NJIT New Jersey Institute of Technology

BME

Department of Biomedical Engineering

Graduate Seminar

Dr. Ravi Radhakrishnan

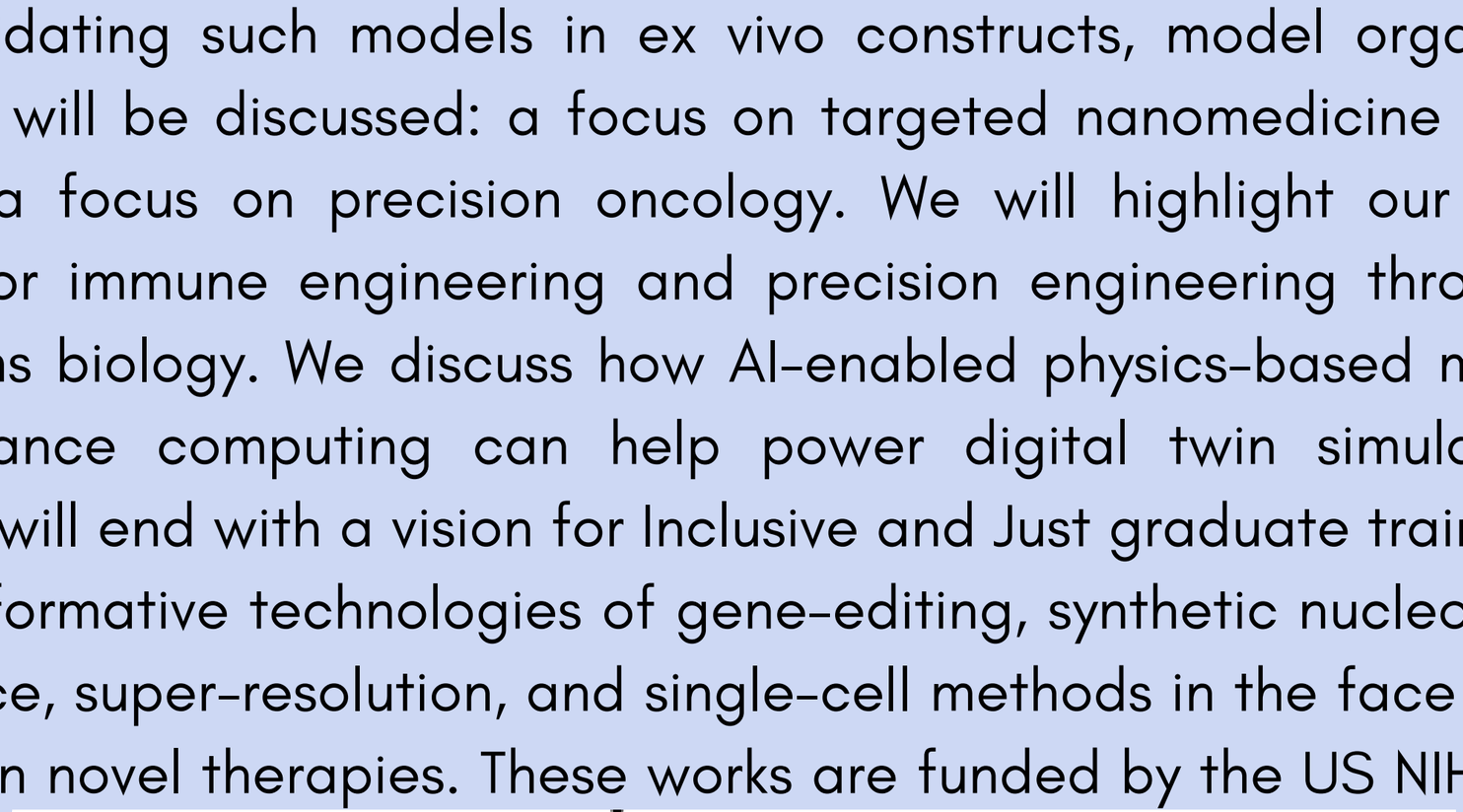
Department Chair and Professor,
Department of Bioengineering,
Penn Institute for Computational Science,
Penn Center for Anticancer Engineering,
The University of Pennsylvania

December 15(Fri)
11:30am - 1:00pm
CKB 217

AI-enabled Physics-Based Models in Cancer and Nanomedicine

Abstract:

AI-enabled physics-based multiscale models power digital twin simulators for in silico oncology and nanomedicine applications. The talk will focus on building predictive multiscale models in biosciences and bioengineering using physics-based approaches and collaboratively validating such models in ex vivo constructs, model organisms, and human trials. Two themes will be discussed: a focus on targeted nanomedicine for immunotherapy applications and a focus on precision oncology. We will highlight our efforts on cancer mechanobiology for immune engineering and precision engineering through nanomedicine and cancer systems biology. We discuss how AI-enabled physics-based multiscale modeling and high-performance computing can help power digital twin simulators for precision medicine. The talk will end with a vision for Inclusive and Just graduate training and education in the era of transformative technologies of gene-editing, synthetic nucleome and organoids, artificial intelligence, super-resolution, and single-cell methods in the face of cell-editing and neural revolutions in novel therapies. These works are funded by the US NIH, NSF, AFOSR, and EU ERC.



About the Speaker

Ravi Radhakrishnan, Ph.D., holds the title of Professor of Bioengineering and Professor of Chemical and Biomolecular Engineering. He is a member of the Genomics & Computational Biology and the Biochemistry & Molecular Biophysics graduate groups at the University of Pennsylvania. Radhakrishnan is currently the Chair of Bioengineering. He is a founder member and served as the former Director of the Penn Institute for Computational Sciences, an interdisciplinary institute promoting research at the interface of multiscale modeling, machine learning, and high-performance supercomputing. He is actively engaged in and funded through several National and International multidisciplinary consortia, including the European Research Council's Computational Horizons in Cancer (CHIC), the US National Cancer Institute's Physical Sciences in Oncology Network and Cancer Systems Biology Consortium, and US National Institute of Biomedical Imaging and Bioengineering's Multiscale Modeling Consortium. Ravi Radhakrishnan serves as a project leader of the NCI-funded Penn Physical Sciences in Oncology Network. He is a Working Group Leader of the High-Performance Computing Working Group for an Inter-Governmental Consortium: Inter-Agency Modeling Group involving NIH, NSF, NASA, DOE, DOD, and DARPA. Radhakrishnan directs a computational research laboratory with research interests at the interface of biophysics and bioengineering. The goal of his lab is to Create Digital Twin Models in Biomedical Engineering for Cancer Treatment and Next Generation Therapeutics. His lab specializes in several computational algorithms spanning the molecular and cellular scales in conjunction with the theoretical formalisms of statistical mechanics and applications of high-performance scientific computing in parallel architectures. He has forged successful and funded collaborations with pharmacologists, cell biologists, biophysical chemists, anaesthesiologists, and oncologists, primarily through grants from the US National Science Foundation, the US National Institutes of Health, and the European Research Council. Radhakrishnan has authored over 170 articles in leading peer-reviewed Journals, serves as a referee for over 45 leading journals, publishers, and federal funding agencies, and serves on the editorial board of five journals, including Scientific Reports of the Nature Publishing Group. He is the Associate Editor of Frontiers in Physiology. He has received the Hewlett Packard Investigator award and is a Fellow of the American Institute of Medical and Biological Engineers, a Fellow of the Royal Society of Medicine, and a Fellow of the Biomedical Engineering Society.