmental Control, Columbia, SC, United States,* ²*USC Arnold School of Public Health, Columbia, SC, United States,* ³*SC Department of Health and Environmental Control, Columbia, SC, United States*

10:10 AM–10:30 AM	4	Determining the Impact of Maternal Antibiotic Use on Inflammation of the Fetal Brain <i>Dawson EL¹, McDonald VA², Lebovitz Y², Theus MH², Hrubec TC^{1,2}. ¹Edward Via College of Osteopathic Medicine Virginia Campus, Blacksburg, VA, United States, ²Virginia-Maryland College of Veterinary Medicine, Virginia Tech, Blacksburg, VA, United States</i>
10:30 AM–10:45 AM	5	Concordance of <i>In Vitro</i> and <i>In Vivo</i> Gene Expression Dynamics for Specific Pathways of Interest for Developmental Neurotoxicity <i>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</i>
10:45 AM–11:05 AM		Break—Harbor Island Foyer
11:05 AM–11:25 AM	6	Establishing a Link between Microbiota and AHR in Zebrafish Neurobehavioral Development <i>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</i>
11:25 AM–11:45 PM	7	Evaluation of Pre- and Postnatal Exposure to Boric Acid in the Hsd:Sprague Dawley [®] SD [®] Rat <i>Watson A¹, Sutherland V¹, Cunny H¹, Miller L², Furr J², Collins B¹, Aillon K³, 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</i>
11:45 PM–12:05 PM	8	Multifactorial Inputs to Craniofacial Birth Defects <i>Everson JL¹, Lipinski RJ², Eberhart JK¹. ¹University of Texas at Austin, Austin, TX, United States, ²University of Wisconsin–Madison, Madison, WI, United States</i>

12:05 PM–1:30 PM

Lunch on Your Own

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 Environmental Chemicals and Developmental Effects: Translating Bench Science to Public Health		Harbor Island 2
	<i>Chairperson: Nicole Churchill Kleinstreuer, NTP Interagency Center for the Evaluation of Alternative Toxicological Methods, NIEHS</i> <i>Lecturer: Kembra L. Howdeshell, National Toxicology Program, NIEHS</i>		
2:00 PM–2:30 PM	James G. Wilson Publication Award Congenital heart disease complexity and childhood cancer risk		Harbor Island 2
	<i>Chairperson: Brian Enright, AbbVie Inc.</i> <i>Lecturer: R. Thomas Collins II, Stanford University School of Medicine</i>		
2:35 PM–5:30 PM	Ocean-Borne Risks to Pregnant Women and Their Babies Symposium (Joint with DNTS)		Harbor Island 2
	<i>Chairpersons: Elaine M. Faustman, University of Washington and Edward D. Levin, Duke University Medical Center</i>		
2:35 PM–3:10 PM	S1	Organic Chemicals in the Marine Environment and Their Relevance to Human Health <i>Lihini I. Aluwihare, Scripps Institution of Oceanography</i>	
3:10 PM–3:45 PM	S2	Research in the Time of Hurricanes: Puerto Rico 2017 <i>José F. Cordero, University of Georgia</i>	
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 <i>Elaine M. Faustman, University of Washington</i>	
4:35 PM–5:10 PM	S4	What Can Fish Tell Us About Developmental Neurotoxic Risks of the Sea? <i>Edward D. Levin, Duke University Medical Center</i>	
5:10 PM–5:30 PM	Discussion		
2:35 PM–5:30 PM	Environmental Exposures from Placenta to Birth: Effects on Immunity Symposium		Harbor Island 1
	<i>Chairpersons: Kristal A. Rychlik, Johns Hopkins Bloomberg School of Public Health and Fenna Sillé, Johns Hopkins Bloomberg School of Public Health</i>		
2:35 PM–3:10 PM	S5	The Placenta As a Driver of Early- and Later-Life Child Health <i>Rebecca C. Fry, University of North Carolina– Chapel Hill</i>	

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? <i>Jennifer J. Adibi, University of Pittsburgh Graduate School of Public Health</i>
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 <i>Cathy Vaillancourt, INRS-Institut Armand Frappier</i>
4:35 PM–5:10 PM	S8	The Long-Term Impact of Prenatal Exposures on Vaccine Immunogenicity and Infectious Disease Risk <i>Fenna Sillé, Johns Hopkins Bloomberg School of Public Health</i>
5:10 PM–5:30 PM		Discussion

