

Collaboratively Envisioning AI and Ethics in Biomedical Research

Summary of NIH hosted Microlabs and Innovation Lab

2022

Collaboratively Envisioning AI and Ethics in Biomedical Research

The NIH is interested in bringing together a diverse cross-section of scientists, social scientists, ethicists, advocates, legal scholars, communicators, and artists interested in the social implications of technology to

- o **Forge new collaborations among these cross-disciplinary groups**
- o **Identify important areas of consideration at the intersection of artificial intelligence (AI) and machine learning (ML), biomedicine, and ethics.**
- o **Generate creative strategies to solve ethical dilemmas in biomedical AI/ML**

Collaboratively Envisioning AI and Ethics in Biomedical Research

Micro Lab #1

Dec 15th, 2021, 2-4pm ET

Who are the relevant stakeholders?

Micro Lab #2

Jan 12th, 2022, 2-4pm ET

What are the key opportunities, challenges, and themes?

Micro Lab #3

Jan 26th, 2022, 2-4pm ET

Organizing and understanding opportunity

Innovation Lab

March 14-18th, 10-5pm ET

A Data Ecosystems Approach to Ethical AI for Biomedical and Behavioral Research

Collaboratively Envisioning AI and Ethics in Biomedical Research

Micro Lab 1

December 15, 2021

Gathered a diverse group of stakeholders to map the current landscape of expertise needed to meaningfully engage in conversations at the intersection of biomedical research, AI/ML technologies, and ethics.

Micro Lab 2

January 12, 2022

Convened an expanded community from cross-disciplinary backgrounds to pose exciting, innovative, and far-reaching research questions and imagine the future opportunities and challenges of AI/ML ethics.

Micro Lab 3

January 26, 2022

Engaged participants to provide collaborative expertise, explore, and assess the opportunities and challenges presented as themes synthesized from previous community input.

Innovation Lab: A Data Ecosystems Approach to Ethical AI for Biomedical and Behavioral Research

March 14-18th, 2022

Provided an intensive, interactive, and idea-generating workshop designed to forge new collaborations among cross-disciplinary participants challenged to develop social and technical approaches to defining and implementing ethics across the AI data ecosystem.

ODSS received 600% more applications than could be accommodated.

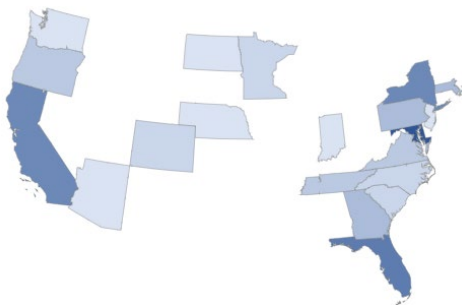
ML1: Who are the relevant stakeholders?

Accepted Attendees: 95

44% self-identified as under-represented, 19% from MSIs

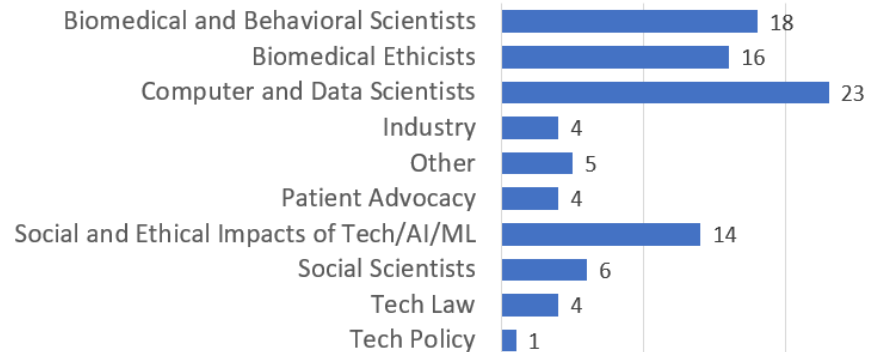
Geographical Representation:

Attendees



Hawaii - HI	2
Alaska - AK	2
Puerto Rico - PR	2
Guam - GU	1
International (Argentina, Belgium, Canada, France, Liberia, Nigeria, UAE, UK)	8

Expertise:



