



# Complex Exposures in Breast Cancer: Unraveling the Role of Environmental Mixtures

## A virtual workshop

Wednesday, August 24, and Thursday, August 25, 2022

FINAL AGENDA

### Day 1 – August 24, 2022 (all times EDT)

#### 10:00 a.m. Welcome and Opening Remarks

[Trevor Archer](#), Deputy Director, National Institute of Environmental Health Sciences (NIEHS)

Introduced by: [Alexandra White](#), Stadtman Investigator, Epidemiology Branch, NIEHS

[Katrina Goddard](#), Director, Division of Cancer Control and Population Sciences, National Cancer Institute (NCI)

Introduced by: [Gary Ellison](#), Branch Chief, Environmental Epidemiology Branch, NCI

#### 10:20 a.m. Overview of Environmental Mixtures and Breast Cancer

Moderator: [Alexandra White](#), Stadtman Investigator, Epidemiology Branch, NIEHS

10:20 a.m. [Breast Cancer and Primary Prevention](#)

[Mhel Kavanaugh Lynch](#), Director, California Breast Cancer Research Program

10:45 a.m. [It Takes a Village – Using Toxicology and Exposure Science to Select Exposures Relevant to Breast Cancer](#)

[Ruthann Rudel](#), Director of Research, Silent Spring Institute

11:10 a.m. [Mixtures Toxicology: Lessons Learned from Adding Chemicals](#)

[Cynthia Rider](#), Toxicologist, National Toxicology Program, NIEHS

#### 11:35 a.m. Lunch

#### 12:15 p.m. Session 1: Setting the Stage for Mixture Exposure Assessment

Moderator: [Danielle Carlin](#), Health Science Administrator, NIEHS

12:15 p.m. [Studying Environmental Contributors to Breast Cancer in Prospective Cohort Studies: Opportunities and Challenges](#)

[Dale Sandler](#), Chief, Epidemiology Branch, NIEHS

12:40 p.m. [Mixtures; They are Everywhere](#)

[Tracey Woodruff](#), Alison S. Carlson Endowed Professor, Department of Obstetrics, Gynecology, and Reproductive Sciences, and Director, Reproductive Health and the Environment Program, University of California, San Francisco

1:05 p.m. [Leveraging GIS and Data Linkages for Assessment of Environmental Mixtures](#)

[Rena Jones](#), Investigator, Occupational and Environmental Epidemiology Branch, Division of Cancer Epidemiology and Genetics, NCI

#### 1:30 p.m. Break

#### 1:45 p.m. Session 2: Novel Methods in Analysis of Exposure Mixtures

Moderator: [Cynthia Rider](#), Toxicologist, Toxicology Branch, NIEHS

1:45 p.m. [Recent Advances in Methods to Assess Health Effects of Environmental Mixtures](#)

[Marianthi-Anna Kioumourtoglou](#), Associate Professor, Department of Environmental Health Sciences, Columbia University

- 2:10 p.m. [Statistical Approaches - New Method for High Dimensional Data or Limit of Detection issues](#)  
[Alex Keil](#), Stadtman Investigator, Occupational and Environmental Epidemiology Branch, Division of Cancer Epidemiology and Genetics, NCI
- 2:35 p.m. [Environmental Risk Score: A Tool for Integrating the Joint Effects of Chemical Mixtures and Exposome](#)  
[Sung Kyun Park](#), Associate Professor of Epidemiology and Environmental Health Sciences, University of Michigan School of Public Health
- 3:00 p.m. Session 3: Case studies of Environmental Mixtures in Relation to Cancer Outcomes**  
Moderator: [Curt Dellavalle](#), Program Director, Epidemiology and Genomics Research Program, Epidemiology Branch, NCI
- 3:00 p.m. [Exposure to Multiple Chemical-Environmental Contaminants and Breast Cancer: The Situation in North Mexico](#)  
[Lizbeth López-Carrillo](#), Public Health Researcher, The Pacific Basin Consortium for Environment and Health
- 3:25 p.m. [Outdoor Air Pollution Mixtures, Breast Tissue Characteristics and Breast Cancer Risk](#)  
[Alexandra White](#), Stadtman Investigator, Epidemiology Branch, NIEHS
- 3:50 p.m. [Structural and Social Determinants of Health and Prostate Cancer](#)  
[Scarlett Lin Gomez](#), Professor and Vice Chair for Faculty Development, Department of Epidemiology and Biostatistics, University of California, San Francisco
- 4:15 p.m. End of Day Wrap up Discussion**  
[Kelly Chandler](#), Health Science Policy Analyst, Office of Research on Women's Health, National Institutes of Health
- 4:30 p.m. Adjournment**

