

**46th Annual Meeting of the Developmental Neurotoxicology Society
Virtual Meeting
June 26–June 29, 2022**

**Held in Conjunction with the
62nd Annual Meeting of the
Society for Birth Defects Research and Prevention
and the
34th Annual Education Meeting for the
Organization of Teratology Information Specialists**

DNTS 2022 Program Overview

The times listed are in Eastern Daylight Time.

Sunday, June 26, 2022

- 11:15 AM–12:00 Noon** **Keynote Lecture**
DNTS 1. Functional Correlation of Genome-Wide DNA Methylation Profiles in Genetic and Teratogenic Neurodevelopmental Disorders (L1)
(Joint with BDRP and OTIS)
Chairperson: Bruce K. Beyer, Sanofi US, Inc.
Speaker: Bekim Sadikovic, London Health Sciences Centre
- 12:00 Noon–12:10 PM** **DNTS Presidential Welcome**
Speaker: Patricia Janulewicz Lloyd, Boston University
- 12:10 PM–12:20 PM** **Break**
- 12:20 PM–2:20 PM** **DNTS Micro Talks**
- DNTS 2. MR Fingerprinting (MRF), Feasibility of a Novel Technology to Image Infants With Prenatal Opioid Exposure (POE)**
Lynn Singer, Deanne Wilson-Costello, Chaitra Badve, Chris Flask, Licia Clowtis, Dan Ma
¹*Case Western Reserve University, Cleveland, OH*
- DNTS 3. Polysubstance Use in Pregnant Opioid Using Mothers at Delivery and Infant Birth Outcomes. R34 DA050341-01**
Licia Clowtis, Jing Zhang, Curtis Tatsuoka, Lynn Singer
Case Western Reserve University, Cleveland, OH
- DNTS 4. Persisting Neurobehavioral Consequences of Developmental Benzo[a]pyrene and Cadmium Exposure in Zebrafish and Rats**
Andrew Hawkey, Sarabesh Natarajan, Anas Gondal, Mikayla Mead, Edward Levin
Duke University, Durham, NC
- DNTS 2022 Conference Award, sponsored by Charles River Laboratories.**
DNTS 5. Reproductive and Developmental Outcomes Following Deployment to the Gulf War
Alexa Friedman¹, Patricia Janulewicz Lloyd¹, Jeffrey Carlson¹, Emily Quinn¹, Steven S Coughlin^{2,3}, Vahe' Heboyan², Glenn Markenson⁴, Lizette Mendez⁴, Lea

Steele⁵, Rosemary Toomey⁶, Timothy Heeren¹, Maxine Krengel⁴, Kimberly Sullivan¹

¹*Boston University School of Public Health, Boston, MA*, ²*Medical College of Georgia, Augusta, GA*, ³*Charlie Norwood VA Medical Center, Augusta, GA*, ⁴*Boston University School of Medicine, Boston, MA*, ⁵*Baylor College of Medicine, Houston, TX*, ⁶*Boston University, Boston, MA*

DNTS 6. YoungMoms: A Prospective Mixed Methods Cohort Study of Prenatal Cannabis and Tobacco Use

Natacha De Genna¹, Gale Richardson¹, Lidush Goldschmidt², Judy Chang¹

¹*University of Pittsburgh, Pittsburgh, PA* ²*University of Pittsburgh Medical Center, Pittsburgh, PA*

DNTS 7. Scoping Review on Environmental Enrichment: Are Critical Periods and Sex Differences Adequately Studied?

Diana Dow-Edwards¹, Annelyn Torres-Reveron^{2,3}

¹*SUNY-Downstate, Brooklyn, NY*, ²*Sur180 Therapeutics, LLC, McAllen, TX*, ³*Ponce Research Institute, Ponce, PR*

DNTS 8. Mapping Neurotoxicological Endpoints in a Systematic Review of Lead Exposure in Animal Models

Tim Anderson, Kirstin Hester, David Lehmann, Laura Carlson

US EPA, Durham, NC

DNTS 9. Early Life Adversity: Effects on the Caecal Microbiome and Long-Term Memory, and Effects of Intervention with Short-Chain Fatty Acid Supplementation in Rats

Lori Driscoll, Emma O'Leary, Tia Vierling, Ethan Grant, Tongyan Sui

Colorado College, Colorado Springs, CO

DNTS 2022 Conference Award, sponsored by Stephen B. Harris.

