

Macromolecular Science Colloquium

Raymond F. Boyer Lecture Series

Friday, November 11, 2022, at 3:15 P.M.

Nord Building – Room 411 – 3:15 PM

Dr. Marcelo Marucho

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Cytoskeleton Filaments



Cytoskeleton filaments are essential for various biological activities in eukaryotic cellular processes as diverse as directional growth, shape, division, plasticity, and migration. The basis for cytoskeleton filaments to transmit electric signals, sustain ionic conductance, and overcome electrostatic interactions to form higher-order structures (bundles and networks) appears primarily dominated by the polyelectrolyte nature of these filaments. However, the underlying biophysical principles and molecular mechanisms that support F-actin and Mts' polyelectrolyte nature and their properties are still poorly understood due to the lack of appropriate methodologies.

Dr. Marucho's laboratory developed JACFC, a Java web application that provides suitable tools for elucidating the molecular mechanisms modulating the electrical signal propagation, stability, and bundle formation of microtubules and actin filaments under different molecular (wild type, isoforms, mutants) and environmental (physiological and pathological) conditions. This acknowledgement might reveal cytoskeleton filaments' potential roles in neuronal activities, including molecular-level processing of information and neural regeneration. It is also crucial for developing reliable, highly functioning small devices with biotechnological applications such as bionanosensors and computing bionanoprocessors.

Questions? Email Hector Gomez Jimenez (hmg57@case.edu)