Research focuses on the development of chemical tools and noninvasive imaging strategies to probe immune function. Researchers utilize a combination of chemical and biological techniques to equip cells with various imaging probes. These probes are then used to track the movements, interactions, and functions of immune cells in whole organisms.

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Abstract
Imaging tools have revolutionized our understanding of living systems by enabling researchers to “peer” into tissues and cells and visualize biological features in real time. While powerful, these probes have been largely confined to monitoring cellular behaviors on a microscopic level. Visualizing cellular interactions and functions across larger spatial scales—including those involved in cell migration to distant tissues, immunosurveillance, and other biological processes—remains a daunting task. My research group is developing general toolsets to image such macroscopic cellular networks and behaviors, and our efforts are focused in two areas: generating novel bioluminescent probes and developing new bioorthogonal chemistries for imaging in vivo.