

Title: Space-time metasurfaces: spatiotemporal light structuring with dielectric meta optics

This talk will cover how dielectric meta-optics can be used as a platform for spatiotemporal shaping of optical fields via angular-dispersion engineering. Building on recent demonstrations of ultrafast space–time optical merons, it will discuss how large-area birefringent metasurfaces, together with spatiotemporal spectral mappings, enable programmable polarization textures on open and closed momentum–energy spectral surfaces to realize 3D-localized topological wave packets. It will also highlight spatially structured self-imaging (the Montgomery effect) as an example of spectrum discretization and overlay-based mode synthesis, showing how controlled spatial-frequency sampling produces tightly localized revivals and arbitrary transverse profiles. Together, these results motivate metasurface-based architectures for dynamic 3D light generation relevant to microscopy, optical trapping, and robust information channels in topological photonics.