

Intelligent Photonics towards Biomedicine: A Disruptive Technology to Shape Computational Imaging, Optogenetics and Endomicroscopy

Juergen Czarske

*Laboratory of Measurement and Sensor Systems, Center Biomedical Computational Laser Systems (BIOLAS), Coopted Professor for Physics, Dresden University of Technology (TUD), Dresden, Germany
Adjunct Professor for Optical Sciences, University of Arizona, USA
Guest Professor at SIOM, Shanghai*



Light has the potential to detect and prevent diseases, improve diagnostics, or cure them early and gently. However, traditional microscopy with lens-based imaging results in bulky systems. We present lensless 3D imaging in scattering media using physics-informed deep learning. This paradigm shift enables minimal-invasive endomicroscopy for virtual staining at cancer investigations. We will also present new approaches on deep holography for optogenetics. The progress for society through intelligent photonics for biomedicine will be highlighted.



Juergen W Czarske, Fellow of EOS, OPTICA, SPIE, IET, IOP, Elected Member of Saxon Academy of Sciences, Fraunhofer Society, Scientific Society Laser Technique, Excellence Cluster Physics of Life, Else Kröner-Fresenius Center for Digital Health and BrainLinks/BrainTools. He is Vice President of International Commission for Optics, ICO, and was the general chair of the world congress ICO-25 with participants from 55 countries and plenary talks of 3 Nobel laureates. Prof Czarske's awards include the 2008 Leibinger Innovation Prize of Trumpf, 2019 OPTICA Joseph-Fraunhofer-Award/Robert-M.-Burley-Prize in Optical Engineering and 2024 SPIE

Dennis Gabor Award in Diffractive Optics.