5:35 PM–6:00 PM **Patricia Rodier Mid-Career Award for Research and Mentoring From Neural Tube Defects to Environmental Contaminants (L2)** **Harbor Island 2**
(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** **Nautilus**
(Joint with DNTS)

Teratology Society Posters P1–P39 and LB1–LB5
DNTS Posters P1–P12

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

Monday, June 24, 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 **Breakfast with the Teratology Mentors** **Seabreeze 1**
(Advance Signup Is Required)

7:00 AM–8:00 AM **Nominations and Elections Committee Meeting** **Room 514**

7:00 AM–8:00 AM **Publications Committee Meeting** **Marina 2**

7:00 AM–8:00 AM **Science Committee Meeting** **Seabreeze 2**

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** **Harbor Island 2**
Neurodevelopmental Disorders Symposium
(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

9:45 AM–10:15 AM S10 Maternal Choline Supplementation: A Therapy for Down Syndrome with Population-Wide Cognitive Benefits
Julie E. Nevins, Cornell University

10:15 AM–10:30 AM Break—Harbor Island Foyer

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** **Harbor Island 1**
from Health Services Research Symposium

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

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

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

**Agnish Fellowship Lecture
Healthy Gametes for a Healthy Life**

Harbor Island 2

Chairperson, Amy L. Williams, Exponent, Inc.

Speaker: Barbara Hales, McGill University

2:35 PM–5:50 PM

CME

Differences in Sex Development Symposium

Harbor Island 2

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

Integration of Human and Animal Data to Inform Medication Use in Pregnant Women: From Drug Labeling to Clinical Trials Symposium
(Joint with OTIS)

Harbor Island 3

Chairpersons: Christina D. Chambers, University of California–San Diego and Marcy Stephens Powell, GlaxoSmithKline

2:35 PM–2:40 PM Introduction

2:40 PM–3:20 PM S23 A Model for Human and Animal Data Integration: Weight-of-Evidence Strategy
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 <i>Leyla Sahin, US Food and Drug Administration</i>
4:00 PM–4:15 PM		Break—Harbor Island Foyer
4:15 PM–4:55 PM	S25	Women in Clinical Trials From Past to Present: Through a Regulatory Lens <i>Marjorie R. Jenkins, US Food and Drug Administration</i>
4:55 PM–5:35 PM	S26	Case Examples: Interpretation of Data and How Much Weight Is Placed on the Label, Nonclinical and Clinical Information <i>Sarah Gloria Obican, University of South Florida</i>
5:35 PM–5:50 PM		Discussion

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

Teratology Society Posters P40–P70 and LB6–LB10
DNTS Posters P13–P22
OTIS Posters 1–8

8:00 PM–10:00 PM **Teratology Society and MARTA Graduate Students and Postdoctoral Fellows Career Event** **Seabreeze**
(Open to the 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** **Harbor Island Foyer**
(Joint with DNTS)

8:00 AM–9:00 AM **Robert L. Brent Lecture—Teratogen Update** **Harbor Island 2**
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
<i>Nicole Churchill Kleinstreuer, NTP Interagency Center for the Evaluation of Alternative Toxicological Methods, NIEHS</i> |
| 9:45 AM–10:25 AM | S28 | <i>In Vitro to In Vivo</i> Extrapolation Using Maternal-Fetal Models
<i>Annie Lumen, US Food and Drug Administration</i> |
| 10:25 AM–10:40 AM | | Break—Harbor Island Foyer |
| 10:40 AM–11:20 AM | S29 | International Progress on Alternative Approaches for Developmental Neurotoxicity: Evaluation of Assay Batteries and Development of IATAs and AOPs
<i>Timothy J. Shafer, US Environmental Protection Agency</i> |
| 11:20 AM–12:00 Noon | S30 | Integrated Testing Strategies for Developmental Neurotoxicity Testing
<i>Mamta Behl, National Toxicology Program, NIEHS</i> |