DNTS 10. Neurobehavioral Health of Children Living Near Coal Ash Storage Sites

Jillian Winn¹, Lonnie Sears¹, John Myers², Kristine Zierold³

¹*University of Louisville, Louisville, KY* ²*Ohio State University, Columbus, OH*

³*University of Alabama - Birmingham, AL*

DNTS 11. Impulsive Choice in Two Different Rat Models of Attention-Deficit/Hyperactivity Disorder: Spontaneously Hypertensive Versus *Lphn3* Knockout Rats

Monica Carbajal¹, Asiah Bounmy¹, Hunter Nolen¹, Joshua Potter¹, Samantha Regan², Michael Williams², Charles Vorhees², Helen Sable¹

¹*University of Memphis, Memphis, TN* ²*University of Cincinnati College of Medicine, Cincinnati, OH*

DNTS 12. Regulation of Mood by Interneuron Dopamine D1 Receptors

Nella Delva, Devon Graham, Gregg Stanwood, Benda Noble

Florida State University, Tallahassee, FL

DNTS 13. Thyroid Hormone Action Controls Cell Signaling in the Developing Ventricular Epithelium: Implications for a Mechanistic Adverse Outcome Pathway

Katherine O'Shaughnessy¹, Kiersten Bell^{1,2}, Benjamin McMichael^{1,2}, Cal Riutta^{1,2}, Aubrey Sasser^{1,2}, Jermaine Ford¹, Tammy Stoker¹, Arun Pandiri³, Mary Gilbert¹

¹*United States Environmental Protection Agency, Center for Public Health and Environmental Assessment, Public Health and Integrated Toxicology Division,*

Research Triangle Park, NC, ²Oak Ridge Institute for Science Education, Oak Ridge, TN, ³National Institute of Environmental Health Sciences, Cellular and Molecular Pathology Branch, Research Triangle Park, NC

DNTS 14. Proteomic Analysis of Brain regions of Adult Long-Evans Rats Exposed to Kainic Acid

Emily Pitzer¹, Garyn Jung¹, William Padgett¹, Witold Winnik¹, Charan Ganta^{2,3}, Heather Jensen², Ronald Herbert², David Herr¹

¹US EPA, Durham, NC ²NIEHS, Durham, NC ³Integrated Laboratory Systems, Durham, NC

2:20 PM-2:30 PM

Break

2:30 PM-4:30 PM

DNTS Philip J. Bushnell Symposium: The Continuing Importance of Behavioral Toxicology

Chairperson: Edward Levin, Duke University for Brain Sciences

2:30 PM–2:50 PM

Appreciation of Phil Bushnell

*Edward Levin, Duke University for Brain Sciences
Mary Gilbert, US Environmental Protection Agency (EPA)*

William Boyes, US Environmental Protection Agency (EPA), ret.

2:50 PM–3:10 PM

DNTS 15. Cognitive Effects of Perinatal Exposure to Manganese in Drinking Water, Variable Stress and Their Combination

Wendy Oshiro, US Environmental Protection Agency (EPA)

David Herr, US Environmental Protection Agency (EPA)

3:10 PM–3:30 PM

DNTS 16. Attention and memory in behavioral toxicology with adolescent methylmercury exposure

Dalisa Kendricks, Auburn University

Chris Newland, Auburn University

3:30 PM–3:35 PM

Break

3:35 PM–3:55 PM

DNTS 17. The Last Two Decades on Preclinical and Clinical Research on Inhalant Effects

Sylvia Cruz, Center for Research and Advanced Studies of the National Polytechnic Institute

Scott Bowen, Wayne State University

3:55 PM–4:15 PM

DNTS 18. Associations of Concurrent PCB and PBDE Concentrations with Executive Function in Adolescents

