UC RIVERSIDE

INSTITUTE FOR INTEGRATIVE GENOME BIOLOGY SEMINAR SERIES

YOU ARE CORDIALLY INVITED TO ATTEND:

Christian Fankhauser

University of Lausanne

Center for Integrative Genomics

Title: "Reaching out for the sun: molecular mechanism underlying growth adaptation in Arabidopsis thaliana"

Date: Friday, April 29, 2022

Time: 12:00 pm - 1:00 pm

Zoom ID: 924-2795-4599 Passcode: 777538

Host: Meng Chen

Abstract: Plant growth ultimately depends on fixed carbon, thus the available light for photosynthesis. Due to canopy light absorption properties, vegetative shade combines low blue (LB) light and a low red to far-red ratio (LRFR). In shade-avoiding plants, these two conditions independently trigger growth adaptations to enhance light access. However, how these conditions, differing in photosynthetically-available light, similarly promote hypocotyl growth remains unknown. Using RNA sequencing we show that these two features of shade trigger different transcriptional reprogramming. LB induces starvation responses, suggesting a switch to a catabolic state. Accordingly, LB promotes autophagy. In contrast, LRFR promotes anabolism including biosynthesis of plasma-membrane sterols downstream of PHYTOCHROME-INTERACTING FACTORs (PIFs) acting in hypocotyls. Genetic analyses show that in vegetative shade the combination of sterol biosynthesis and autophagy is essential for hypocotyl growth promotion. We propose that vegetative shade enhances hypocotyl growth by combining autophagy-mediated recycling and promotion of specific lipid biosynthetic processes.