



THE UNIVERSITY OF  
CHICAGO

DEPARTMENT OF STATISTICS

## Master's Thesis Presentation

Andrew Zhang

Department of Statistics  
The University of Chicago

### “Benchmarking Six Graph Neural Network Methods for Spatial Domain Detection”

May 28, 2025, at 4:00 PM  
Jones 111, 5747 S. Ellis Avenue

#### Abstract

Spatial domain detection in situ is critical for understanding tissue organization and disease mechanisms, especially in the tumor microenvironment. We compare seven graph-based methods—Spatial LDA, SpaGCN, STAGATE, UTAG, stLearn and CytoCommunity—on three spatial omics datasets (mouse spleen CODEX, mouse visual cortex STARmap, human colorectal tumor CODEX) using a unified pipeline. Performance is measured by evaluating scatter plots vs ground truth. Our results highlight how modeling and graph-construction choices drive method-specific strengths, offering practical guidance for spatial domain analysis.