



# EMERGING SCIENCE FOR ENVIRONMENTAL HEALTH DECISIONS

## AGENDA

### Integrating the Science of Aging and Environmental Health Research

JUNE 9-10, 2020

THE NATIONAL ACADEMIES OF SCIENCES, ENGINEERING, AND MEDICINE

ALL TIMES LISTED ARE EASTERN DAYLIGHT TIME

A VIRTUAL WORKSHOP

**WITH THE GLOBAL POPULATION** living longer—the number of people worldwide aged 80 years or over is projected to triple by 2050—understanding the factors that influence healthy aging throughout our lifetimes is critical for protecting public health. Scientists have long known that environment plays an important role in aging: for example, research has shown that human exposure to environmental pollutants can exacerbate age-related diseases, such as Alzheimer's and Parkinson's. However, many questions remain about the mechanisms through which environmental stressors influence aging, longevity, and the etiology of age-related disease. How do environmental pollutants, such as

airborne particulate matter and pesticides, alter the biological processes that underlie human aging and longevity?

This workshop will explore emerging research at the intersection between aging, longevity, environmental exposures, and human health. Workshop speakers will detail emerging research findings through two lenses: (1) How environmental exposures influence or mediate aging; and (2) How aging influences environmentally-mediated health outcomes.

In addition to research opportunities, participants will also explore the translation and use of new data to inform decision-making.

**TUESDAY, JUNE 9, 10:00 AM–3:45 PM**

10:00 Welcome and Opening Remarks

- **Keegan Sawyer**, National Academies of Sciences, Engineering, and Medicine (NASEM)
- **Andrea Hodgson**, NASEM
- **Emma Alme**, NASEM Policy Fellow
- **Michelle Heacock**, National Institute of Environmental Health Sciences (NIEHS)

10:15 Environmental determinants of aging—why not measure everything?—**Gary Miller**<sup>§</sup>, Columbia University

10:25 Integration of the Science of Aging with Environmental Health Research Through the Perspective of Biomarkers—**Luigi Ferrucci**, National Institute of Aging (NIA)

10:45 Contributions of Toxicants to the Development of Age-Related Diseases—**Julie Andersen**, Buck Institute

11:05 *Break*

#### SESSION 1 EMERGING TRENDS AND TOOLS IN BIOLOGICAL AGING RESEARCH

11:20 Key molecular pathways of aging—**Rafael de Cabo**, Intramural Research Programs, National Institutes of Health (NIH)

11:35 Single cell analytical techniques in aging research—**Murat Acar**<sup>§</sup>, Yale University

*(continued)*

<sup>§</sup> Member of the workshop Organizing Committee for Integrating the Science of Aging and Environmental Health Research.

<sup>†</sup> Member of the Standing Committee on the Use of Emerging Science for Environmental Health Decisions.

## TUESDAY, JUNE 9 (CONTINUED)

- 11:50 *Break for lunch*
- 12:20 Ageotypes: molecular pathways of aging in people—**Michael Snyder**, Stanford University
- 12:35 Leveraging Omics profiling to estimate biological age—**Nathan Price**, Institute for Systems Biology (ISB)
- 12:50 Panel Discussion: Exploring Potential Connections between Biological Age and Exposures  
**Moderator: Donna L. Mendrick**<sup>§</sup>, U.S. Food and Drug Administration (FDA)
- **Luigi Ferrucci**, NIA
  - **Julie Andersen**, Buck Institute
  - **Andrew Geller**, U.S. Environmental Protection Agency (EPA)
  - **Nathan Price**, ISB
- 1:20 *Break*

### SESSION 2 EXPLORING EMERGING AREAS OF INTEGRATION-EXPOSURES AND AGING PROCESS

- 1:35 Integrating exposure science and development of age-related neurodegenerative disease in molecular and population research—**Caleb Finch**, University of Southern California (USC)

#### Air Pollution Exposures

- 1:50 Particle exposures and aging biomarkers: findings from the VA normative aging study—**Jamaji Nwanaji-Enwerem**, Harvard University
- 2:05 Air pollution and the development of cardiovascular disease: the MESA Air project—**Joel Kaufman**, University of Washington

#### Integrating Exposure and Other Stressors

- 2:20 Racial disparities in cardiometabolic risk with age—**Uchechi Mitchell**, University of Illinois at Chicago

- 2:35 Maternal stress, particle matter exposure, and development—**Rosalind Wright**, Mount Sinai

- 2:50 *Break*

- 3:05 Panel Discussion

- Moderator: Jiu-Chiuan (JC) Chen**<sup>§</sup>, USC
- **Jamaji Nwanaji-Enwerem**, Harvard University

<sup>§</sup> Member of the workshop Organizing Committee for Integrating the Science of Aging and Environmental Health Research.

