Department of Mechanical Engineering
College of Engineering and Applied Sciences
Stony Brook University

Mechanical Engineering Seminar

Ana Doblas, Ph.D

University of Massachusetts Dartmouth

Making Advances in Optical Microscopic Imaging Accessible to Our Community: The Mission of the Optical Imaging Research Laboratory

November 21st, 2025 at 1:00 PM, Room 173, Light Engineering Building

Abstract:

Microscopy has long been one of the most powerful tools for scientific discovery, enabling us to visualize and quantify structures that lie beyond the limits of human vision. Today, the convergence of optical engineering and computational imaging is redefining what microscopes can achieve. In this talk, I will present the latest research products and innovations emerging from the Optical Imaging Research Lab (OIRL) at UMass Dartmouth. Our work emphasizes the synergy between hardware and software—where optical design, illumination engineering, and algorithmic reconstruction are co-optimized to extract more information from light. We will discuss new developments in quantitative phase imaging, low-cost confocal microscopy, and lensless computational systems, illustrating how intelligent hardware–software integration can overcome traditional limitations in resolution, contrast, and imaging depth. These technologies are being translated into impactful applications spanning biomedical imaging, environmental monitoring, and oceanographic sensing. Central to OIRL's mission is the democratization of advanced imaging—making sophisticated optical technologies accessible, scalable, and adaptable to the next generation of scientific and educational frontiers.

Bio:

Ana Doblas received her B.S., M.S., and Ph.D. degrees in Physics from the Universitat de València, Spain, in 2010, 2011, and 2015, respectively. Following her doctoral studies, she joined the Optical Coherence Imaging Laboratory at the University of North Carolina at Chapel Hill, where she conducted postdoctoral research under the supervision of Dr. A. Oldenburg. From 2016 to 2023, she was with the Department of Electrical and Computer Engineering at the University of Memphis, serving first as a Research Assistant Professor in the Computational Imaging Research Laboratory (CIRL) and later as an Assistant Professor and founding Principal Investigator of the Optical Imaging Research Laboratory (OIRL). In 2021, she received the NSF CAREER Award for her project "Three-Dimensional Super-Resolution Light Microscopy of Thick, Unprocessed Biological Samples." Since Fall 2023, Dr. Doblas has been a faculty member in the Department of Electrical and Computer Engineering at the University of Massachusetts Dartmouth. Her research interests span optical engineering, computational optics, and three-dimensional imaging, with a focus on advancing the fundamental science and engineering of imaging and photonics instrumentation for biological and biomedical applications. Her long-term vision is to translate laboratory innovations into accessible, high-impact optical systems for research, education, and industry. Dr. Doblas has co-authored more than 50 peer-reviewed journal papers, presented her work at over 90 international conferences, and is a co-inventor on four U.S. patents.