

# Rebecca Knowlton

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## EDUCATION

### University of Texas at Austin

Ph.D., Statistics

2020-2025

Advisor: Layla Parast

Committee: Layla Parast, Roger Peng, Antonio Linero, Elizabeth Matsui

### Trinity University

B.A., Mathematics

2014-2017

Summa Cum Laude

## RESEARCH EXPERIENCE

### Department of Statistics and Data Sciences, University of Texas at Austin

Graduate Researcher

2022-2025

*Advisor: Layla Parast*

Developed a novel framework for assessing utility of a surrogate marker with respect to multiple baseline covariates via the proportion of the treatment effect explained. Proposed relevant parametric and semiparametric procedures for estimation and testing, as well as methods for identifying relevant subgroups for future clinical trial design. In the case of heterogeneous surrogate utility, proposed a fully nonparametric method for efficient testing using surrogate information (ETSI), which enables treatment effect estimation and hypothesis testing in a setting where the surrogate is valid to substitute for the primary outcome for certain patient subgroups, and not for others. Demonstrated performance of proposed methodology via simulation studies and application to AIDS clinical trial data.

### SISTM Team, Bordeaux Population Health Center, University of Bordeaux

Visiting Graduate Researcher

November 2023

*Advisors: Layla Parast and Boris Hejblum*

Presented dissertation research on complex heterogeneity in the utility of surrogate markers in department seminar and discussed future directions for the work based on feedback and overlapping interests with the SISTM team.

### Department of Information, Risk and Operations Management, University of Texas at Austin

Graduate Research Assistant

Fall 2022

*Advisors: Sinead Williamson and Maytal Saar-Tsechansky*

Researched methods for developing AI to advise medical experts in high-stake decision-making, such as organ transplants. Developed methods aimed to complement human expertise and judgement via interpretable models while minimizing information leakage.

## HONORS AND AWARDS

University of Texas at Austin Graduate School Dissertation Writing Fellowship

2025

Women in Statistics and Data Science Student Travel Award

2024

University of Texas at Austin Graduate School Continuing Fellowship

2024

American Statistical Association Student and Early Career Travel Award

2024

University of Texas at Austin Professional Development Award

2023

University of Texas at Austin Dean's Strategic Fellowship

2020-2021

Trinity University Transfer Scholarship	2014-2017
National Merit Scholarship Finalist	2013
Professional Association of Georgia Educators STAR Student Award	2012

## INDUSTRY EXPERIENCE

### **Microsoft, Austin, TX**

Data Scientist Intern, Identity and Access Summer 2024  
Implemented a tool in C# to migrate existing Managed Service Identity (MSI) configurations to a modern, platform-agnostic configuration library that enables the combining of multiple runtime files into a single flattened file. Supported modernized feature management and zero-touch enablement of new environments in this migration, validating functional equivalency to old deprecated configurations.

### **Microsoft, Austin, TX**

Data Scientist Intern, Identity and Access Summer 2023  
Piloted metrics in R to monitor efficiency and drive improvements for the building out of new cloud environments for Microsoft Identity services. Served as the sole data scientist on a software engineering team and collaborated with the engineers to understand the complex dependencies of the buildout process and associated data.

### **Microsoft, Redmond, WA**

Data Scientist Intern, Identity and Access Summer 2022  
Exploratory analysis of application health data within Azure Active Directory, including synthesizing information across eight datasets using Spark and understanding best practices for modern identity management. Created measure of application “blast radius” in Python to capture how interconnected an application is within an organization in the event of a security incident.

### **Apple, Austin, TX**

Data Scientist Intern, Strategic Data Solutions Summer 2021  
Researched, engineered, and implemented new features for the primary fraud decisioning model actioning all purchases on the App Store. Collaborated cross functionally with four different teams to understand unexplored dataset of 9 billion rows, and trained machine learning model in Python to assess potential feature lift.

