# SMART Program

## Statistical Mentoring in Application, Research, and Technology

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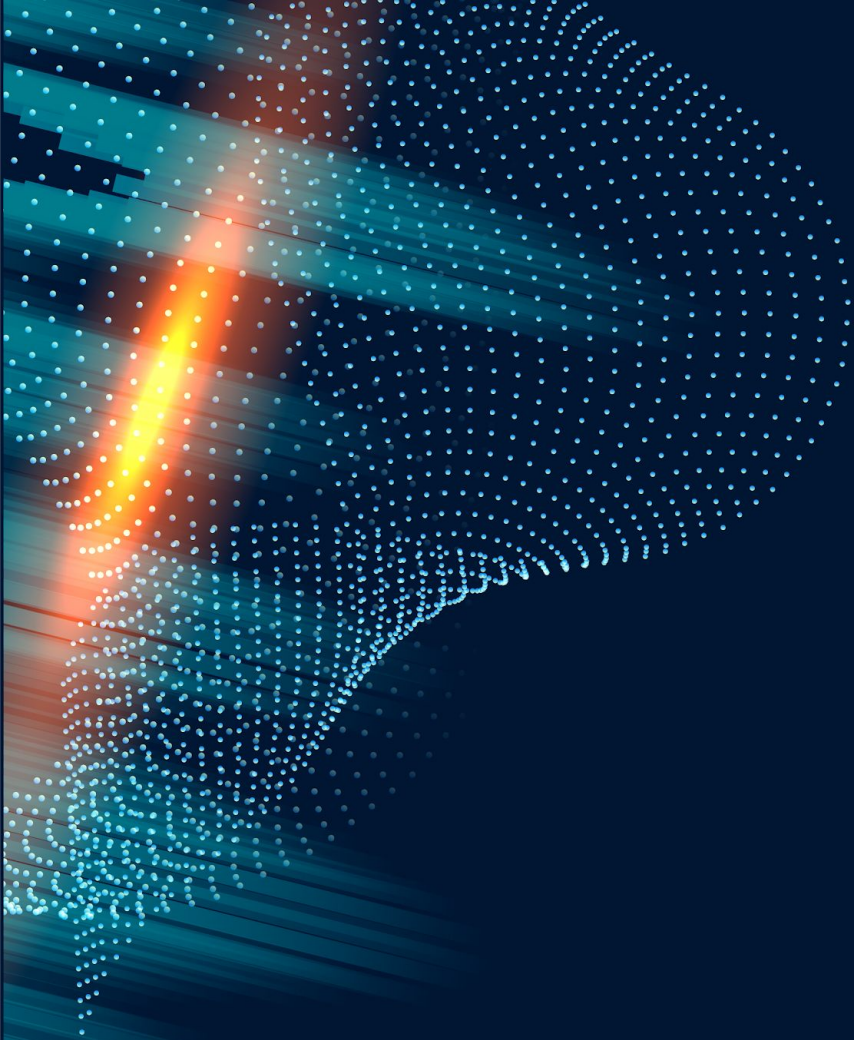
The mission of the SMART program is to provide undergraduate students with the opportunity to conduct statistical projects under the supervision of graduate students and to provide graduate students with an opportunity to develop projects and mentor students.

# 01 Who can participate?

**MENTORS**

- STAT graduate students (MS/PhD)

**FELLOWS**

- Undergraduate students majoring or minoring in STAT or DS; active HiSS members.

- Interested in attending graduate school.

- Must be able to commit to an average of 5 hours per week for one quarter.

- Can only participate in the program once per year.

## 02 What do participants do?

**MENTORS**

- Create a project that an undergraduate student can complete within 6-8 weeks.

- Set prerequisites.

- Gather teaching materials.

- Mentor an undergraduate student for the duration of the quarter.

- Meet with an undergraduate student for 1-2 hours a week.

- Monitor student progress and adjust the project as needed.
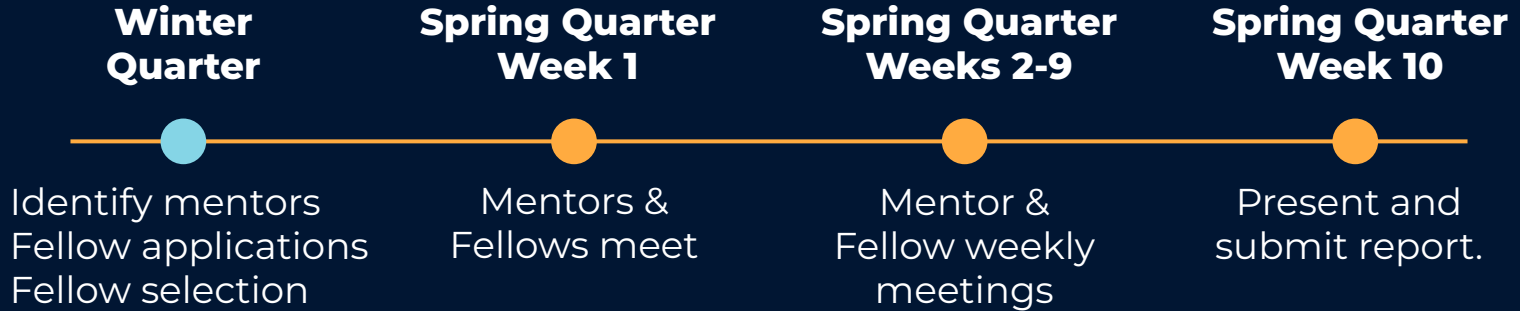
## 02 What do participants do?