## Day 2 – August 25, 2022

- 10:00 a.m. Welcome and Opening Remarks**  
[Linda Birnbaum](#), Scientist Emeritus and Former Director, National Toxicology Program, NIEHS and Scholar in Residence, Duke University  
Introduced by: [Brittany Trottier](#), Health Specialist, NIEHS
- 10:10 a.m. Session 4: Novel Methodologies to Understand the Mechanisms of Breast Cancer**  
Moderator: [Tram Kim Lam](#), Program Director, Epidemiology and Genomics Research Program, NCI
- 10:10 a.m. [Cell-to-Society Models for Breast Health Equity](#)  
[Melissa Troester](#), Director, UNC Center for Environmental Health and Susceptibility, University of North Carolina, Chapel Hill (UNC-CH)
- 10:35 a.m. [PFAS Exposure in 3D Breast Tumor Models: Does Exposure Time, Oxygen Tension, and Tissue Type Matter?](#)  
[Matt Lockett](#), Associate Professor, Department of Chemistry, UNC-CH
- 11:00 a.m. [Chemicals and Breast Cancer Risk: Need Better Animal Models or Better Strategies?](#)  
[Sue Fenton](#), Senior Scientist, National Toxicology Program, NIEHS
- 11:25 a.m. Break**
- 11:40 a.m. Session 5: Big Data Science Approaches and Challenges**  
Moderator: [Abee Boyles](#), Health Scientist Administrator, Population Health Branch, NIEHS
- 11:40 a.m. [Establishing a High-Resolution Mass Spectrometry Framework for the Cancer Exposome Atlas](#)  
[Doug Walker](#), Associate Professor, Gangarosa Department of Environmental Health, Emory University
- 12:05 p.m. [Data Science Approaches to Identify Drivers of Human Disease Amongst the Expanding Exposome](#)  
[Julia Rager](#), Assistant Professor, Department of Environmental Sciences and Engineering, UNC-CH
- 12:30 p.m. [Using Silicone Wristbands to Monitor Personal Exposure to Environmental Mixtures: How do they Compare to Blood and Urine?](#)  
[Heather Stapleton](#), Ronie-Richelle Garcia-Johnson Distinguished Professor, Nicholas School of the Environment, Duke University

**12:55 p.m. Lunch and Trainee Lightning Talks (6 minutes each)**

Moderator: [Danielle Carlin](#), Health Science Administrator, NIEHS

- 12:55 p.m. Hormone Receptor Bioactivities of Complex Mixtures of Known and Suspect Chemicals in Silicone Wristband Samplers worn by Office Workers  
[Anna Young](#), Research Associate, Department of Environmental Health, Harvard Chan School of Public Health
- 1:01 p.m. Environmental Mixtures and Breast Cancer: Identifying Co-Exposure Patterns between Understudied vs Breast Cancer-associated Chemicals Using Chemical Inventory Informatics  
[Lauren Koval](#), Ph.D. Student, Department of Environmental Sciences and Engineering, UNC-CH
- 1:07 p.m. Group Inverse- Gamma Gamma Shrinkage for Sparse Regression with Application to Correlated Environmental Exposure Data  
[Jonathan Boss](#), Ph.D. Candidate, Department of Biostatistics, University of Michigan
- 1:13 p.m. Exposure to Carcinogen Industrial Air Emmison Mixtures and Breast Cancer Incidence in the United States  
[Jennifer Ish](#), Postdoctoral Fellow, Environment and Cancer Group, Epidemiology Branch, NIEHS
- 1:19 p.m. Personal Care Product Mixtures and Breast Cancer Risk  
[Che-Jung \(Rong\) Chang](#), Postdoctoral Fellow, Epidemiology Branch, NIEHS
- 1:25 p.m. Breast Cancer Molecular Subtypes and Supervised Analysis of Urinary Metal Mixtures in Mexican Women  
[Ángel Mérida-Ortega](#), Epidemiologist, Mexico National Institute of Public Health