Jenna Sprowles, Beckman Institute for Advanced Science and Technology, University of Illinois Urbana-Champaign

Susan Schantz, Beckman Institute for Advanced Science and Technology, University of Illinois Urbana-Champaign

4:15 PM–4:30 PM

Discussion of the Continuing Importance of Behavioral Toxicology

Edward Levin, Duke University for Brain Sciences

Chris Newland, Auburn University
William Boyes, US Environmental Protection Agency
(EPA), ret

- 4:30 PM-6:00 PM** **Extended Break**
- 6:00 PM-7:30 PM** **Virtual Social Event**
- 8:40 PM-9:10 PM** **Patricia Rodier Mid-Career Award for Research and Mentoring**
- DNTS 19. Putting the Long in Longitudinal: Research and Mentoring in Neurotoxicology**
(Joint with BDRP)
- Chairpersons: Kembra L. Howdeshell, National Institute of Environmental Health Sciences and Mary E. Gilbert, US Environmental Protection Agency*
- Lecturer: Jennifer Anne Willford, Slippery Rock University of Pennsylvania*
- Monday, June 27, 2022**
- 11:00 AM-12:00 Noon** **Josef Warkany Lecture**
- DNTS 20. Finding A Common Ground: Translation of the Principles of Teratology in Today's Regulatory Climate**
(Joint with BDRP and OTIS)
- Chairperson: Susan L. Makris, Center for Public Health and Environmental Assessment, US EPA*
- Lecturer: Alan M. Hoberman, Charles River*
- 12:05 PM-3:00 PM** **Novel Approaches for Assessment of Complex Chemical Mixtures in Evaluations of Reproductive and Developmental Effects Symposium**
(Joint with BDRP)
- Chairpersons: Catheryne Chiang, Office of Research and Development, US EPA and Krista Christensen, Office of Research and Development. US EPA*
- 12:05 PM-12:15 PM** **Introduction**
- 12:15 PM-12:45 PM** **DNTS 21. Exploration of Disinfection Byproduct Mixture Methods in an Epidemiological Study of Birth Defects**
J. Michael Wright, US Environmental Protection Agency
- 12:45 AM-1:15 PM** **DNTS 22. Application of Sufficient Similarity Analyses for Complex Polychlorinated Biphenyl Mixtures**
Catheryne Chiang, US Environmental Protection Agency
- 1:15 PM-1:30 PM** **Break**
- 1:30 PM-1:55 PM** **DNTS 23. Impact of Prenatal Exposure to Phthalate Mixture on Uterine Function in Female Offspring**
Indrani C. Bagchi, University of Illinois at Urbana Champaign

1:55 PM–2:30 PM	DNTS 24. Prenatal Consumer Product Chemical Mixtures and Size-for-Gestational Age at Birth <i>Paige A. Bommarito, National Institute of Environmental Health Sciences</i>
2:30 PM–2:55 PM	DNTS 25. Association between Exposure to a Metal Mixture and Neurobehavior at Six to Seven Years of Age <i>Francheska M. Merced-Nieves, Icahn School of Medicine at Mount Sinai</i>
2:55 PM–3:00 PM	Discussion
3:00 PM–3:30 PM	Break
3:30 PM–4:30 PM	President’s Distinguished Lecture <i>Chairperson: Patricia Janulewicz Lloyd, Boston University</i>
3:30 PM–4:10 PM	DNTS 26. Children’s Exposure to Chemical and Non-Chemical Stressors: What Have We Learned About Health and Well-Being? <i>Nicolle S. Tulve, Center for Public Health and Environmental Assessment, US EPA</i>
4:10 PM–4:30 PM	Discussion
4:30 PM–5:30 PM	Extended Break
5:35 PM–8:55 PM	The Legacy of Dr. Robert L. Brent: Accurate Assessment and Communication of Teratogen Risks Symposium (Joint with BDRP and OTIS) <i>Chairpersons: Janine E. Polifka, Retired and Christine Perdan Curran, Northern Kentucky University</i>
5:35 PM–6:00 PM	DNTS 27. Tribute to Dr. Robert L. Brent: Let the Yolk Sac Speak—A Small Drop in the Deep Water of Bob’s Legacy in Science <i>Asher Ornoy, Hebrew University, Hadassah Medical School, Adelson School of Medicine, Ariel University</i>
6:00 PM–6:25 PM	DNTS 28. Radiation Risks and Information Needs of Pregnant and Lactating Women <i>Fred Mettler, University of New Mexico School of Medicine</i>
6:25 PM–7:00 PM	DNTS 29. Professionally Responsible Counseling of Pregnant Women about COVID-19 Vaccination <i>Frank A. Chervenak, Lenox Hill Hospital</i>
7:00 PM–7:15 PM	Break
7:15 PM–7:40 PM	DNTS 30. Using Supervised Learning Methods to Create Prediction Models Based on Narrative Descriptions of Fetal Risk

