

# Yuying Lu

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## EDUCATION

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Mailman School of Public Health, Columbia University, New York, USA  
Ph.D. Candidate of Biostatistics

Sept. 2024 - Now

Shanghai Jiao Tong University (SJTU), Shanghai, China  
Bachelor of Mathematics and Applied Mathematics (Wu Wenjun Program)

Sept. 2020 - Jun. 2024

## RESEARCH INTERESTS

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Transfer Learning; Semi-supervised Learning; Online Statistical Inference; Synthetic Data; Diffusion Model; Electronic Health Records (EHRs); Precision Medicine.

## SELECTED RESEARCH EXPERIENCE

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### ReFIT: Federated Transfer Learning for Sequential Prediction

May. 2025 - Dec. 2025

- Designed a streaming (online) optimization algorithm for federated, semi-supervised transfer learning, enabling parameter updates as source data arrive sequentially.
- Implemented the method in R and ran numerical experiments on simulated data, using conformal inference for calibrated prediction sets.
- Built a model-ready cohort from breast cancer EHR data in All of Us Workbench by querying, cleaning, and standardizing records for 40,000+ participants, with validation for missing data and multicollinearity.
- First author; submitted a manuscript to the journal *Statistics in Biosciences (SIBS)*.

### DRIFT: Multi-Domain Robust Estimation of Individualized Treatment Effect

Jan. 2025 - Jan. 2026

- Proved consistency of a latent-factorized outcome model and a maximin individualized treatment effect (ITE) estimator.
- Modified and implemented an R optimization algorithm for maximin ITE and ran numerical experiments on simulated data, achieving a 110% average gain in worst-case predictive accuracy over leading baselines.
- Co-first author; prepared a manuscript for submission to the Journal of the American Statistical Association (JASA).

### CoxTL: Transfer Learning for Time-to-Event Outcomes

Sept. 2024 - Dec. 2024

- Developed a two-step transfer learning method to enhance time-to-event outcome prediction for the target population with limited sample sizes and published an R package ‘CoxTL’ on GitHub.
- CoxTL outperformed the best baseline by +4.5% C-index for time-to-event prediction under covariate shift on simulated data and achieved the top AUC on real data among 5 methods (4 alternatives).
- First author; paper ‘Adaptive Transfer Learning for Time-to-Event Modeling with Applications in Disease Risk Assessment’ is accepted by the journal *Biostatistics*.

### SC2CD: Co-optimizes Spatial Clustering and Cell-type Decomposition

Jul. 2023 - May. 2025

- Derived an iterative framework that combines a graph-based neural network and a matrix-factorization-based decomposition model to jointly improve spatial domain identification and cell-type decomposition.
- Built a Python pipeline for spatial cell-type decomposition and applied it to 3 Visium datasets spanning 14 tissues; increased median PC1 regression  $R^2$  by 25.4% ( $p$ -value = 0.0041).
- Co-first author; submitted the paper to the conference RECOMB and published a Python package on GitHub.

### FEST: Federated Semi-supervised Transfer Learning for Risk Prediction.

Apr. 2023 - Sept. 2023

- Built an R implementation of FEST to fuse external labeled data with unlabeled internal data and train a global model across multi-site datasets without individual data sharing.
- Our method outperformed benchmarks on simulated data (AUC +4%, MSE –30% vs. best baseline) and ranked first in AUC among all 5 methods (4 alternatives) on real data application.
- First author; paper ‘Enhancing genetic risk prediction through federated semi-supervised transfer learning with inaccurate electronic health record data’ is published in the journal *Statistics in Biosciences (SIBS)*.

## HONORS & AWARDS

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Outstanding Graduates of Shanghai, China	2024
Summer Research Internship Scholarship from Mitacs	2023
Excellent Monitor of Shanghai Jiao Tong University	2023
Excellent Undergraduate Scholarship, Shanghai Jiao Tong University	2021 & 2022 & 2023
Wu Wenjun Scholarship	2021
Second Prize in National College Students Mathematics Competition	2021
Merit Student of Shanghai Jiao Tong University	2021

## TEACHING & EXPERIENCE

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Teaching Assistant, Statistical Inference I, Columbia University	<b>Sept. 2025 - Dec. 2025</b>
Teaching Assistant, Biostatistical Methods II, Columbia University	<b>Jan. 2025 - May 2025</b>
Member of Rongchang Talent Students Program, Shanghai Jiao Tong University	<b>May 2021 - May 2024</b>
Member of Student Union, School of Mathematical Sciences, Shanghai Jiao Tong University	<b>Feb. 2021 - Jul. 2022</b>

## POSTERS

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University Biostatistics Annual Symposium 2025 Poster Competition	2025
Data Science Day 2025 Poster, Columbia University Data Science Institute	2025

## PUBLICATIONS & PREPRINTS

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**Yuying Lu**, Tian Gu & Rui Duan. *Enhancing Genetic Risk Prediction through Federated Semi-Supervised Transfer Learning with Inaccurate Electronic Health Record Data*. Statistics in Biosciences (2023).

**Yuying Lu**, Tian Gu & Rui Duan. *Adaptive Transfer Learning for Time-to-Event Modeling with Applications in Disease Risk Assessment*. Biostatistics (2025). accepted.

**Yuying Lu**, Lan Luo, & Tian Gu. *ReFIT: Federated Transfer Learning for Sequential Prediction and Uncertainty Quantification Using Streaming EHR Data*. Statistics in Biosciences (2025). submitted.

**Yuying Lu**, Camille Morencé, Yong Jin Kweon, Archer Y. Yang & Jun Ding. *SC2CD: Co-optimizes Spatial Clustering and Cell Decomposition through Bidirectional Information Flow in Single-Cell Spatial Transcriptomics*. preprint.

Wenbo Fei, **Yuying Lu** (co-first), Yuanjia Wang, & Molei Liu. *Maximin Learning of Heterogeneous Treatment Effect on Multi-Domain Outcomes*. In prep.