Activity: Territory Mapping

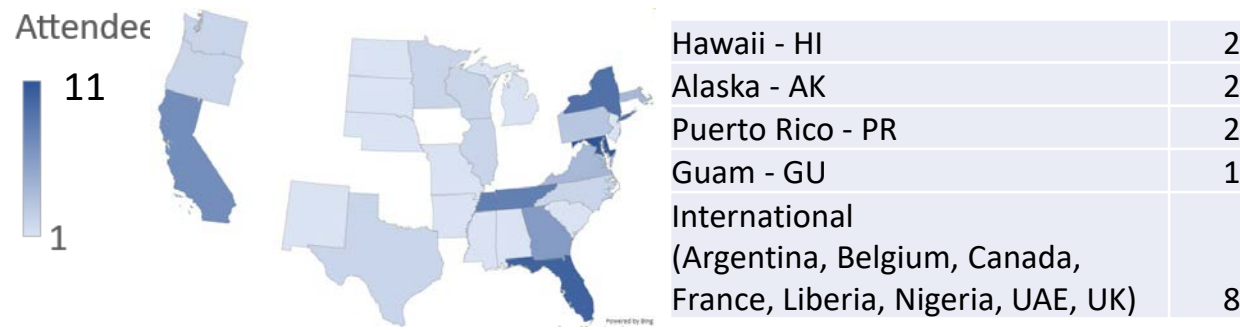


ML2: What are the key opportunities, challenges, and themes?

Accepted Attendees: 100

50% self-identified as under-represented, 16% from MSIs

Geographical Representation:



Expertise:



Activity: Question Wall

Question Wall

These are the questions that were thought of in small groups at Microlab 2.

207 items 2 unread

Towards a systems approach to ethics for the AI data ecosystem: 4 items

49 Room 11: We want someone to work on how to incorporate broad, societal implications into our thinking about research projects. For example, training a new AI is hugely expensive and energy-intensive. How do we think about the environmental impact versus the research benefit?

182 Room 14: How do we build a system in which we have more diversity of thought in AI design and deployment for health.

193 Room 1: How to get FAIR and trustable models?

Using intent for ethical AI: 2 items

154 Room 17: Gap: The regulatory system doesn't even let us think about larger ethical issues like overall conflict of interest in the system (designing own systems)--who is evaluating that?

201 Room 4- Should researchers retailor AI algorithms to external pressures?

Scaling ethics to multi-stakeholder AI: 6 items

19 Room 7: How can we incorporate perspectives and preferences of multiple stakeholders in complex decision making scenarios?

95 Group 1: What are successful strategies for engaging local community members in the ethics of AI?

129 Room 1: The subjectivity of the values that go into AI and research.

183 Room 1: How can we standardize data across treatment platforms?

Ubiquitous AI: 21 items

Participants from 2 rounds of 24 breakout rooms shared **264** questions and themes

ML3: Organizing and understanding opportunity

Activity: Deep dive breakout discussions

Towards a systems approach to ethics for the AI data ecosystem*

Robust assessment and control of AI products

Unifying the qualitative and quantitative for a more complete understanding of AI

Appropriately accounting for known determinants of health

Using intent for ethical AI

Learning from the Limits of AI

Creating ethical models when data are limited

Understanding what digital dignity means in the practice of AI

Scaling ethics to multi-stakeholder AI

Risk based approaches for mitigating social harm and enhancing social justice

AI as a tool for ethics research

Training for deep expertise, general competency, or the ability to translate

Ubiquitous AI

Cross walking disciplinary terminology and literacy

Understanding ethical considerations of Human-AI teaming in basic research

*So popular it was split into two breakouts

InnovationLab: A Data Ecosystems Approach to Ethical AI for Biomedical and Behavioral Research

**Developing social and technical approaches
to defining and implementing ethics
across the AI data ecosystem**

Creating a culture of ethical inquiry

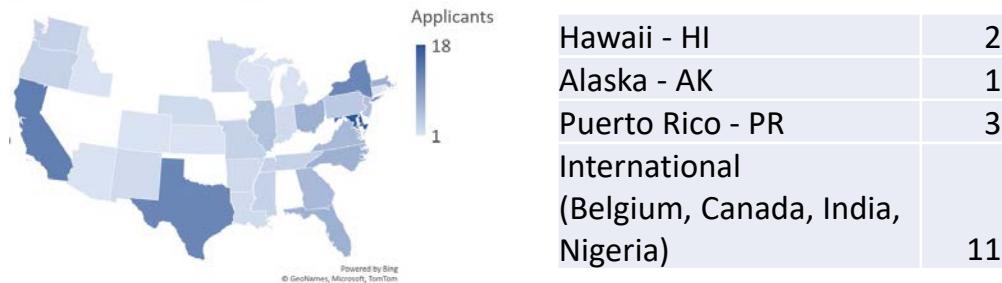
March 14-18, 2022 from 10:00 AM ET - 5 PM ET.
<https://apply.hub.ki/aiandethicsinnovationlab/>