9:05 AM–12:00 Noon

CME

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 |
| 9:15 AM–9:50 AM | S31 | Criteria for Assessing Causality in Teratology
<i>Sonja A. Rasmussen, University of Florida</i> |
| 9:50 AM–10:25 AM | S32 | A Smoking Gun that Faced Opposition: The Causal Agent of Fetal Alcohol Spectrum Disorders
<i>Kenneth Lyons Jones, UCSD, CA MotherToBaby</i> |
| 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
<i>John C. Carey, University of Utah</i> |

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 V^{1,2}, Mitchell CA^{1,2}, 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 C^{1,2}, Manivannan S^{1,2}, Cameron EM^{1,2}, Garg V^{1,2,3}, Basu M^{1,2,3}. 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

- 10:15 AM–10:30 AM 13 Effect Measure Modification of the Association between Maternal Diabetes and Birth Defects by Maternal Obesity, National Birth Defects Prevention Study, 1997–2011
Tinker SC¹, Gilboa SM¹, Moore CA¹, Waller DK², Simeone RM¹, Kim SY¹, Jamieson DJ³, Botto LD⁴, Fisher S⁵, Reefhuis 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 A, Dixon GB, Eberhart JK. The 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 PG^{1,2}. 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 L¹, Huybrechts KF¹, Hernandez-Diaz S², Mogun H¹, 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 KG¹, Shrestha S¹, Garrison LM¹, Lowe J¹, Stephen JM², Bakhireva LN¹. 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)

Harbor Island 1

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 and Their Development
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

1:00 PM–1:30 PM

AOP Interactive Exercise

12:00 Noon–1:30 PM

Lunch on Your Own

1:30 PM–4:30 PM



**Wiley Symposium
Maternal Morbidity and Mortality: Causes, Disparities,
and Solutions**

Harbor Island 2

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

- | | | |
|-----------------|-----|---|
| 1:30 PM–1:45 PM | | Introduction
<i>Emma Roberts, Northeastern University, Bouve
College of Health Sciences</i> |
| 1:45 PM–2:20 PM | S35 | Maternal Morbidity and Mortality: Risk Factors,
Trends, and Disparities
<i>Suzan L. Carmichael, Stanford University</i> |
| 2:20 PM–2:55 PM | S36 | Quality Improvement Initiatives to Improve
Maternal Health in California
<i>Elliott K. Main, Stanford University</i> |
| 2:55 PM–3:10 PM | | Break—Harbor Island Foyer |
| 3:10 PM–3:45 PM | S37 | Cardiovascular Disease and Preeclampsia:
Impact on Maternal and Fetal Health
<i>Afshan B. Hameed, University of California–Irvine</i> |
| 3:45 PM–4:20 PM | S38 | Maternal Genotype and Fetal Sex Impact the
Developmental Origins of Stress-Induced
Hypertension
<i>Terry K. Morgan, Oregon Health & Science
University</i> |
| 4:20 PM–4:30 PM | | Discussion |

1:30 PM–4:30 PM

**Current Topics and Updates for Pregnancy
Registries Workshop**
(Joint with OTIS)

Harbor Island 3

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

- | | | |
|-----------------|----|---|
| 1:30 PM–1:35 PM | | Introduction |
| 1:35 PM–2:00 PM | W5 | Detection of an Early Signal for Neural Tube
Defects with Exposure to Dolutegravir in
Botswana
<i>Rebecca Zash, Beth Israel Deaconess Medical
Center</i> |
| 2:00 PM–2:25 PM | W6 | Management of Neural Tube Defect Signals in
the Antiretroviral Pregnancy Registry: Efavirenz
vs. Dolutegravir
<i>Angela Scheuerle, University of Texas
Southwestern Medical Center</i> |

