



University
of Basel

Department of
Biomedical Engineering



Seminar Series:

Latest Breakthroughs in Biomedical Engineering Research

Location: DBE Science Lounge, Hegenheimermattweg 167C, 4123 Allschwil

Date & Time: Thursday 10.10.2024 | 15:30 – 16:30

Host: Dr. Ferda Canbaz

Towards Clinical Ultrafast Laser Surgery

Adela Ben-Yakar

University of Texas at Austin

Abstract

Ultrashort laser pulses offer precise, non-thermal tissue ablation, making them ideal for novel laser surgery treatments, mainly limited to ophthalmic applications. One of the technological barriers to broader clinical adoption is the lack of a flexible means to deliver the laser light to target tissue sites in or on the patient. In this talk, I will describe fundamental mechanisms and limitations of ultrafast laser ablation, novel techniques for overcoming these limitations, the current state of clinical applications, and conclude with our recent efforts in developing fiber-coupled probes for flexible ultrafast laser surgery and imaging.

Biosketch

Adela Ben-Yakar is the Harry Kent Endowed Professor in the Departments of Mechanical and Biomedical Engineering at the University of Texas at Austin. She earned her Ph.D. in Engineering from Stanford University and completed postdoctoral work in the Physics Departments at both Stanford and Harvard Universities. Dr. Ben-Yakar's research spans two primary areas: 1) ultrafast laser microsurgery and nonlinear imaging, with applications in vocal fold and spine surgeries, as well as early cancer diagnostics, and 2) the development of high-throughput optical and microfluidic systems for drug screening using small animal models and organoids, focusing on nerve regeneration, neurodegenerative diseases, and aging. She is a Fellow of SPIE, Optica, and AIMBE, and has been honored with the Fulbright Scholarship, Zonta Amelia Earhart, NSF career, Human Frontier Science Program Research, and the NIH Director's Transformative Awards.