<sup>†</sup> Member of the Standing Committee on the Use of Emerging Science for Environmental Health Decisions.

- **Rosalind Wright**, Mount Sinai
  - **Heather Strosnider**, Centers for Disease Control and Prevention
  - **Caleb Finch**, USC
- 3:35 Day 1 Closing Remarks—**Mary Ann Ottinger**<sup>§</sup>, University of Houston
- 3:45 *Adjourn*

## WEDNESDAY, JUNE 10, 10:00 AM–2:00 PM

#### Chemical Exposures

- 10:00 Day 2 Welcome—**Gary Miller**, Columbia University

- 10:05 Pesticides and the development of neurodegenerative disorders—**Beate Ritz**, University of California, Los Angeles (UCLA)

- 10:20 The influence of chemical exposures on development—**John Meeker**, University of Michigan

#### Heavy Metal Exposures

- 10:35 The effects of arsenic toxicity on telomeres—**Brandon Pierce**, University of Chicago

- 10:50 The epigenetic impact of prenatal heavy metal exposure—**Andres Cardenas**, University of California, Berkeley

- 11:05 Panel Discussion

- Moderator: Kristen Malecki**<sup>§</sup>, University of Wisconsin-Madison

- **Beate Ritz**, UCLA
- **Emma Lavoie**, U.S. EPA
- **John Meeker**, University of Michigan
- **Suzanne Fitzpatrick**, U.S. FDA

- 11:35 *Break for lunch*

### SESSION 3 CONSIDERATIONS FOR DECISION-MAKING (CONCURRENT BREAKOUT BRAINSTORMING SESSIONS)

- 12:05 Overview of breakout session—**Katherine A. James**, University of Colorado-Anschutz Medical Campus

- 12:15 Breakout Session

#### Group A – Critical Research Priorities to Advance the Science

- **Jennifer Przybyla**, Agency for Toxic Substances and Disease Registry
- **Jean Harry**, NIEHS
- **Gina Solomon**<sup>†</sup>, University of California, San Francisco (UCSF)
- **Andrew Geller**, U.S. EPA

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## WEDNESDAY, JUNE 10 (CONTINUED)

### Group A – Critical Research Priorities to Advance the Science (continued)

- **Mary Ann Ottinger**<sup>§</sup>, University of Houston
- **Joel Kaufman**, University of Washington

### Group B – Critical Translational Priorities to Inform Decision-making

- **Sandra Howard**, U.S. Department of Health and Human Services
- **Emma Lavoie**, U.S. EPA
- **Rafael de Cabo**, Intramural Research Programs, NIH
- **John Vandenberg**, U.S. EPA
- **Mark Miller**, California Environmental Protection Agency
- **Gary Ginsberg**<sup>†</sup>, New York State Department of Health

1:00 Panel Discussion

**Moderator: Katherine A. James**<sup>§</sup>, University of Colorado-Anschutz Medical Campus

- **Kristi Pullen Fedinick**<sup>†</sup>, Natural Resources Defense Council
- **Sandra Howard**, U.S. Department of Health and Human Services
- **John Vandenberg**, U.S. EPA
- **Luigi Ferrucci**, NIA
- **Joel Kaufman**, University of Washington

1:45 Closing Remarks—**Kristen Malecki**<sup>§</sup>, University of Wisconsin-Madison

2:00 **Adjourn Workshop\***

\* The Use of Emerging Science for Environmental Health Decisions Committee Business Meeting is from 2:20-3:00pm. This meeting is open to committee members, government liaisons, and workshop participants.

<sup>§</sup> Member of the workshop Organizing Committee for Integrating the Science of Aging and Environmental Health Research.

<sup>†</sup> Member of the Standing Committee on the Use of Emerging Science for Environmental Health Decisions.

### Workshop Organizing Committee

This workshop was organized by the following experts: **Murat Acar**, Yale University; **Jiu-Chiuan (JC) Chen**, Keck School of Medicine of USC; **Katherine A. James**, University of Colorado-Anschutz Medical Campus; **Kristen Malecki**, University of Wisconsin-Madison; **Donna L. Mendrick**, National Center for Toxicology Research, U.S. FDA; **Gary Miller**<sup>†</sup>, Columbia University; **Mary Ann Ottinger**, University of Houston

### About the Use of Emerging Science for Environmental Health Decisions

The National Academies' Standing Committee on the Use of Emerging Science for Environmental Health Decisions (ESEHD) examines and discusses issues on the use of new science, tools, and research methodologies for environmental health decisions. The ESEHD committee is organized under the auspices of Board on Life Sciences and the Board on Environmental Studies and Toxicology of the National Academies of Sciences, Engineering, and Medicine, and sponsored by the National Institute of Environmental Health Sciences.