Diversity of Innovation Lab Applicants and Attendees

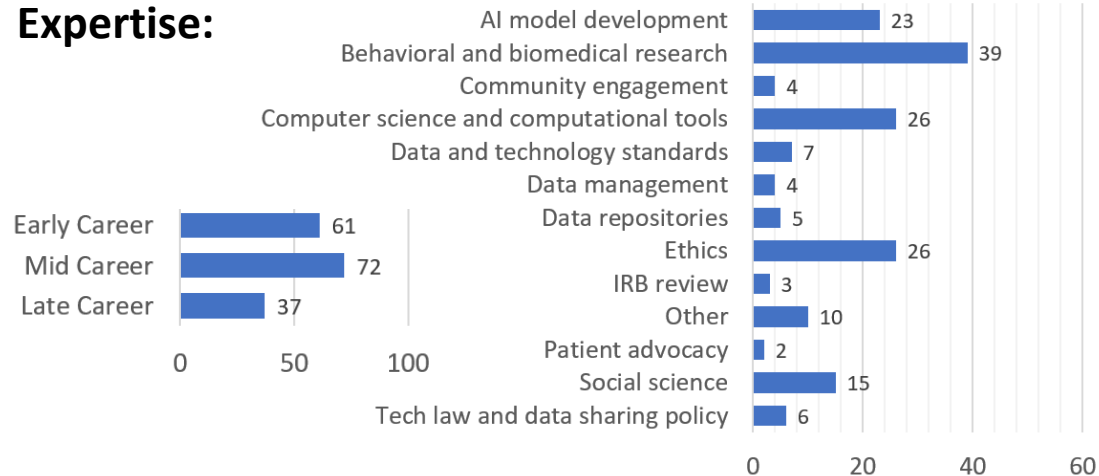
Applicants: 170

17% from MSIs. **21%** identify as a racial or ethnic group underrepresented in biomedical research.

Geographical Representation:



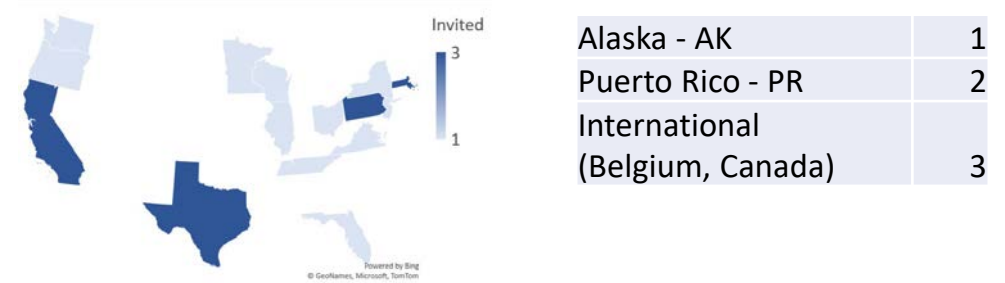
Expertise:



