

NANO-BME Seminar

Time: 4:00PM Thursday, Mar 10

Location: EP253 and <https://sdsmt.zoom.us/j/94046899625>

Volumetric Imaging of Macrophage Activity

by Lattice Light-Sheet Microscopy

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Abstract: Macrophages are first responders of the innate immune system whose basic functions include removing dangerous foreign materials coated with antibodies (Ab) or dead host cells via phagocytosis and sampling the extracellular environment for soluble cues via macropinocytosis. These essential processes are controlled by receptors on the macrophage surface and by intracellular signaling pathways.

We utilize lattice lightsheet microscopy to image the membrane and protein dynamics during phagocytosis and macropinocytosis with high spatial and temporal resolution. In this seminar, I will discuss our recent successes in understanding the membrane dynamics leading to successful macropinosome formations. Additionally, I will discuss how we are using advanced microscopy to better understand the role that receptor mobility, target size, cellular motility, and self-signaling play in the recruitment of downstream signaling molecules and the overall phagocytic response.

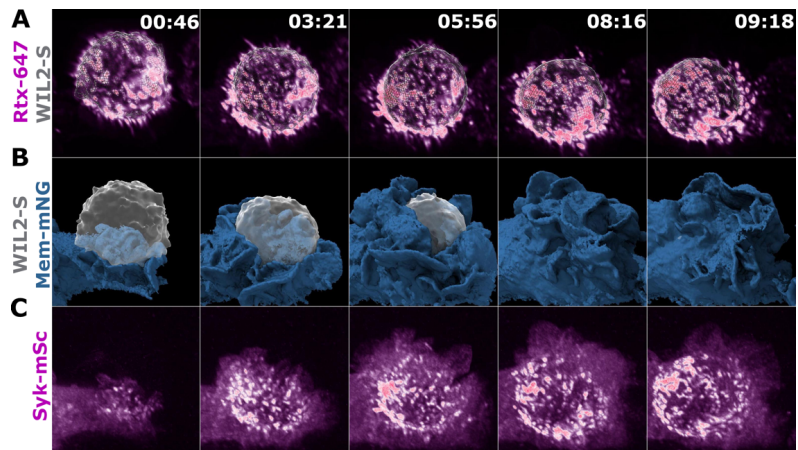


Figure: Phagocytosis of Ab-coated target cell. **A.** Volumetric intensity projection of the target cell and labeled Ab highlighting the rearrangement during internalization. **B.** Isosurface rendering of the macrophage membrane and the target showing the shape of the phagocytic cup and additional membrane ruffling occurring during and after internalization. **C.** Volumetric intensity projection of a fluorescent protein fusion showing the recruitment of the essential kinase for phagocytosis.

About the speaker: Dr. Scott obtained his Ph.D. in Biochemistry from South Dakota State University and continued there as a postdoc until joining SD Mines in 2018. He was promoted to Research Assistant Professor in 2019 when he became South Dakota's only Chan-Zuckerberg Imaging Scientist. He is an expert in biochemistry, cell biology and live cell volumetric imaging.

