Functions of Mesoscale Macromolecular Organization in Living Cells

Pre- and post-doctoral positions open to those with training in any of the biological or physical sciences.

Over a century ago colloidal phase-separation of matter into non-membranous bodies of hundreds of nanometer (meso-) scale was recognized as a fundamental organizing principal of cell "protoplasm". Recent insights into the molecular properties of such phase-separated bodies present challenges to our understanding of cellular macromolecular networks, as well as opportunities for interpreting and understanding of native and pathological (particularly involved in neurodegenerative disease) molecular interactions. We have launched a major effort to understand the origins, properties and biological functions of phase-separated bodies by using novel fluorescence spectroscopic and super-resolution nanoscopic imaging and large-scale cell based assays and quantitative imaging.

Trainees will be given the opportunity to study specific problems in the understanding of, as examples, the roles of macromolecular phase separation in membrane transport and membrane biogenesis, chromatin remodelling in gene regulation or the effects of metabolites in age-related proteinopathies caused by pathological phase separation.

Bergeron-Sandoval, L. P., Safaee, N. & Michnick, S. W. Mechanisms and Consequences of Macromolecular Phase Separation. *Cell* **165**, 1067-1079, (2016).

Bergeron-Sandoval, L. P. et al. Endocytosis caused by liquid-liquid phase separation of proteins. bioRxiv 145664; doi: https://doi.org/10.1101/145664 (2017)

Trainees will receive full scholarships funded through Canadian federal or international agencies, including Canadian Institutes of Health Research, Natural Sciences and Engineering research Council of Canada or Human Frontiers Sciences Program.

Those interested should send their CV and a motivational letter to:
stephen.michnick@umontreal.ca

Stephen Michnick
Department of Biochemistry
University of Montreal