St. Jude Children's Research Hospital | **Pediatric Biomedical Imaging Initiative**

Zoltán Patay Scientific Symposium

Moving Towards Artificial Intelligence in Pediatric Tumor Imaging

April 3, 2023

Bonny Banerjee, PhD — *Fundamentals – Nuts and Bolts of AI*

Dual Assistant Professor Institute for Intelligent Systems and Dept. of Electrical and Computer Engineering
University of Memphis

Dr. Banerjee directs the Computational Intelligence Laboratory at UM. The goal of his lab's research is to understand how perception and action give rise to cognition from a computational perspective and use that knowledge to build artificial systems that can perceive from, act on and reason with spatiotemporal data in multiple sensory modalities. This research exists at the confluence of artificial intelligence, machine learning, cognitive science, and computational neuroscience, with applications to intelligent systems (e.g., smart biomedical devices, decision support systems, human-machine interaction, ambient intelligence) and algorithms that learn to be efficient by solving similar problems. His lab is currently investigating hierarchical neural models for understanding perception and cognition by applying them to real-world problems. Prior to joining UM, Dr. Banerjee led the research in a start-up company which led to 12 U.S. and international patents (pending) within three years.

Pranav Rajpurkar, PhD — *Scope and Limitations of AI in Modern Medicine (virtual)*

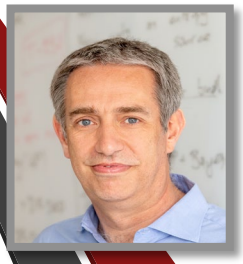
Assistant Professor Dept. of Biomedical Informatics
Harvard Medical School

Pranav Rajpurkar is an Assistant Professor at Harvard Medical School leading a research lab working on developing artificial intelligence technologies for medical applications. His lab has developed label-efficient deep learning algorithms that can read medical images at the level of experts, built large-scale open medical datasets, and demonstrated the effects of AI on medical decision making. Rajpurkar co-hosts The AI Health Podcast and co-edits the Doctor Penguin AI Health Newsletter. He instructed the Coursera course series on AI for Medicine and leads the joint Harvard-Stanford Medical AI Bootcamp Program. Previously, Prof. Rajpurkar received his B.S., M.S., and Ph.D. degrees, all in Computer Science from Stanford University.

I. Glenn Cohen, JD — *Ethical Issues in Using AI in Medicine*

James A. Attwood & Leslie Williams Professor of Law Deputy Dean
Harvard Law School

Professor Cohen is one of the world's leading experts on the intersection of bioethics (sometimes also called "medical ethics") and the law, as well as health law. He also teaches civil procedure. He has advised the U.S. Vice President on reproductive rights, discussed medical AI policy with members of the Korean Congress, and lectured to legal, medical, and industry conferences around the world. His work has been frequently covered by or appeared in PBS, NPR, ABC, NBC, CBS, CNN, MSNBC, Mother Jones, the New York Times, The Washington Post, the Boston Globe, and many other media venues.



Daniel Rückert, MD, PhD — *AI in Biomedical Image Acquisition, Analysis, and Interpretation*

Alexander Von Humboldt Professor, AI in Medicine and Healthcare
University of Munich

Daniel Rückert (Fellow, 2015) is an Alexander von Humboldt Professor for AI in Medicine and Healthcare at the Technical University of Munich. He is also a Professor of Visual Information Processing in the Department of Computing at Imperial College London. He received a PhD from Imperial College in 1997. He has published more than 500 journal and conference articles in the area of medical image computing. He served as associate editor of IEEE Transactions on Medical Imaging and is a member of the editorial board of Medical Image Analysis. In 2014, he was elected as a Fellow of the MICCAI society, and in 2015 he was elected as a Fellow of the Royal Academy of Engineering & of the IEEE. More recently he was elected as Fellow of the Academy of Medical Sciences (2019) and as fellow of the American Institute for Medical and Biological Engineering (2021).

Patricia Johnson, PhD — *AI-Based Image Reconstruction Accelerated Imaging*

Assistant Professor

New York University, Grossman School of Medicine

Patricia Johnson is also an Assistant Professor in the Department of Radiology at NYU Langone Health. Her research focuses on Deep learning-based MRI reconstruction. Patricia received a PhD from Western University in London, Canada.

Bernhard Kainz, PhD — *AI Optimization and Automation in Post-Processing* (virtual)

Professor and Reader, Medical Image Computing

Imperial College London, FAU Erlangen- Nürnberg

Dr. Kainz heads the Image Data Exploration and Analysis lab (IDEA), and his research is dedicated to developing novel image processing methods that ourperform human decision-making capabilities. His results are bridging the gaps between modern computing methods and clinical practice. His work on motion compensation for fetal magnetic resonance imaging is currently defining the state-of-the-art in the field and his work on machine learning for ultrasound imaging is sparking great interest from the community. He has over 150 state-of-the-art-defining scientific publications in the field.

Greg Zaharchuk, MD PhD — *AI for Neuroimaging*

Professor of Radiology

Stanford University

Greg Zaharchuk is a clinical neuroradiologist and directs the Center for Advanced Functional Neuroimaging (CAFN) at Stanford University where his research focuses on advanced medical imaging techniques and algorithms (including AI) with the goal of alleviating the burden of neurological disease. He is a member of the editorial board of *Radiology*, *Journal of Magnetic Resonance Imaging*, and the *American Journal of Neuroradiology*. He is the immediate past-president of the American Society of Functional Neuroradiology (ASFNR) and chaired both 2018 Machine Learning Workshops sponsored by the International Society of Magnetic Resonance in Medicine (ISMRM), where he serves on the Board of Directors. He was recently elected as a Fellow of the American Institute for Medical and Biological Engineering (AIMBE).

Kristen Yeom, MD — *AI Strategies for Pediatric Brain Tumors* (virtual)

Professor of Radiology, Neurology and Neurosurgery

Stanford University

Kristen Yeom is a Professor of Radiology, Neurology, and Neurosurgery with a focus on pediatric neuroimaging and neurosciences. She currently serves as the Associate Director at Center for Artificial Intelligence in Medicine and Imaging at Stanford. As a faculty at Stanford since 2008, Dr. Yeom's research has included clinical and translational studies of MRI methods, such as diffusion, perfusion, and quantitative susceptibility MRI, as well as novel image processing tools for improved understanding of normal neural development and diagnosis and management of neurological and neuro-oncologic diseases. Her current research focuses on machine-learning strategies applied on pediatric brain tumors, as well as novel computer vision tasks on normal and abnormal brain development and aging, neurovascular pathologies, as well as generative and distributed learning strategies for model optimization, efficient model development, and deployment.

Andrew Peet, PhD, FRCPHC — *Towards AI-Based Prediction of Survival of Pediatric Brain Tumors*

Professor of Clinical Pediatric Oncology, Institute of Cancer and Genomic Sciences

University of Birmingham and Birmingham Children's Hospital, UK

Professor Peet's research focuses on the development and evaluation of novel MRI techniques for diagnosis, management and understanding of childhood cancer and neurological diseases with an emphasis on quantification, machine learning, artificial intelligence and clinical decision support systems. The imaging research is underpinned by a laboratory program which focuses on tumor metabolism. He has more than 100 publications in the field.