Elizabeth C. Ailes, Centers for Disease Control and Prevention

7:40 PM–8:05 PM **DNTS 31. Bob Brent: Medical Expert, Expert Medical Witness, and Expert on Medical Expert Witnessing.**
Jan M. Friedman, University of British Columbia

8:05 PM–8:55 PM **Sharing Memories of Dr. Robert L. Brent**

Tuesday, June 28, 2022

10:30 AM–11:00 AM **Virtual Social (Mentorship/Career Advice)**

11:00 AM–11:30 AM **Virtual Social (Academia Discussion Group)**

11:30 AM–12:00 Noon **Virtual Social (Government/Industry Discussion Group)**

12:05 PM–3:00 PM **Disparities in Pregnancy and Birth Outcomes Symposium**
(Joint with BDRP and OTIS)

Organized by the Diversity, Equity, and Inclusion Workgroup

Chairpersons: José Cordero, University of Georgia and Nicole R. Sparks, University of California, Riverside

12:05 PM–12:40 PM **Disparities in Research Funding for Health Issues that Affect People of Color**
José Cordero, University of Georgia

12:40 PM–1:15 PM **DNTS 32. Disparities in Maternal Health and Neurodevelopmental Outcomes**
Natacha M. De Genna and Gale A. Richardson, University of Pittsburgh

1:15 PM–1:30 PM **Break**

1:30 PM–2:05 PM **DNTS 33. The Influence of Social Disparities on Congenital Anomalies in the North**
Laura Arbour, UBC Department of Medical Genetics

2:05 PM–2:45 PM **DNTS 34. Structural and Interpersonal Racism and Adverse Birth Outcomes: From Associations to Advocacy**
Renee Mehra, University of California, San Francisco

2:45 AM–3:00 PM **Discussion**

3:00 PM–13:15 PM **Break**

3:15 PM–4:15 PM **Elsevier Distinguished Lecturer**
Chairperson: Patricia Janulewicz Lloyd, Boston University

3:15 PM–3:55 PM **DNTS 35. What Improves, and What Impairs, Executive Functions**
Adele Diamond, The University of British Columbia

3:55 PM–4:15 PM **Discussion**

4:15 PM–5:00 PM	Extended Break
5:00 PM–8:00 PM	<p>Per- and Polyfluoroalkyl Substances (PFAS) and Children's Health Symposium (Joint with BDRP)</p> <p><i>Organized by the Public Affairs Committee</i></p> <p><i>Chairpersons: Suzanne E. Fenton, National Institute of Environmental Health Sciences and Tamarra James-Todd Harvard T.H. Chan School of Public Health</i></p>
5:00 PM–5:15 PM	<p>Introduction to PFAS: Exposures and Biomonitoring <i>Rachel D. Rogers, ATSDR, CDC</i></p>
5:15 PM–5:45 PM	<p>DNTS 36. Underlying Conditions and PFAS Exposures: A Risky Mix in Pregnancy <i>Tamarra James-Todd Harvard T.H. Chan School of Public Health</i></p>
5:45 PM–6:15 PM	<p>DNTS 37. GenX Effects in Pregnant Mice and Persistent Effects in Their Offspring <i>Suzanne E. Fenton, National Institute of Environmental Health Sciences</i></p>
6:15 PM–6:30 PM	Break
6:30 PM–7:00 PM	<p>DNTS 38. Cardiometabolic and Bone Health Effects of PFAS Exposure in Adolescents <i>Joseph M. Braun, Brown University School of Public Health</i></p>
7:00 PM–7:30 PM	<p>DNTS 39. Immunotoxic Effects of PFAS in Children <i>C. Amalie G. Timmermann, University of Copenhagen</i></p>
7:30 PM–7:45 PM	<p>DNTS 40. Approaches to Address Concerns About PFAS Exposure in Susceptible Populations. <i>Rachel D. Rogers, ATSDR, CDC</i></p>
7:45 PM–8:00 PM	Discussion

