How novel imaging algorithms could reveal new structures around the black hole in our galactic center

Abstract:
In this talk, I want to take you on a journey toward our galactic center where a bright radio source called Sagittarius A* (Sgr A*) is located. In 2017 this radio source was observed by the Event Horizon Telescope (EHT) - a virtual instrument made of radio-telescopes around the world. Even though Sgr A* was observed at the same period as the first black hole image of M87*, it took an extra three years to analyze the data. One of the key challenges we faced was the dynamic nature of Sgr A* which evolves on the timescale of acquisition. Computationally, this is analogous to an MRI patient that refuses to sit still while being imaged. Furthermore, I will give you a peek into the future, where new computational algorithms we are developing could reveal new structures beyond a 2D image. Could we reveal the dynamic evolution? Could we look at the 3D structure? These are the type of imaging questions and computational algorithms we are working on for the next generation of EHT observations. Bio: Aviad Levis is a postdoctoral scholar in the Department of Computing and Mathematics at Caltech, working with Prof. Katherine Bouman. Currently, as part of the Event Horizon Telescope collaboration, his work focuses on developing novel computational methods for imaging black hole dynamics. Prior to that, he received his Ph.D. (2020) from the Technion and his B.Sc. (2013) from Ben-Gurion University. Notably, his Ph.D. research into 3D remote sensing of clouds is a key enabler in a novel interdisciplinary space mission (CloudCT) funded by the ERC and led by Yoav Schechner, Ilan Koren, and Klaus Schilling. Aviad is a recipient of the Zuckerman and the Viterbi postdoctoral fellowships.