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Multimodality imaging for clinical research: The role of bio-photonics

In order to see the bench-to-bedside dream of translational research become a reality, we need to develop imaging approaches that is technologically sophisticated, allow deployment into a clinical setting. Multimodality imaging is gaining adoption, but the bio-photonic component is absent or un-sophisticated. Our focus area is where light and patient meet, and improvements that yield better outcomes, by identifying/addressing the obstacles preventing timely clinical adoption of laboratory-based advances, not the least of which is the difficulty of detecting, characterizing and monitoring very small entities (molecules, cells) within the human body, especially quantitatively, dynamically, and preferably without contrast agents. How and where we look becomes critically important, especially if one targets (as one should) early diagnosis; for this, new tools and strategies are needed, with likely new outcomes. We proposed and implemented an optical multimode approach to biomedical optical imaging at all levels, featuring hyperspectral imaging, and optimized for earlier, more quantitative/reproducible detection of abnormalities and a tighter spatio-temporal coupling between such diagnosis and intervention. Addressing major areas of unmet need in the clinical realm with these new approaches should yield important improvements in disease management. Our work on cancer, stem cells, vascular and neuro (specifically highlighting very early detection of Alzheimer's disease) applications will be described, with emphasis on the new technologies needed to achieve the desired imaging performance. Thoughts about better ways for academia, the clinical and the corporate world to work together for innovative imaging solutions and their use for addressing major disease will be briefly outlined.

Biography

Daniel L Farkas is a former Fulbright scholar, directed a National Science and Technology Center at Carnegie Mellon University. He was Professor of Bioengineering at University of Pittsburgh, and Vice-chairman for research and; Professor of Surgery at Cedars-Sinai Medical Center. He has 200+ publications, 11 editorial boards, \$80 million funding, 32 international conferences chaired, and several prestigious awards. His focus is on translational biomedical optics, in academia and startups he founded.

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