**FELLOWS**

- Work on a project under the guidance of a graduate student.

- Spend an average of 5 hours per week on the project.

- Meet with a graduate student mentor for 1-2 hours per week.

- Develop a 1-page report and 10-15 minutes presentation for the end of the quarter.

- Present their work at a department seminar.

# TIMELINE OVERVIEW

**Winter Quarter**

Identify mentors
Fellow applications
Fellow selection

**Spring Quarter Week 1**

Mentors & Fellows meet

**Spring Quarter Weeks 2-9**

Mentor & Fellow weekly meetings

**Spring Quarter Week 10**

Present and submit report.

# 03 Why is this program valuable?

## MENTORS

- Leadership Opportunities
- Mentoring Experience
- Collaboration
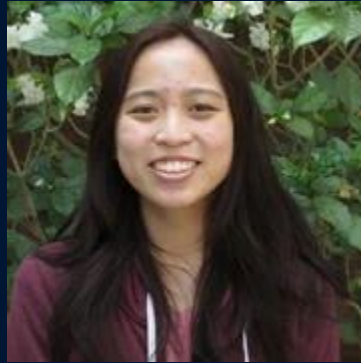- Communication
- **Community Building**

## FELLOWS

- Project experience
- One-on-one guidance
- Exposure to topics outside of curriculum
- Communication:  one-on-one and presenting
- Informally learn about grad school experiences and process
- **Community Building**

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# 3 Mentors

**Brian Tran**

**Emily Ouyang**

**Jericho Lawson**

# Project Overview: **Brian Tran**

**Topic:**    Time Series Analysis w/ Applications

**Description:** Time-series data refers to the data that is collected sequentially over time; it appears in almost all facets of life (annual precipitation, closing stock prices, annual livestock production, export sales, EKG measurements etc.). The student will learn about the fundamental concepts (stationarity, white noise) and general models (AR, MA, ARMA, ARIMA) used in time-series analysis. The goal of this project is to perform time-series analysis on a chosen data set using R and present the findings. The student may choose to perform time-series analysis with machine learning components (convoluted neural networks, recursive neural networks) if they are comfortable with the pace and willing to learn the material.

**Prerequisites:**
- STAT 107 (147)
- STAT 160A

# Project Overview: **Brian Tran**

**Goals / Topics:**

1) Gain an introduction to the fundamental concepts and models used in time-series analysis
   - E.g. AR, MA, ARMA, ARIMA models

2) Broaden knowledge of time-series analysis and its application through application of a chosen data set

3) Discover the potential intersections of machine learning w/ time-series analysis (if time permits)
   - E.g. convoluted neural networks, recursive neural networks

# Project Overview: **Emily Ouyang**

**Topic:**   Text Analysis

**Description:** Text analysis is a huge field in data science. Starting from the basics of working with and creating visualizations for text data (e.g. word clouds), the student will work their way up to learning about sentiment analysis and classification with machine learning techniques. The student will also familiarize themselves with data scraping to generate their own text data which can be used for text analysis, and if time permits, even create their own data scraper. Using these techniques, the student will create their own research presentation catered to their own personal interests.

**Prerequisites:**
- STAT 107 (147)
- Familiarity with basics of tidyverse recommended

# Project Overview: **Emily Ouyang**

**Goals / Topics:**

1) Gain familiarity with the basics of working w/ text data
   - E.g. string operations, search, word clouds

2) Develop an understanding of common text analysis techniques used for sentiment analysis and classification

3) Understand the many applications of data scraping and learn how to use data scrappers to gather data

4) Apply the techniques to create a research project that focuses on clear and concise communication

# Project Overview: **Jericho Lawson**

**Topic:**    Statistics for a Better Society

**Description:** The student will learn and understand the positive and negative impacts of statistical methodology within our society. Using an advanced statistical method, the student will conduct a research project using Python/R and LaTeX that analyzes a particular social issue at play (e.g. food insecurity, use of credit scores, racial inequality in education). In the process, they will prioritize clear communication to stakeholders at play will be important (through visuals and concise language).

**Prerequisites:**
- None!

# Project Overview: **Jericho Lawson**

**Goals / Topics:**

1) Develop awareness of issues related to misuse of statistical methodology and application

2) Conduct a statistical research project using R/Python and LaTeX on a particular social issue using advanced methods

3) Develop an understanding of clear, concise communication w/ the use of visuals (e.g. ggplot)

# APPLICATION PROCESS

## Winter 2023

**Friday** (Week 7)
2/24/2023

**Friday** (Week 10)
3/17/2023

**Friday** (Finals)
3/24/2023

Information
Session
&
Application
Opens

Applications
Close

Applications
Reviewed

Fellows
Notified

# APPLICATION Materials

1) Courses taken and R experience

2) What are your career goals? (Word Limit: 300)

3) How would you benefit in participating in the SMART Program? (Word Limit: 300)

4) Do you plan to attend graduate school?

5) Upload a 1-2 page Resume (Submit a PDF)

6) Project Interest Ranking

## APPLICATION

https://forms.gle/BAT5m2Css4pdY3rD9

# THANK YOU!

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