Wednesday, June 29, 2022

10:20 AM – 11:10 AM	<p>DNTS Micro talks</p> <p>DNTS 41. Fetal Alcohol Exposure Disrupts Angiogenesis- and Erythropoiesis-Related Placental Gene Network Modules <u>Maya Deyssenroth</u>¹, Promita Bose¹, Ke Hao², Sandra Jacobson^{3,4}, Joseph Jacobson^{3,4}, Jia Chen², R.Colin Carter⁵ ¹Columbia University, New York, NY, ²Icahn School of Medicine at Mount Sinai, New York, NY ³Wayne State University, Detroit, MI, ⁴University of Cape Town, Cape Town, South Africa. ⁵Columbia University Irving Medical Center, New York, NY</p> <p>DNTS 42. Investigating the Effects of Prenatal Alcohol Exposure on the Human Placenta at the Cellular Level</p>
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Randy Williams¹, Corina Lesseur¹, Sandra Jacobson^{2,3}, Joseph Jacobson^{2,3}, Ke Hao⁴, Jia Chen¹, Robert Carter⁵

¹Department of Environmental Medicine and Public Health, Icahn School of Medicine at Mount Sinai, New York, NY ²Department of Behavioral Neurosciences, Wayne State University School of Medicine, Detroit, MI, ³Departments of Human Biology and of Psychiatry and Mental Health, University of Cape Town Faculty of Health Sciences, Cape Town, South Africa. ⁴Department of Genetics and Genomic Sciences, Icahn School of Medicine at Mount Sinai, New York, NY ⁵Institute of Human Nutrition and Departments of Emergency Medicine and Pediatrics, Columbia University College of Physicians and Surgeons, New York, NY

DNTS 43. A Novel Prenatal Model of Fentanyl Exposure and its Long-Term Consequences

Devon Graham

Florida State University College of Medicine, Tallahassee, FL

DNTS 44. The Effect of Developmental Benzo[a]pyrene Exposure on Brain-Derived Neurotrophic Factor

Kevin Berling, Katelyn Clough, Angela Kyntchev, Connor Perry, Trevor Shumate, Christine Curran

Northern Kentucky University, Highland Heights, KY

DNTS 45. The Effect of Benzo[a]pyrene on Learning and Memory in *Cyp1a1*(-/-) Knockout and Wild Type Mice

Mickayla Kowalksi, Maria Truitt, Tianna Niemeier, Aria Towell, Connor Perry, Trevor Shumate, Angela Kyntchev, Christine Curran

Northern Kentucky University, Highland Heights, KY

DNTS 46. Dopamine and Serotonin Signaling Following Developmental Benzo[a]pyrene Exposure in *Cyp1a1* (-/-) knockout and wild type mice

Mackenzie Feltner, Emma Foster, Katelyn Clough, Christine Curran

Northern Kentucky University, Highland Heights, KY

11:10 AM – 11:20 AM

Break

11:20 AM–12:00 Noon

DNTS Richard Butcher New Investigator Award

Chairperson: TBD

DNTS 47. The Aspects of Lifestyle That Influence Ozone Induced Morbidities: Interactions of Non-Chemical and Chemical Stressors on Brain.

