Abstract

Whole or large-scale brain imaging and mapping at microscopic resolution is feasible with intrinsic optical contrasts. Serial optical coherence scanner, which combines a multi-contrast optical coherence tomography and a tissue slicer, distinguishes white matter and gray matter and visualizes nerve fiber tracts that are as small as a few tens of micrometers. Axonal birefringence highlights the location and myelination of nerve fibers, while the axis orientation contrast indicates the fiber alignment in the plane. A method to extract the inclination angle that completes the 3D orientation will be presented as well. The scanner could reveal biomarkers for disease onset and progression and support development of therapeutics. If time permits, I will present a summary of another study that is on optical imaging of neural action potentials.
Bio:
Taner Akkin received his BSc (1995) and MSc (1997) degrees in electrical and electronics engineering from Çukurova University, Turkey, and his PhD degree (2003) from the University of Texas at Austin. After postdoctoral studies at Harvard Medical School/Wellman Center for Photomedicine, Massachusetts General Hospital, he joined the Department of Biomedical Engineering at the University of Minnesota (2005), where he is an associate professor. He develops optical imaging systems to study neural structure and function.