NATIONAL ACADEMIES Sciences Engineering Medicine

BOARD ON ENVIRONMENTAL STUDIES AND TOXICOLOGY

# Workshops to Support EPA's Development of Human Health Assessments: Artificial Intelligence and Open Data Practices in Chemical Hazard Assessment

CLICK HERE TO JOIN

**Meeting ID**
160 161 3224
**Passcode**
230124

**Phone Only**
+1 669 254 5252
+1 669 216 1590
+1 551 285 1373
+1 646 828 7666
833 568 8864

International numbers available: https://nas-sec.zoomgov.com/u/abP0IGcYoa

## WEDNESDAY, MAY 25, 2022 (all times listed in ET)

### Overview

- Practical application of systematic review (SR) methods to the peer-reviewed literature and other data sources for chemical hazard identification is labor intensive and costly. Advances in artificial intelligence hold promise to ease those constraints through semi-automation of SR workflows. Computational approaches have been advanced to interrogate, retrieve, screen, organize, and extract information from published and publicly available data sources. However, study methods and findings reported in the literature are often recorded using highly variable natural language, which can obscure concepts and relationships needed for information retrieval and interpretation. Other limitations include the lack of high-quality training, test, and validation data. This workshop will explore opportunities for using AI methods to enhance chemical hazard assessments and address the associated challenges.
- At the request of the Environmental Protection Agency, the National Academies of Sciences, Engineering, and Medicine are convening a two-day virtual workshop to address these key questions:
  - What are the new advances in AI and Open Data Practices that open avenues for their application in Chemical Hazard Assessment?
  - What are the key practical hurdles for applying systematic methods, especially with respect to data extraction, and what computational tools and methods have been developed to address them?
  - What are the advantages and limitations of applying AI solutions for chemical hazard assessment and review?
  - What are the key opportunities for furthering application of AI in chemical hazard assessment?

### 11:00–11:30 Welcome and Introductions

**Kaley Beins**, National Academies Responsible Staff Officer
**Elaine Faustman**, Committee Chair
**Kristina Thayer**, U.S. EPA Sponsor

### 11:30–12:55 Session I. AI and Data Science Applications: Promises and Prospects

**Daniel Ho**, Stanford University
*AI Innovation in Federal Government*

**Christopher Mungall**, Lawrence Berkeley National Laboratory
*Ontologies and Knowledge Graphs in Chemical Hazard Assessment*

**Nicole Kleinstreuer**, National Institute of Environmental Health Sciences
*Intelligence Augmentation in Computational Toxicology*

#### Panel Discussion

Committee Moderator: **Chirag Patel**
Panelists: Session I Presenters

**Public Q&A**

**BREAK**

**1:10–2:45** **Session II. Addressing Challenges for Applying Systematic Review Methods Using AI**

**Malcolm Macleod**, The University of Edinburgh
*Automation of Systematic Reviews: Challenges, Adoption Criteria, and Opportunities*

**Rens van de Schoot**, Utrecht University
*Saving Time and Sanity: Active Learning for Accelerating the Screening Phase*

**Panel Discussion**

Committee Moderator: **Scott Auerbach**
Panelists: Session II Presenters
**Karen A. Robinson**, Johns Hopkins University
**Olwenn Martin**, University College London

**Public Q&A**

**BREAK**

**3:15–4:45** **Session III. Optimizing Data Extraction for Evidence Synthesis and High Level Decision-Making**

**Weida Tong**, U.S. Food and Drug Administration
*AI Approaches Alternative to Animal Studies*

**Jason Fries**, Stanford University

**Daniel Sanders**, IBM

**Marianthi-Anna Kioumourtzoglou**, Columbia University

**Panel Discussion**

Committee Moderator: **Byron Wallace**
Panelists: Session III Presenters

**BREAK**

**5:00–6:00** **Session IV. Poster Presentations and Virtual Networking**

The poster session and virtual networking will be held via the ePosterboards platform. This session is separate from the Zoom webinar used for the other sessions. To make an account and access the poster presentations and virtual networking, please visit https://events.eposterboards.com/e/nasem-ai/register.

**END OF DAY 1**

CLICK HERE TO JOIN

**Meeting ID**
160 161 3224

**Passcode**
230124

**Phone Only**
+1 669 254 5252
+1 669 216 1590
+1 551 285 1373
+1 646 828 7666
833 568 8864

International numbers available: https://nas-sec.zoomgov.com/u/abP0IGcYoa

## THURSDAY, MAY 26, 2022 (all times listed in ET)

**11:00–11:05** **Welcome**
**Elaine Faustman**, Committee Chair

**11:05–12:45** **Session VA. Using AI Tools and Resources in Systematic Review**

**Overview**
**Andrew Rooney**, National Institute of Environmental Health Sciences
*Unique considerations for development and application of AI in chemical hazard assessment*

**Information extraction tools and ontology resources**
**Vickie Walker**, National Institute of Environmental Health Sciences
*Dextr: A Semi-Automated Web-based Data Extraction Tool*

**Brian Howard**, Sciome
*Towards Automating Information Extraction with FIDDLE 2.0: From Text Annotation to Interoperable Information Extraction via Machine Learning*

**Nancy Baker**, Leidos
*Abstract Sifter*

**Karen Ross**, Georgetown University
*Text Mining, Ontologies, and Semantic Knowledge Graphs for Systems Analysis*

**Mark Musen**, Stanford University

**Panel Discussion**
Committee Moderator
Panelists: Session VA Presenters
**Julie McMurry**, University of Colorado School of Medicine

**BREAK**

**1:00-2:15** **Session VB. Systematic Review Tools**
**Ryan Jones**, U.S. EPA
*HERO: Health and Environmental Research Online (Database System)*

**Sean Watford**, U.S. EPA
*Health Assessment Workspace Collaborative (HAWC)*

**Derek Lord**, Evidence Partners
*DistillerSR*

**Eitan Agai**, PICOPortal
*PICOPortal: Accelerating Systematic Reviews*

**Artur Nowak**, Evidence Prime
*Laser AI: tool for living systematic reviews*

**Iain Marshall**, King's College London
*RobotReviewer: Automating evidence synthesis*

**Panel Discussion**
Committee Moderator: **Joyce Tsuji**
Panelists: Session VB Presenters

**BREAK**

**2:30–3:30** **Session VI. Ensuring Rigor and Reproducibility in AI Applications**

**Marzyeh Ghassemi**, Massachusetts Institute of Technology

**Aarti Singh**, Carnegie Mellon University

**John Absher,** Squarespace

**Panel Discussion**
Committee Moderator: **David Reif**
Panelists:
Session VI Presenters

**BREAK**

**3:45–4:45** **Session VII. Poster Presentations and Virtual Networking**

The poster session and virtual networking will be held via the ePosterboards platform. This session is separate from the Zoom webinar used for the other sessions. To make an account and access the poster presentations and virtual networking, please visit https://events.eposterboards.com/e/nasem-ai/register.

**BREAK**

**5:00–6:00** **Session VIII. Workshop Summary**

Session Summaries

- AI and Data Science Applications: Promises and Prospects
  - **Elaine Faustman**
- Addressing Challenges for Applying Systematic Review Methods Using AI
  - **Scott Auerbach**
- Optimizing Data Extraction for Evidence Synthesis and High-Level Decision-Making
  - **Byron Wallace**
- Ensuring Rigor and Reproducibility in AI Applications
  - **David Reif**

**Panel Discussion**
Committee Moderator: **Elaine Faustman**
Panelists: Committee Members

**Workshop Conclusion**
**Elaine Faustman**, Committee Chair

**MEETING ADJOURNS**