Craig Levin

Short Biography:

Dr. Craig S. Levin is a Professor of Radiology and, by Courtesy, of Physics, Electrical Engineering, and Bioengineering at Stanford University, U.S.A. He is a founding member of the Molecular Imaging Program at Stanford, and Principal Investigator and Director of the NIH-NCI funded T32 Stanford Molecular Imaging Scholars postdoctoral training program. He received his M.S., M.Phil, and Ph.D. degrees in Physics from Yale University. An internationally recognized researcher in the field of molecular imaging he has over 200 peer-reviewed publications and 40 patents awarded or pending. He directs a 20-member laboratory that explores new concepts in instrumentation and software algorithms for molecular imaging, introduces some of these new tools into clinical and pre-clinical imaging studies of cancer, heart disease and neurological disorders, and partners with industry to disseminate some of these technologies into products used for patient care throughout the world. To support his research, he has generated numerous grant awards as Principal Investigator from government, industry, and private institutions. He lectured in a Nobel symposium in 2007, and in 2012 was elected into the American Institute for Medical and Biological Engineering's College of Fellows, and also in 2012 was given the U.S. Academy of Radiology Research Distinguished Investigator Recognition Award. In 2020 he received the Edward J. Hoffman Medical Imaging Scientist award from the IEEE Nuclear and Plasma Sciences Society, and in 2023 he received the Society of Nuclear Medicine and Molecular Imaging Mars Shot Award.

Abstract:

Generative artificial intelligence (AI) is capable of generating text, images, or other media, using generative models. Generative AI models learn the patterns and structure of their input training data in order to generate new, synthetic data that have similar characteristics. Generative AI has shown great promise in a number of fields, including in medical imaging, and specifically, positron emission tomography (PET). In this talk we present selected generative deep learning (DL) applications in PET imaging signal processing we are currently studying that employ artificial neural networks to mimic the learning process of the human brain. These generative DL methods address certain PET signal processing needs that we have found to be difficult to solve using traditional non-AI approaches. We have applied these techniques to commercially available multi-modality PET/CT and PET/MRI systems as well as novel PET research instrumentation we have designed and developed in our labs at Stanford University