

A Roadmap for AI-Enabled Human and Environmental Health Protection

A Generative Conference Convened by
The Health and Environmental Sciences Institute (HESI)

June 4–5, 2025

Day 1: June 4, 2025

8:00 AM – 9:00 AM **Registration and Coffee**

Welcome

Welcome and Meeting Goals

Speaker: Dr. Cyril Pettit, HESI

9:00 AM – 9:15 AM

Goal: Input from the audience, panelists, and speakers will be used to generate a roadmap advancing the use of AI/ML in protecting human and ecosystem health by the end of the meeting!

Setting the Stage

How might AI serve to catalyze more effective approaches to integrate data from molecules to environments to protect human and environmental health protection?

9:15 AM – 10:05 AM

Keynote: Setting the Stage

Speaker: TBA

Session 1: Molecular Initiating Events and Cellular Responses – Tackling challenges to understanding complex toxicity and exposure pathways with novel computational and AI methods

Moderator: Carole Yauk, University of Ottawa

Format: Case Studies, Panel, Audience Q&A with Virtual Polling

10:05 AM – 11:00 AM

Session Keynote: AI as a Tool to Support New Approaches in Human and Environmental Safety Assessment

Speaker: Dr. Nicole Kleinstreuer, NIEHS

11:00 PM – 11:30 PM

Break

11:30 AM – 11:45 AM

AI-enabled PBPK Models for Environmental Chemicals for Safety Assessment

Speaker: Dr. Zhoumeng Lin, PHHP

11:45 AM – 12:00 PM

Opportunities for AI to Enhance Species Extrapolation Capabilities

Speaker: Dr. Carlie LaLone, USEPA

12:00 PM – 12:15 PM

AI-optimized Ontologies as Mechanistic Roadmaps for in vitro Hazard Identification: Chemical-induced Human Hepatotoxicity as a Case Study

Speaker: Dr. Mattieu Vinken, Vrije Universiteit Brussel

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12:15 PM – 12:30 PM **Understanding MIEs and Cellular Responses for Novel Therapeutics and ToxGen**
Speaker: Dr. Zhichao Liu, Boehringer-Ingelheim

Panel Discussion

12:30 PM – 1:00 PM The panel will explore how these case studies could be harnessed for additional contexts of use and/or further strengthened with greater integration of AI approaches.

1:00 PM – 2:00 PM **Lunch & Networking**

Session 2: Understanding Organism and Population Responses to Stressors – Potential for Expanding Study Design, Diversity of Exposure Scenarios, and Study Feasibility with Virtual Elements

Moderator: Nina Hallmark, Bayer

Format: Case Studies, Panel, Audience Q&A with Virtual Polling

2:00 PM – 2:15 PM **Quantitative Knowledge Activity Relationships (QKAR) for predicting safety**
Speaker: Dr. Dongling Li, NCTR FDA

2:15 PM – 2:30 PM **Virtual Control Groups, IHI VICT3R**
Speaker: Dr. Thomas Steger-Hartmann, Bayer AG

2:30 PM – 2:45 PM **Digital Heart**
Speaker: Dr. Steve Levine, Desso Systems

2:45 PM – 3:00 PM **Toxicodynamic Modeling**
Speaker: TBA

Panel Discussion

3:00 PM – 3:30 PM The panel will explore how these case studies could be harnessed for additional contexts of use and/or further strengthened with greater integration of AI approaches.

3:30 PM – 3:50 PM **Break**

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Session 3: Ecosystem and One-Health (Human, Ecological, & Environmental) Protection and Prediction – Can AI Help Us with Global Scale Health Protection?

Moderator: Gary Minsavage, Exxon

Format: Case Studies, Panel, Audience Q&A with Virtual Polling

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| 3:50 PM - 4:05 PM | AI Models to Tackle One-Health Challenges at the Global Level
<i>Speaker: Dr. Lauren Charles, PNNL</i> |
| 4:05 PM – 4:20 PM | Flood Prediction – The Role of AI and Data Sourcing for Environmental Prediction
<i>Speaker: Victora Baxter, Google</i> |
| 4:20 PM – 4:35 PM | Smart Biodiversity Inventorying
<i>Speaker: Dr. Levente Klein or Dr. Campbell Watson, IBM</i> |
| 4:35 PM – 4:50 PM | AI and landscape Modeling in Agricultural Chemical Safety
<i>Speaker: Dr. Julian Heinrich, Bayer</i> |
| 4:50 PM – 5:20 PM | Panel Discussion
The panel will explore how these case studies could be harnessed for additional contexts of use and/or further strengthened with greater integration of AI approaches. |

Audience Engagement Session

Moderator: HESI Staff

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| 5:20 PM – 5:45 PM | All audience members will be asked to participate in a live polling and engagement session. Feedback from the questions above and the text transcript of the sessions earlier in the day will be fed into an AI tool and asked to develop an initial roadmap for advancing AI and Human/Environmental health. |
| 5:45 PM – 7:45 PM | Evening Reception and Poster Session |

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Day 2: June 5, 2025

8:00 AM – 9:00 AM

Coffee and Networking

Welcome

9:00 AM – 9:45 AM

Keynote: Environmental Impacts of AI technology/deployment
Speaker: TBA

9:45 AM – 10:15 AM

Putting It Together: An Initial Look at the Roadmap Created on Day 1
Presenter: Dr. Justin Teegarden, PNNL
Presentation of initial draft 'roadmap' and key barriers/opportunities. The audience will have the opportunity for input and feedback.

Session 4: Exploring the Last Mile of Implementation: Legal, Ethical, Environmental

Moderator: Warren Casey, NIEHS

Format: Case Studies, Panel, Audience Q&A with Virtual Polling

10:15 AM – 10:45 AM

Building Best Practices for AI Data Equity
Speaker: Marcel D'Agostino, PAHO, WHO

10:45 AM – 11:10 AM

Driving Value through Actionable AI-Enabled Outputs: Digital Biomarkers and Assessing ROI for Collaborative Effort - Preclinical Digital In Vivo Alliance
Speaker: Dr. Brian Berridge, B2 Pathology Solutions LLC

11:10 AM – 11:40 AM

Regulatory Landscape for AI/ML for Drug and Chemical Safety
Speaker: Dr. Yasu Kanda, Japan NIHS

11:40 AM – 12:10 PM

The Evolving Ethics and Regulatory Landscape of Leveraging AI for Medicine and Clinical Research
Speaker: Dr. Vasiliki N. Rahimzadeh, BCM

12:10 AM – 12:40 PM

Ecology and AI
Speaker: Dr. Barbra Han, Cary Institute

12:40 PM – 1:45 PM

Lunch

Wrap-Up

1:45 PM – 2:45 PM

Revised Roadmap to Implementation
Roadmap presented to Audience and Panel Convenes to Discuss

2:45 PM – 3:00 PM

Final Remarks