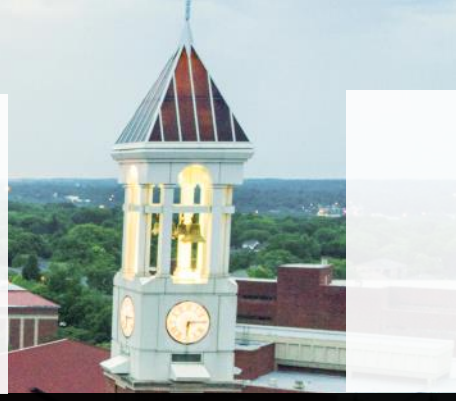
**$15 UberEats voucher during Webinar for Purdue students!**



# Purdue OSA-SPIE Webinar Series

## July 29, 1:00pm ET

**Zoom Link:** https://purdue-edu.zoom.us/j/93689650800

**RSVP:** https://forms.gle/qu47V48hDkoZYEoB6 **Event Passcode: 721901**

## Speaker: Prof. Ayman F. Abouraddy

## Space-time optics and photonics: A new frontier for structured light


## Abstract:

Exercising control over the spatial degrees of freedom of the optical field has continued to yield breakthroughs over the past few decades, ranging from the discovery of Bessel beams and beams endowed with orbital angular momentum, to optical tweezers and traps, and the manipulation of the field in multimode optical fibers. Separately, but in parallel with these efforts, ultrafast pulse shaping has revolutionized our control over the temporal degree of freedom of the optical field. The spatial and temporal realms in optics have led for the most part independent lives with few examples of creative intersections. In this talk I show that precise, joint sculpting of the spatial and temporal degrees of freedom of optical fields – rather than modulating each separately – yields a new class of pulsed beams that I call 'space-time' (ST) wave packets. Surprising and useful optical behaviors are exhibited by ST wave packets when freely propagating or when interacting with photonic devices, leading to a new frontier for the study of structured light. I will share our recent experimental and theoretical results from this rapidly emerging topic and sketch potential applications that could benefit from ST wave packets.


## About the Speaker:

Ayman F. Abouraddy received the B.S. and M.S. degrees from Alexandria University, Alexandria, Egypt, in 1994 and 1997, respectively, and the Ph.D. degree from Boston University, Boston, MA, in 2003, all in electrical engineering. In 2003 he joined the Massachusetts Institute of Technology (MIT) as a postdoctoral fellow, and then became a Research Scientist at the Research Laboratory of Electronics in 2005. He is the coauthor of more than 130 journal publications, 240 conference presentations, and 80 invited talks; he holds seven patents, and has three patents pending, and is a fellow of the OSA. He joined CREOL, The College of Optics & Photonics, at the University of Central Florida as an assistant professor in September 2008 and was promoted to full professor in August 2017. His recent research interests are in the area of structured light, particularly in the emerging field of space-time optics and photonics, in addition to quantum optics and quantum information processing.