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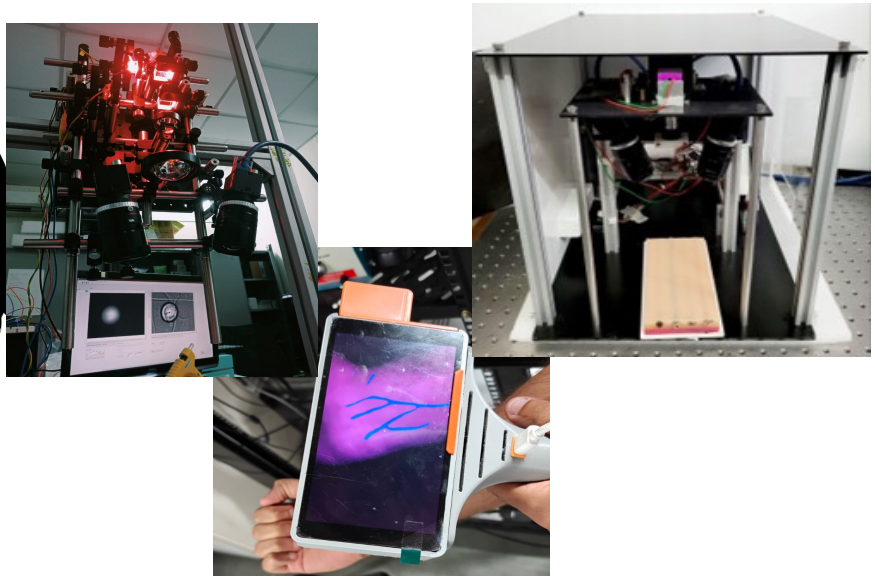
SEMINARS ON TECHNOLOGICAL ADVANCES AND INNOVATION

Real-Time 3D Vein Imaging Using Stereo Near-Infrared Vision and Artificial Intelligence



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Finding a vein is often the most difficult step in intravenous cannulation. While this task is routine for many patients, it becomes significantly more challenging when veins are poorly visible in pediatric and geriatric cases. Although near-infrared (NIR) vein viewers enhance vascular contrast, they provide only a two-dimensional representation of the veins. This work presents two complementary imaging platforms designed to address this limitation: a portable AI-assisted handheld vein viewer for clinical use and a stereo NIR imaging system capable of real-time three-dimensional (3D) vein reconstruction. By integrating synchronized multi-wavelength illumination, hardware-assisted background subtraction, AI-based vein segmentation, rapid stereo calibration, feature-based correspondence estimation, and Direct Linear Transform (DLT)-based triangulation, the system reconstructs superficial vein geometry in real time, demonstrating a practical approach toward portable depth-aware vascular imaging.

With Live Demonstration

Aug 13 2026

TIFRH Auditorium 16:00 Hrs | Tea/Coffee 15:45 Hrs