



Statistical Engineering and Analysis (SEAL) Lab – SCRP Application 2024

PROJECT: The Survivalverse

Contact:

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Project Description:

Survival analysis is the study of time until an event of interest. In engineering applications, it can mean time until a device breaks (reliability). In HR applications, these methods can be used to model time to promotion or job tenure. In health studies, it can be time until onset of a disease. Survival analysis methods are unique in that they are designed to handle cases in which the exact event time is unknown.

A major need exists to create an alternative to the current suite of R functions & packages. Many are clunky and not user-friendly, and few leverage the power of the Tidyverse to make analyses easier. The primary objective of this project is to continue the development of the Survivalverse, a Tidyverse-centric R package for survival analysis and reliability methods. Student researchers would be responsible for contributing functions and sample datasets to the package. They would also conduct a user experience (UX) pilot to gain feedback on the usability of their functions.

This project has the potential to benefit a wide variety of practitioners in academia and industry.

Expectations:

Toward the beginning of the summer, the student researchers will work closely with Dr. Gore to establish the foundation for the project. However, after the initial few weeks, researchers will need to work more independently after receiving guidance. Researchers must also be available and prepared for biweekly check-ins to ensure adequate progress in the package development. Sound time management is a must. *However*, research progress is rarely linear, and challenges are bound to arise

(which is also what makes research fun!). As such, researchers are expected to maintain effective transparent, frequent communication with Dr. Gore throughout the summer.

Tentative Project Timeline

Week	Objectives
1	Training on developing R packages
2	Crash course on survival analysis/reliability M: Survival basics, censored data, event plots, Kaplan Meier curves T: Practice methods on datasets W: Parametric survival analysis H: Practice methods on datasets F: Talk through the current Survivalverse package components
3	Map out survivalverse ecosystem & implementation plan Create geom_AF for general accelerated life tests (ALT)
4	Create geom_ALT for temperature, voltage ALT's.
5	Documentation & datasets for geom_AF, geom_ALT
6	Create geom_coxph for Cox proportional hazards models
7	Documentation & datasets for geom_coxph
8	Pilot study & refinement
9	Overflow

Application

Instructions: Please fill in the following, save the document as a pdf with your first and last name in the file name, and email it to kgore@willamette.edu. Thank you!

GENERAL

Name:

Major(s):

Year @ WU:

In 1-2 paragraphs,
explain what most
interests you
about this project.

What are your
long term career
goals/interests?

ACADEMIC BACKGROUND

Please list the courses you've taken in the following areas:

Data Science /
Statistics

Computer Science

Physics /
Engineering

Math (including
calculus)

PROGRAMMING EXPERIENCE

On a scale of 1-5 where 1=no experience and 5=highly proficient, please rate your proficiency programming in the following languages:

R

Python

Other (please list)

OTHER

Do you have any relevant work, research, and/or internship experience? If so, please provide details.

What characteristics make you a good fit for this researcher position?

How many hours per week are you able to dedicate to this project?

Are there any weeks this summer when you plan to travel and/or will be unable to complete work for this project?

Anything else I should know?

Thanks for completing this application for SEAL Lab's SCRP project. Please email a pdf of this application to me at kgore@willamette.edu. Make sure you include "SCRP – Survivalverse – YourLastName" in the email subject so I can filter my emails accordingly. Lastly, feel free to email me or stop by my office (Ford 208) if you have any questions regarding the project. Look forward to potentially working with you! -Dr. Gore