Biomarkers AI and Bioinformatics Workshop

November 30, 2023

Vision and Objective

Hold a three-day workshop followed by a hackathon at Caltech in Spring 2024 to gather researchers, practitioners, and experts in cancer science, informatics and related fields, particularly at the intersection of biomarkers and AI.

Through a series of keynotes, contributed talks, and extensive discussions around use cases, needs, and capabilities, develop recommendations for the next few years to support advancement and application of data-driven approaches to cancer biomarker research leveraging datasets from the EDRN and related consortiums.

Goals

- Define use cases and needs for cancer biomarker discovery and validation
- Discuss the state-of-the-art and current gaps in applying AI/ML and bioinformatics methods to cancer biomarker research
- Discuss challenges around reproducibility, interpretability, and explainability
- Discuss current informatics capabilities and infrastructure needs to support use cases
- Develop a set of goals and recommendations to address these needs in cancer biomarker research for the next few years

Proposed Audience

- EDRN Site Investigators and their bioinformatics/data science/computational science researchers and teams

- Other NCI Programs, including CBIIT

- Academic partners and other researchers at the intersection of cancer and AI/bioinformatics

Proposed Program Committee

Dan Crichton, NASA/JPL
Heather Kincaid, NASA/JPL
Ashish Mahabal, Caltech
Ziding Feng, Fred Hutchinson Cancer Research Center
Matt Schabath, Moffitt Cancer Research Center
Anirban Maitra, MD Anderson
Jennifer Beane, Boston University
Eugene Koay, MD Andeson
David Elashoff, UCLA
Zhen Zhang, Johns Hopkins University
Sudhir Srivastava, National Cancer Institute
Christos Patriotis, National Cancer Institute
Natalie Abrams, National Cancer Institute

Planning to also enlist members from the Data Sharing and Informatics Subcommittee

Format

Hold a series of focused session with a keynote, talks, and discussions

Hold a poster session for researchers to share their progress

Hold a hack-a-thon to support hands on use of biomarker data and machine learning tools

Potential Sessions

Session 1: Cancer biomarker discovery -- use cases and opportunities for AI

Session 2: AI and Bioinformatics in biomarker validation

Session 3: Data preparation and design

Session 4: Application of AI, ML and bioinformatics algorithms and methods

Session 5: Infrastructure support for data capture, sharing, and computation

Session 6: Recommendations and next steps

Hack-a-thon

Leverage data captured from EDRN along with public datasets.

Include ideation/brainstorming about combining diverse datasets for specific big questions that may have been considered out of reach just a few years ago.

Include bioinformatics and AI/ML experts PIs, junior investigators and all those interested in learning more about the application and use of various bioinformatics and AI/ML tools and methods to cancer biomarker research.

Explore use of synthetic data and ML foundation models

Next Steps

1. Agree on goals and purpose
2. Agree on high level sessions
3. Finalize workshop proposal – will send Google Doc
4. Identify additional program committee members
5. Identify dates for the workshop which includes ensuring Caltech facilities are open
6. Setup website on EDRN portal
7. Distribute invitation and call for posters
8. Assign program committee members to
   - Chair sessions
   - Chair posters
   - Organize the hack-a-thon
9. Build schedule and identify key speakers