### **USAA, San Antonio, TX**

Actuarial Analyst, Auto Pricing 2017-2020  
Spearheaded pricing efforts for automobile insurance in Texas, the company’s largest state at \$1.9 billion written premium, and assisted in implementing behavior-based insurance and improved rate capping methodology. Led a team of five to analyze countrywide Auto loss trends and understand the drivers for frequency and severity, adjusting data as needed and making appropriate recommendations for annual Auto rate planning. Received scores of 9 or higher on the first five Casualty Actuarial Society Exams, indicating the achievement of 130% or higher of the set passing mark (with fewer than 50% of candidates passing each sitting).

## TEACHING EXPERIENCE

### **Head Teaching Assistant**

University of Texas at Austin, Department of Statistics and Data Sciences  
DS 395T: Data Science for Health Discovery and Innovation Fall 2024

DS 395T: Data Science for Health Discovery and Innovation

Spring 2024

**Course Co-Developer**

University of Texas at Austin, Department of Statistics and Data Sciences

DS 395T: Data Science for Health Discovery and Innovation

Fall 2023

**Teaching Assistant**

University of Texas at Austin, Department of Statistics and Data Sciences

SDS 320E: Elements of Statistics

Spring 2022

SDS 324E: Elements of Regression Analysis

Fall 2021

**SAT, ACT, Mathematics, Statistics, and Writing Tutor**

Advantage Testing, Austin, TX

2022-Present

Private tutor, San Antonio, TX

2014-2017

PEER-REVIEWED ARTICLES    Weine E, Smith SP, **Knowlton R**, Harpak A (2024). Tradeoffs in Modeling Context Dependency in Complex Trait Genetics. *eLife*, In press.

SUBMITTED    **Knowlton R**, Tian L, Parast L. A General Framework to Assess Complex Heterogeneity in the Strength of a Surrogate Marker.  
**Knowlton R**, Parast L. Efficient Testing Using Surrogate Information.

IN PREPARATION    **Knowlton R**, Parast L. Evaluating Heterogeneous Surrogacy in Real World Data.

INVITED PRESENTATIONS    Rank-Based Identification of Surrogates in Small Ebola Studies (RISE) Symposium and Workshop, University of Texas at Austin, June 2024  
 Bordeaux Population Health Center, University of Bordeaux, November 2023  
 Department of Mathematics, Trinity University, October 2023  
 Joint Statistical Meetings, Toronto, Ontario, August 2023

CONFERENCE ORGANIZATION    **Invited Session Chair**, 2024 Women in Statistics and Data Science, *Cause For Celebration: Adapting Causal Inference Methods For Challenging Datasets*

OTHER SERVICE    **Committee Member**, SDS PhD Recruitment In-person and Virtual Visits Committee, 2024-2025.  
**Committee Member**, SDS Social Committee, 2021-2022.

JOURNAL REFEREE    Biometrics

PROFESSIONAL MEMBERSHIPS    American Statistical Association  
 Institute of Mathematical Statistics  
 ENAR of The International Biometric Society

**SOFTWARE**      **cohetsurr**, an R package for assessing complex heterogeneity in the utility of a surrogate marker with respect to multiple baseline covariates  
**etsi**, an R package for efficient testing using surrogate information

**COMMUNITY SERVICE**      **The Phoenix, Austin, TX**  
 Volunteer 2023-Present  
 Led weekly rock climbing and board game events for people in recovery and sober allies. Ran a table for National Overdose Awareness Day on campus at the University of Texas at Austin.

**Breakthrough Central Texas, Austin, TX**  
 Volunteer Spring 2024  
 Assisted with the development and administration of a four week short course on preparing for the ACT, offered at no cost to students who will be the first in their families to attend college. Individually taught a three hour course on the mathematics section.

**Each One Teach One, San Antonio, TX**  
 Volunteer 2019-2020  
 Tutored mathematics to adults studying for the GED.