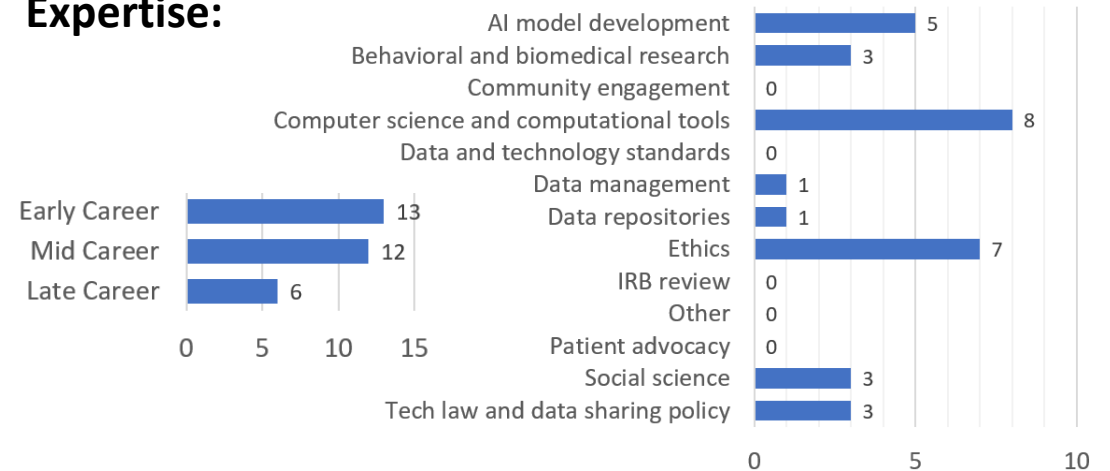
Invited: 31

16% from MSIs. **21%** identify as a racial or ethnic group underrepresented in biomedical research.

Geographical Representation:



Expertise:



Innovation Lab Subject Guides



Kristofer Bouchard

PI and Group Lead
Computational
Biosciences Group
Lawrence Berkeley
National Laboratory



Mildred Cho

Associate Director
Stanford Center for
Biomedical Ethics
Stanford University



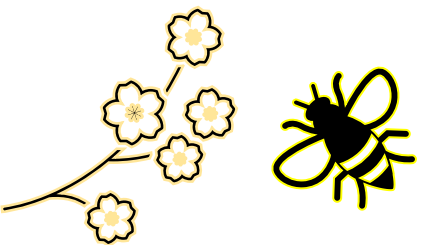
Beth Plale

Director
Data to Insight Center
University of Indiana



Katie Shilton

Associate Professor
and Lead
Ethics & Values in
Design (EViD) Lab
University of Maryland



A Data Ecosystems Approach

The social impact of AI depends on the context in which it's used. What types of knowledge are needed to apply AI ethically?



Does the connectivity of the ecosystem create its own ethical challenge?

Physicians create data and metadata for AI. What ethics apply to their role in data science?

What does beneficence mean for a search engine?
To whom is the developer responsible?

What does beneficence mean for a data repository?
What are potential harms?

Innovation Lab Agenda

- **Day 1**
 - Getting to know everyone and exploring the call
 - Gathered 228 Research Questions
- **Day 2**
 - Explore knowledge gaps and opportunities
 - Bumble Bee Provocation Panel
 - Gathered 128 WIGBIS: “Wouldn't it be great if we could (an aspirational challenge) by (a novel approach)?
 - The top 7 “Spiciest” WIGBIs were stewarded through presentations
- **Day 3**
 - Explore and steward projects in service to the group
 - An additional 5 ideas were stewarded
 - New groups stewarded 6 more ideas (5 NIH/BB)
 - Groups picked ideas that emerged during stewarding and drafted their first round of pitches
- **Day 4**
 - Teams refine and present projects
 - Teams incorporated feedback from their peers
 - Teams met 1:1 with the Subject Guide Panel to ask questions and gather feedback
- **Day 5**
 - Teams make final presentations

Innovation Lab: Key Emergent Themes

- The need for and challenges associated with drafting an NIH framework for ethical AI/ML in biomedical/behavioral research.
- The need for and challenges of gathering and honoring input from community groups contributing to or affected by biomedical/behavioral research.
- The value of risk management and mitigation approaches for addressing ethical challenges.
- The need for novel governance structures to define and uphold ethical principles across the data ecosystem.
- The value of social research, namely ethnographic methods, to discover, uncover, and define the AI-data ecosystem supporting biomedical/behavioral research through studies of the behaviors of the participants in this ecosystem. These studies have the potential to integrate feedback from a currently siloed field of experts.

Thank you

ODSS: Laura Biven, Branch Chief, Data Science Ecosystem
Allison Dennis, AI Program Coordinator
Kristin Hook, AAAS STPF (former)
John Gachago, DATA Scholar

Co-Organizers: Heidi Sofia (NHGRI/ODSS) and Jennifer Couch (NCI)

ODSS Working Group: AI, Ethics, and Transparency for People and Machines
ODSS Working Group to Address a Workforce Gap in Data Governance for AI and Biomedicine