PIONEERS IN BIOMEDICAL RESEARCH SEMINAR

Presented by the Fralin Biomedical Research Institute at VTC, and co-sponsored by the Office of the Executive Director

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Virtual Seminar: World's Deepest-Penetration and Fastest Optical Cameras: Photoacoustic Tomography and Compressed Ultrafast Photography

Dr. Wang and his team developed photoacoustic tomography (PAT) to peer deep into biological tissue. PAT provides *in vivo* omniscale functional, metabolic, molecular, and histologic imaging across the scales of organelles through organisms. The team also developed compressed ultrafast photography (CUP) to record 70 trillion frames per second, orders of magnitude faster than commercially available camera technologies. CUP can record in real time the fastest phenomenon in nature, namely, light propagation, and can be slowed down for slower phenomena such as neural conduction. PAT physically combines optical and ultrasonic waves. Conventional high-resolution optical imaging of scattering tissue is restricted to depths within the optical diffusion limit (~1 mm). PAT beats this limit and provides deep penetration at high ultrasonic resolution and high optical contrast by sensing molecules. Broad applications include early-cancer detection and brain imaging. The annual conference on PAT has become the largest in SPIE's 20,000-attendee Photonics West since 2010. CUP can image with a single exposure transient events occurring on a time scale down to 10s of femtoseconds. Akin to traditional photography, CUP is receive-only—avoiding specialized active illumination required by other single-shot ultrafast imagers. CUP can be coupled with front optics ranging from microscopes to telescopes for widespread applications in both fundamental and applied sciences, ranging from biology to cosmophysics.

FRIDAY, FEB. 4, at 11 a.m.

Watch live via Zoom at https://virginiatech.zoom.us/j/82722436593 or at https://fbri.vtc.vt.edu/events/live-webcast.html.

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