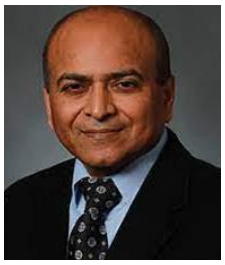

Biomedical Informatics Grand Rounds

Wednesday, April 27th, 2022 3:00 pm – 4:00 pm

Machine Learning in Biomedical and Health Sciences

Vasant G Honavar, PHD
Dorothy Foehr Huck and J. Lloyd Huck Chair in Biomedical Data Sciences and Artificial Intelligence
Professor of Data Sciences, Informatics, Computer Science, and of Bioinformatics and Genomics
Pennsylvania State University

Remote Access
Join Zoom Meeting https://stonybrook.zoom.us/j/95617197636?pwd=KytzZ2pVRG9SZGpKZUtpNXJISjNjZz09
Meeting ID: 956 1719 7636 Passcode: 924293

Bio: Dr. Vasant Honavar is professor of Data Sciences, Informatics, Computer Science, and of Bioinformatics and Genomics at Pennsylvania State University where he currently holds the Dorothy Foehr Huck and J. Lloyd Huck Chair in Biomedical Data Sciences and Artificial Intelligence. He leads the Artificial Intelligence Research Laboratory and is the founding director of the Center for Artificial Intelligence Foundations and Scientific Applications. Honavar received his PhD in Computer Science from the University of Wisconsin-Madison. Before moving to Penn State in 2013, Honavar was on the faculties of Computer Science and Bioinformatics and Computational Biology at Iowa State University from 1990 to 2013 and served as program director in the Information and Intelligent Systems Division at the National Science Foundation from 2010-2013 where he led the Big Data program. Honavar's primary research expertise is in artificial intelligence, data sciences, machine learning, knowledge representation, causal inference, and bioinformatics. He has served as PI or co-PI of research, infrastructure, and training grants totaling over $80 million from NSF, NIH, USDA, and DOD. Honavar's research (documented in over 300 peer-reviewed publications, with over 17,000 citations, h-index =60) has resulted in foundational contributions in scalable methods for learning predictive models from big data; deep learning methods for representation learning from complex data; Methods for causal inference from observational and experimental data; languages and tools selective sharing of knowledge across disparate knowledge bases; and applications of machine learning in bioinformatics and systems biology. He is especially interested in developing computational abstractions of scientific domains (e.g., biology), and AI-powered cognitive tools. Honavar has received several awards including the National Science Foundation Director's Awards for Superior Accomplishment, and for Collaborative Integration, the Edward Frymoyer Endowed Professorship in Information Sciences and Technology, the Sudha Murty Distinguished Visiting Chair in Neurocomputing and Data Science at the Indian Institute of Science, the Iowa Board of Regents Award for Faculty Excellence in 2007, the Iowa State University College of Liberal Arts and Sciences Award for Career Excellence in Research, and the Iowa State University Margaret Ellen White Graduate Faculty Award. Honavar is a Fellow of the American Association for the Advancement of Science.

Abstract: The unprecedented advances in our ability to acquire and process diverse types of data, and the resulting emergence of "big data" offers unprecedented opportunities for accelerating discoveries in biomedical and health sciences. They also drive fundamental methodological advances in artificial intelligence in general, and machine learning and causal inference in particular. I will describe several examples, drawn from research in my lab, of successful applications of artificial intelligence yielding in new tools for biomedical research, e.g., for characterizing and predicting bimolecular interactions and complexes, identifying metagenomic biomarkers of inflammatory bowel disease, elucidating brain activity biomarkers of age-related cognitive declines, and predicting cancer survival. I will provide some examples of methodological advances in machine learning, e.g., federated machine learning algorithms for settings where access constraints prevent centralized access to data, algorithms for predictive modeling from ultra high dimensional, ultra sparse, irregularly sampled, longitudinal data for predicting health risks from longitudinal clinical records. I will conclude with a brief discussion of some open problems.

Educational Objects: Upon completion, participants should be able to:

- Introduce applications of AI and machine learning across a broad range of problems in biomedical and health research

Disclosure Statement: The faculty and planners have no relevant financial relationship with ineligible companies whose primary business is producing, marketing, selling, re-selling, or distributing health care products used by or on patients.

Continuing Medical Education Credits: The School of Medicine, State University of New York at Stony Brook, is accredited by the Accreditation Council for Continuing Medical Education to provide continuing medical education for physicians. The School of Medicine, State University of New York at Stony Brook designates this live activity for a maximum of **1** ***AMA PRA Category 1 Credits™.*** Physicians should only claim credit commensurate with the extent of their participation in the activity.