**1:35 p.m. Breakout Group Discussions**

Instructions Provided to Breakout Groups: Danielle Carlin

Breakout Group #1: Methods for Data Management and Analysis and Tools

Moderators: [Alison Motsinger Reif](#), Chief and Principal Investigator, Biostatistics and Computational Biology Branch, National Institute of Environmental Health Sciences

[Marianthi-Anna Kioumourtoglou](#), Associate Professor, Department of Environmental Health Sciences, Columbia University

Breakout Group #2: Methods for Analysis of Biomarkers and in vitro/in vivo Studies

Moderators: [Sue Fenton](#), Senior Scientist, National Toxicology Program, NIEHS

[Heather Stapleton](#), Ronie-Richelle Garcia-Johnson Distinguished Professor, Nicholas School of the Environment, Duke University

Breakout Group #3: Bringing Cohorts and their Data/Health Point Information Together

Moderators: [Alexandra White](#), Stadtman Investigator, Epidemiology Branch, NIEHS

[Mary Beth Terry](#), Professor, Epidemiology in Environmental Health Sciences, Columbia University

Breakout Group #4: Research Translation, Communication, and Prevention/Intervention

Moderators: [Abee Boyles](#), Health Scientist Administrator, Population Health Branch, NIEHS

[Julia Brody](#), Executive Director and Senior Scientist, Silent Spring Institute

Questions for Breakout Groups:

- What are the challenges associated with your group's topic?
- What do you see as the low hanging fruit? What can be addressed sooner rather than later?
- Where do we need to place resources on your topic to move research on breast cancer and mixtures forward (i.e., priority setting)?
- What are the perceived limitations, that if alleviated, would move field forward?
- How do we promote translation of research findings (e.g., to other fields of science, to policy makers, to interventions, to move from bench to practice)?
- What are other examples (or good case studies) from other fields that we can use to apply to this field/topic?
- How should we better integrate experts on basic science, data science, exposome, and epidemiology to address complex questions?

**2:35 p.m. Break**

**2:45 p.m. Report back from break out groups**

Moderator: [Curt Dellavalle](#), Program Director, Epidemiology and Genomics Research Program, Epidemiology Branch, NCI

**3:45 p.m. Session 6: Next steps: Health Disparities, Policy, and Prevention**

Moderator: [Brittany Trottier](#), Health Specialist, NIEHS

3:45 p.m. [Environmental Mixtures and Breast Cancer Disparities](#)

[Justin Colacino](#), Associate Professor, Department of Environmental Health Sciences, University of Michigan

4:10 p.m. [From Research to Regulation: Mammary Gland Evaluation in EU Research Project FREIA and in OECD](#)

[Sofie Christiansen](#), Senior Researcher, National Food Institute, Technical University of Denmark

4:35 p.m. [Identifying Communities Burdened by Environmental Health Disparities](#)

[Vince Cogliano](#), Deputy Director, Division of Scientific Programs, Office of Environmental Health Hazard Assessment, California Environmental Protection Agency

**5:00 p.m. Workshop Wrap-up**

[Alexandra White](#), Stadtman Investigator, Epidemiology Branch, NIEHS

**5:15 p.m. Adjournment**