

CBC SEMINAR ANNOUNCEMENT



Associate Professor Gabriela Schlau-Cohen
Massachusetts Institute of Technology, Cambridge
Carotenoid-mediated light harvesting in plants

Plants absorb sunlight across the visible region of the solar spectrum and then, through complex kinetics, collect the energy required for photochemical reactions in lower-lying states. 2D electronic spectroscopy measures both excitation energy and emission energy with femtosecond temporal resolution and therefore is a powerful tool to disentangle complex kinetics. However, previous 2D experiments to study plants have been limited to the dynamics of the low-energy states, leaving the higher-energy states unexplored. We describe the development of ultrabroadband 2D electronic spectroscopy and its application to map out the excited states and dynamics of the major antenna complex of plants across the visible region. First, by analyzing the vibrational wavepackets in the spectra, we identify a debated dark state on a single carotenoid, lutein 2, that mediates relaxation. This result reveals that the protein binding pocket can control the electronic structure of carotenoids, and therefore their function in photosynthesis. Second, we measure chlorophyll-to-carotenoid energy transfer, a hypothesized but previously unobserved pathway to safely dissipate excess energy. This dissipative pathway provides a mechanism by which plants can flourish despite fluctuations in sunlight, i.e. on both sunny and cloudy days.

Biography

Gabriela Schlau-Cohen is an Associate Professor in the Department of Chemistry at MIT. Her research group uses single-molecule spectroscopy and ultrafast spectroscopy to explore dynamics in biological and bio-inspired systems, particularly in photosynthetic light harvesting. Her work has been featured in the media, including the Canadian Broadcasting Corporation radio show 'Quirks and Quarks' and Newsweek. Dr. Schlau-Cohen has also been recognized by awards such as the NIH Director's New Innovator Award, the Beckman Young Investigator Award, and the Camille Dreyfus Teacher-Scholar Award. She currently serves as the Associate Director of CIFAR's Bio-inspired Solar Energy program and on the advisory board of Chem.

Date: 11th September 2020 (Friday)
Time: 10.00 am to 12.00 pm
Venue: Zoom Platform
Host: Associate Professor Tan Howe Siang

For Zoom registration:

