

DEPARTMENT OF BIOCHEMISTRY FACULTY RECRUITMENT CANDIDATE SEMINARS:

Assistant Professor in Metabolomics of Adaptive Responses



Aleksandra Skirycz, Assistant Professor, Boyce Thompson Institute & Adjunct Professor, Cornell University

Research Seminar:

Tuesday, January 24, 2023 | 12:00 p.m. – 1:00 p.m.

Seminar Title: "Using protein–metabolite interaction networks to tap into the dark matter of metabolomes"

Abstract: Functional diversity reflects the immense chemical diversity of living organisms that produce hundreds of thousands of small molecule compounds, most of which remain chemically and functionally characterized, hence the dark matter. Because small molecules rarely work on their own but rather via interactions with proteins, following the proverbial "tell me who your friends are, and I will tell you who you are," identification of protein interactors can be used to unravel the function of a metabolite. The complex and dynamic protein-metabolite interaction (PMI) network underlies all biological processes but remains under-characterized. In my group, we adapted co-fractionation mass-spectrometry (CF-MS), a well-established approach to map protein assemblies, for proteome and metabolome-wide identification of the protein-metabolite complexes. CF-MS experiments combine the separation of native complexes with MS analysis of the obtained fractions and use the similarity of elution profiles, referred to as co-elution or co-fractionation, to delineate interactors. CF-MS enables the untargeted identification of complexes without needing a protein or a metabolite bait. The resulting PMIs networks comprise tens of annotated metabolites and hundreds of unknown metabolic features. During my seminar, I will introduce novel regulatory roles of 2', 3' - cyclic nucleotides and proteinogenic dipeptides uncovered by our studies in plants and yeast. Moreover, I will discuss how we can use CF-MS to probe cell-state-specific and "inter-organismal" PMIs, exemplified by a diauxic shift transition in yeast and *Arabidopsis* infection with bacterial pathogen *P.syringae*, respectively.

Biography: Aleksandra defended her Ph.D. from the University of Potsdam, Germany, in 2008. She then moved to Belgium to the PSB Institute in Gent, where she worked for Prof. Dirk Inze, studying the molecular mechanisms underlying plant growth inhibition in response to water-limiting conditions. In 2012 she moved to Milano, Italy, and in 2013 to Belem in Brazil. In 2015 she came back to Germany and established a small-molecule signaling group at the Max Planck Institute of Molecular Plant Physiology in Golm. In October 2020, she was appointed an assistant professor position at the Boyce Thompson Institute, Ithaca, US. She is also an adjunct professor at Cornell University.

ZOOM Link for Seminar: <https://ucr.zoom.us/j/93141755813>
Meeting ID: 931 4175 5813

Host: Dr. Jikui Song