

Open-World Learning for Biomedicine

Host: Steven Zucker



Maria Brbic

Monday- February 14, 2022
4:00 p.m.

Zoom Presentation

Abstract: Biomedical data poses multiple hard challenges that break conventional machine learning assumptions. In this talk, I will highlight the need to move beyond our prevalent machine learning paradigms and methods to enable them to drive novel biomedical discoveries. I will give an overview of my work on developing open-world deep learning methods that generalize to scenarios never seen during training and demonstrate their impact in single-cell genomics. I will first present a method that transfers knowledge across a collection of heterogeneous datasets generated under different distributions, and then describe the paradigm and methods needed to discover novel phenomena. I will discuss the biological findings enabled by my methods and the conceptual shift they bring in annotating comprehensive single-cell atlas datasets. Altogether, my work demonstrates that generalization to never-before-seen scenarios is not only possible, but it is a necessary component in developing next-generation machine learning methods that can reveal new scientific insights.

Bio: Maria Brbic is a postdoctoral researcher in Computer Science at Stanford University. She develops new machine learning methods inspired by challenging problems in biomedicine and applies her methods to advance biomedical research. Her methods have been used by global cell atlas consortia efforts aiming to create reference maps of all cell types, including the Human BioMolecular Atlas Program (HuBMAP) and Fly Cell Atlas consortium. Previously, she received her PhD degree from University of Zagreb while also researching at Stanford University and University of Tokyo. Her research was awarded with the Fulbright Scholarship, L’Oreal UNESCO for Women in Science Scholarship, Branimir Jernej award for outstanding publication in biology and biomedicine, and Josip Loncar Silver Plaque award for the best doctoral dissertation. She has been named a Rising Star in EECS by MIT. She is a member of the Chan Zuckerberg Biohub at Stanford.