



Image Source: National Institutes of Health

Robert H. Lurie Comprehensive Cancer Center of Northwestern University

Lurie Cancer Center's Basic Research Seminar Series

# Horizons in Pathology - Innovations in Multiplexed Tissue Imaging for Discovery and Diagnostics

Tuesday, May 20, 2025

11:00 a.m. - 12:00 p.m. CT

Searle Seminar Room, 1st Floor

Robert H. Lurie Medical Research Center

303 E. Superior St., Chicago, IL

The integration of multiplexed tissue imaging into pathology is poised to transform our ability to analyze human disease by providing powerful spatial molecular data. This talk will examine recent advances in high-plex imaging technologies – such as cyclic immunofluorescence (CyCIF), Orion, and emerging three-dimensional (3D) modalities – and illustrate how they are expanding our understanding of tumor microenvironments, cancer cell biology, and disease progression. By combining computational approaches with spatial profiling, we can now develop new biomarker discovery pipelines and precision diagnostics that bridge traditional histopathology with next-generation digital molecular pathology. Using examples from glioblastoma, colorectal, and ovarian cancer studies (including cancer precursor lesions), this presentation will highlight how spatial molecular imaging drives insights into tissue biology and therapeutic responses. A key focus will be on the clinical integration of these technologies, enabling pathologists and oncologists to access to actionable molecular and spatial data. The talk will also highlight the critical role of 3D imaging of thick tissue sections, which reveals fine structural details – including nuclear envelope integrity, micronuclear rupture, and chromatin bridges – often obscured in twoD analyses. Although these methods have immediate relevance in oncology, they offer broad potential in other disease contexts. Finally, this talk will underscore the value of collaborative, multidisciplinary teams – linking pathologists, data scientists, and clinicians – to realize the full impact of these innovations. In this rapidly evolving era of pathology, the convergence of molecular imaging, artificial intelligence, and high-throughput data analysis promises to redefine diagnostics, guide therapeutic decision-making, and accelerate precision medicine.



**Sandro Santagata, MD, PhD**

Associate Professor

Department of Systems Biology

Harvard Medical School

Hosted by: Marc Mendillo, PhD