Department of
Biomedical Engineering
UNIVERSITY OF WISCONSIN–MADISON

Fall 2019 Seminar Series

Control of cell polarity, adhesion and germinal zone exit during neuronal progenitor differentiation

David Solecki, PhD
Associate Member; Developmental Neurobiology Department; St. Jude Children's Research Hospital

Dr. David Solecki will discuss unpublished work on how fluctuations in oxygen tension in the developing brain regulate neuronal differentiation and how correlative imaging techniques can revolutionize our understanding of chromatin morphogenesis in differentiating neurons.

ABOUT the SPEAKER

Neuronal polarity is an essential driving force that coordinates the choreography of neural development. Many fundamental questions in the field of developmental neurobiology have driven my primary research program. These include how polarity signaling organizes neurogenesis, shapes the behavior of immature neurons, and drives the neuronal morphogenesis associated with brain lamination. I am also interested in how polarity-signaling cascades are regulated. I am committed to developing a cell biologic and mechanistic understanding of neural development by using the partitioning defective (Pard) polarity signaling complex as a molecular entry point. Therefore, my laboratory has pioneered novel ex vivo approaches and live-cell imaging protocols for the multimodal analysis of cerebellar granule neuron (CGN) differentiation from progenitor cells and their subsequent migration. These methods now include the application of lattice light-sheet (LLS) microscopy and super-resolution technologies to dissect the biology of neuronal development at the highest levels of mechanistic and cellular resolution. Over the course of my career, my studies have been published in such high-impact journals as eLife, Nature Communications, Neuron, Nature Neuroscience, and Science, demonstrating that I am among the leaders in the field of cytoskeletal dynamics, cell polarity signaling, and adhesion control during neuronal cell migration. Moreover, we have begun to apply the techniques that have been successful to dissect cytoskeletal function during migration towards the definition of nuclear structure-epigenetic changes during CGN differentiation. The studies conducted in my laboratory are critical to understanding the pathology of neurodevelopmental diseases, in which the production of neurons or their subsequent migration is defective and how nuclear structure impacts the elaboration of neuronal differentiation gene expression programs.

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Monday, December 2
12 p.m. in 1003 Engineering Centers (Tong Auditorium)