Matthew Valdez

ORISE, Oak Ridge, TN, USA. US EPA, Research Triangle Park, NC

12:05 PM–3:00 PM

Wiley Symposium

Environmental Justice in Birth Defects Research

(Joint with BDRP)

Chairpersons: Bevin E. Blake, US Environmental Protection Agency and Brandy Beverly, National Institute of Environmental Health Sciences

12:05 PM–12:30 PM

DNTS 48. Understanding the Impact of the Environment on Maternal Health Outcomes and Disparities: Introduction and Future Directions
Brandy Beverly, National Institute of Environmental Health Sciences

- 12:30 PM–1:00 PM** **DNTS 49. Health Disparities in Pregnancy and Postpartum Care During Public Health Emergencies**
Sonja A. Rasmussen, University of Florida
- 1:00 PM–1:30 PM** **DNTS 50. Developmental Lead Exposure, Brain and Behavioral Outcomes: A Forty-Year Prospective Study**
Kim Dietrich, The University of Cincinnati College of Medicine
- 1:30 PM–2:00 PM** **Warkany Tea**
- 2:00 PM–2:30 PM** **DNTS 51. Race Differences in Phthalate Exposure and Consequent Risk of Preterm Birth: Findings from Sixteen US Cohorts**
Kelly K. Ferguson, Perinatal and Early Life Epidemiology Group, NIEHS
- 2:30 PM–3:00 PM** **Discussion**
- 3:00 PM–3:10 PM** **Break**
- 3:10 PM – 4:20 PM** **DNTS Platform Session**
- 3:10 PM—3:25 PM** **DNTS 52. Association of Prenatal Acetaminophen Exposure with Attention at 2 and 3 Years**
Woodbury M^{1,2,3}, Geiger S^{2,4}, Schantz S^{2,5}
¹Neuroscience Program, University of Illinois Urbana-Champaign, Urbana, IL, ²Beckman Institute for Advanced Science and Technology, University of Illinois Urbana-Champaign, Urbana, IL, ³PROTECT Center, College of Engineering, Northeastern University, Boston, MA, ⁴Department of Kinesiology and Community Health, University of Illinois Urbana-Champaign, Urbana, IL, ⁵Department of Comparative Biosciences, University of Illinois Urbana-Champaign, Urbana, IL
- 3:25 PM—3:40 PM** **DNTS 53. Transgenerational Transmission of Aspartame Induced Anxiety-Like Behavior and Amygdala GABA-A Receptor Signaling Mechanisms**
Jones S, McCarthy D, Vied C, Bhide P
Florida State University, Tallahassee, FL
- 3:40 PM—3:55 PM** **DNTS 54. Polymorphisms in Choline Metabolism Genes Predict Severity of Fetal Alcohol-Related Memory Deficits in Two South African Birth Cohorts**
Carter RC¹, Di Narzo A², Zeisel S³, Dodge N⁴, Meintjes E⁵, Molteno C⁵, Jacobson J^{4,5}, Jacobson S^{4,5}
¹Columbia University College of Physicians and Surgeons, New York, NY, ²Di Narzo Consulting, Krakow, Poland, ³University of North Carolina, Kannapolis, NC, ⁴Wayne State University School of Medicine, Detroit, MI, ⁵University of Cape Town Faculty of Health Sciences, Cape Town, South Africa

3:55 PM—4:10 PM

DNTS 55. Parental Preconception and Prenatal Chlorpyrifos Exposure Effects on the Offspring's Gene Expression and Epigenetic Regulations: An Avian Model

Rimawi I¹, Turgeman G², Avital-Cohen N³, Rozenboim I³, Yanai J¹

¹*Hebrew University Medical School, Ein Kerem, Israel.*

²*Ariel University, Ariel, Israel.* ³*Hebrew University of Jerusalem, Rehovot, Israel*

4:10 PM—4:20 PM

Discussion

4:20 PM – 4:30 PM

Break

4:30 PM—5:45 PM

DNTS Business Meeting

END OF DNTS MEETING 5:45 PM