2:25 PM–2:50 PM	W7	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 <i>Vic Spain, Genentech</i>
2:50 PM–3:05 PM		Break—Harbor Island Foyer
3:05 PM–3:30 PM	W8	First Cases in Small Cohorts: Random Error Playing Games with Us <i>Lewis B. Holmes, MassGeneral Hospital for Children</i>
3:30 PM–3:50 PM	W9	Safety of Tetanus, Diphtheria, and Acellular Pertussis Vaccination in a Cohort of Pregnant Active Duty US Military Women <i>Hall C^{1,2}, Abramovitz LM^{1,2}, Bukowinski AT^{1,2}, Khodr ZG^{1,2}, Gumbs GR^{1,2}, Wells NY², Conlin AMS^{2,3}. ¹Leidos, Inc., San Diego, CA, United States, ²Naval Health Research Center, San Diego, CA, United States, ³Innovative Employee Solutions, Inc., San Diego, CA, United States</i>
3:50 PM–4:10 PM	W11	Prevalence and Predictors of Acetaminophen Use in Pregnancy <i>Bandoli G, Luo J, Johnson D, Chambers CC. University of California—San Diego, San Diego, CA, United States</i>
4:10 PM–4:30 PM		Discussion
4:35 PM–6:00 PM	Multidisciplinary Research Needs Workshop (W12)	Harbor Island 2
		<i>Chairpersons: Dana L. Shuey, Incyte and William Slikker, Jr., National Center For Toxicological Research, US FDA</i>
4:35 PM–4:50 PM		Overview of Workshop Goals and Progress from 2018
4:50 PM–5:30 PM		Concurrent Breakout Sessions <ul style="list-style-type: none"> • Opioid Research • <i>In Vivo</i> and <i>In Vitro</i> 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 The New 3-Rs: Reproducibility and Rigor in Reproduction Studies <i>Chairpersons: Manon Beekhuijzen, Charles River and Susan L. Makris, National Center for Environmental Assessment, US EPA</i>	Harbor Island 2
	European Teratology Society The Academic Perspective (L5) <i>Seamus Giles, University College, Dublin, Ireland</i>	
	Teratology Society The Industrial and Contract Research Perspective (L6) <i>Donald G. Stump, Charles River</i>	
9:05 AM–12:00 Noon	HESI Symposium Thyroid Hormone Assessments: Implications for Developmental and Reproductive Toxicology <i>Chairpersons: Pragati Sawhney Coder, Charles River and Susan L. Makris, National Center for Environmental Assessment, US EPA</i>	Harbor Island 2
9:05 AM–9:20 AM	Introduction <i>Susan L. Makris, National Center for Environmental Assessment, US EPA</i>	
9:20 AM–9:55 AM	S39 The Thyroid Axis: Overview of Anatomy, Physiology, Regulation in Mammalian Systems <i>Mary E. Gilbert, National Health and Environmental Effects Research Laboratory, US EPA</i>	
9:55 AM–10:30 AM	S40 Thyroid Homeostasis and Disruption in Humans <i>T.I.M. Korevaar, Erasmus University</i>	
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 <i>Pragati Sawhney Coder, Charles River</i>	

11:30 AM–12:00 Noon 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
What Do We Need to Know about Climate Change
and Effects on Maternal-Fetal Health?**

Harbor Island 3

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 Health Effects of Wildfire Smoke Exposure in Susceptible Populations: Lessons Learned from a Nonhuman Primate Cohort
Lisa A. Miller, UC Davis School of Veterinary Medicine

10:15 AM–10:30 AM

Discussion

10:30 AM–11:00 AM

Warkany Tea
(Joint with DNTS)

Harbor Island Foyer

11:00 AM–12:00 Noon

Innovator Award Finalists Platform Session 3

Harbor Island 3

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 KL^{1,2}, Bell KS^{1,2}, 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 TB*¹, *Spencer R*², *Zurlinden TJ*³, *Salli KS*³, *Baker NC*⁴. 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 G*¹, *Feldkamp ML*², *Pankratz N*³, *Lane J*³, *Kay DM*⁴, *Shaw GM*⁵, *Reefhuis J*⁶, *Jenkins MM*⁶, *Almli LM*^{6,7}, *Olshan AF*⁸, *Pangilinan F*⁹, *Brody LC*⁹, *Canfield M*¹⁰, *Romitti PA*¹¹, *Mills JL*¹, *UW Center for Mendelian Genomics*¹², *NISC Comparative Sequencing Program*¹³, *The National Birth Defects Prevention Study*¹⁴.
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, ¹⁰DSHS, 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

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

1:30 PM–4:30 PM

Leveraging Zebrafish to Unravel Mechanisms of Developmental Toxicity Symposium

Harbor Island 2

Chairpersons: Tamara L. Tal, US Environmental Protection Agency and David C. Volz, University of California–Riverside

1:30 PM–1:35 PM

Introduction

1:35 PM–2:10 PM	S46	The Developing Pancreas Is a Sensitive Target Organ of Toxicant Exposures <i>Alicia R. Timme-Laragy, University of Massachusetts–Amherst</i>
2:10 PM–2:45 PM	S47	Endocrine Disruptors Cause Malformations and Functional Defects in the Zebrafish Heart via Membrane-Associated Receptor Pathways <i>Daniel A. Gorelick, Baylor College of Medicine</i>
2:45 PM–3:00 PM		Break—Harbor Island Foyer
3:00 PM–3:35 PM	S48	Triclosan-Resistant Host-Associated Microbiota Perform Xenobiotic Biotransformations in Larval Zebrafish <i>Tamara L. Tal, US Environmental Protection Agency</i>
3:35 PM–4:10 PM	S49	Dynamic Alterations in DNA Methylation Precede Tris(1,3-dichloro-2-propyl)phosphate-Induced Delays in Zebrafish Epiboly <i>David C. Volz, University of California–Riverside</i>
4:10 PM–4:30 PM		Discussion

1:30 PM–4:30 PM

Platform Session 4

Harbor Island 1

Chairpersons: Nicole Churchill Kleinstreuer, NTP Interagency Center for the Evaluation of Alternative Toxicological Methods, NIEHS and Nelson D. Pace, Exponent, Inc.

1:30 PM–1:45 PM		Introduction
1:45 PM–2:00 PM	22	Copper Associates with Differential Methylation in Placentae from Two US Birth Cohorts <i>Kennedy EM¹, Everson TM¹, Punshon T², Jackson BP³, Hao K⁴, Lambertini L⁵, Chen J⁵, Karagas MR^{6,7}, Marsit CJ^{1,7}. 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</i>

2:00 PM–2:15 PM	23	Evaluation of the Available Male Reproductive Data for Nickel and Nickel Compounds <i>Williams AL, DeSesso JM. Exponent, Inc., Alexandria, VA, United States</i>
2:15 PM–2:30 PM	24	Prenatal Exposure to Sodium Arsenite: Effects on Macrophages <i>Rychlik KA, Illingworth E, Attreed S, Kashiwagi C, Howard T, Sillé FC. Johns Hopkins University Bloomberg School of Public Health, Baltimore, MD, United States</i>
2:30 PM–2:45 PM	25	Effects of Trimester-Specific Prenatal Fluoride Exposure and Childhood IQ in a Canadian Birth Cohort <i>Green RR¹, Lanphear BP², Flora D¹, Hornung R³, Ayotte P⁴, Muckle G⁴, 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</i>
2:45 PM–3:00 PM		Break—Harbor Island Foyer
3:00 PM–3:15 PM	26	Gestational Exposure to GenX Induces Adverse Responses in Maternal Weight Gain and Placental Health in CD-1 Mice <i>Blake BE^{1,2}, Cope H¹, Elmore S³, Mahler B³, Scott B³, Fenton SE^{1,2}. 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</i>
3:15 PM–3:30 PM	27	Differential Transcript Usage in the Placenta Is Associated with Aberrant Fetal Growth <i>Deysenroth M¹, Peng S¹, Hao K¹, Marsit CJ², Chen J¹. ¹Icahn School of Medicine at Mount Sinai, New York, NY, United States, ²Emory University Rollins School of Public Health, Atlanta, GA, United States</i>

- 3:30 PM–3:45 PM 28 Identification of Shared Toxicity Phenotypes in Zebrafish Exposed to Structurally Similar PFAS
Gaballah S¹, Swank A^{2,3}, 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
- 3:45 PM–4:00 PM 29 Oral Fluconazole Use in Pregnancy and the Risk of Birth Defects
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
- 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, 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**

Harbor Island 2

Graduate Student and Postdoctoral Fellow Travel Awards
Wilson Presentation Awards
Marie Taubeneck Award
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

Shoreline

Thursday, June 27, 2018

7:00 AM–9:30 AM

Council 2 Meeting

Marina 2