

# BRIAN BURROWS

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Certified software engineer with six years of experience implementing algorithms and developing APIs. Projects include implementing machine learning algorithms for various scientific applications and developing web apps using Python, Javascript, HTML/CSS in Flask, Node, Express, and React. Currently finishing Springboard's software engineering certification.

## SKILLS

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<b>Languages</b>	Python, Javascript, Matlab, R, HTML, CSS, Bash
<b>Dev Tools</b>	Flask, Node.js, Express, SQL-Alchemy, Jasmine, Jest, unittest, Heroku, React, Redux, WTForm, terminal, jQuery, bootstrap, Node-pg, JSON Web tokens.
<b>Data Tools</b>	SQL, ArcGIS, Tableau, Numpy, Scipy, Pandas, scikit-learn, Seaborn, matplotlib, statsmodels.

## PROJECTS

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### **SOKA Adventures** ([github.com/brianjburrow/SOKA\\_PUBLIC](https://github.com/brianjburrow/SOKA_PUBLIC))

SOKA Adventures is a social media platform for orienteering built in Python, Flask, Javascript, CSS, and HTML. The website's function is to display landmarks for the user to find, provide information needed to plan a trip to each landmark, and share photos of the trip with friends. SOKA provides this functionality through a combination of Mapbox, OpenWeatherMap, and custom-built API's. Once an activity is complete, a user can upload images, which are compressed on the server side and uploaded to Amazon S3 using presigned URLs.

## EXPERIENCE

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### **Self Employed** 2020-Present

- Proposed a software engineering project to improve wind farms. Finalist at NREL (~ 400 Applicants)
- Prototyped algorithms for optimal sensor placement, extremum seeking control, and information fusion..
- Implemented unit and integration tests using Python's unittest package.
- Provided code reviews for data science student at MIT's Policy Hackathon on Environmental Justice.

### **Research Scientist I** A.I.R. Worldwide, Financial Uncertainty Group, 2019-2020

- Fixed QA issues by creating an ETL pipeline for statistical modeling of insurance claims.
- Fixed QA issues with probability distributions by designing a constrained non-linear optimization problem.
- Created documentation for various software components and data pipelines.
- Created data visualizations of natural disasters for various research teams.

### **Intern, Lawrence Livermore National Laboratory** Center for Applied Scientific Computing, Summer 2017

- Performed exploratory data analysis on 700 terabytes of physics simulations on a Linux supercomputing cluster.
- Identified error signatures in the data set, and wrote shell scripts to automate detection and correction.

### **Graduate Research Assistant, Texas A&M University** Computational Design Laboratory, 2014-2019

- Improved accuracy of estimating damage to an aircraft by developing new machine learning algorithms.
- Improved computational cost of estimation by developing approximate Gaussian Process models.
- Enabled scalable design space exploration by refactoring existing simulation code to run on a supercomputer.
- Performed technology review by implementing Transport Maps, Kalman Filters, MCMC, and treed-GP.
- Developed API for each of the above algorithms, published 2 journal articles, and three conference articles.

## EDUCATION

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<b>Software Engineering Career Track Certification</b> , Springboard	2022
<b>Applied Data Science Certificate</b> , Massachusetts Institute of Technology	2021
<b>Ph.D. in Mechanical Engineering</b> , Texas A&M University	2019
<b>M.S. in Mechanical Engineering</b> , University of South Carolina	2014
<b>B.S. in Bioengineering</b> , Clemson University	2010

## AWARDS AND HONORS

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<b>South Carolina Life Scholarship</b>	2006 - 2010
<b>Tau Beta Pi</b> Engineering Honors Society	2013 - Present
<b>Pi Tau Sigma</b> Mechanical Engineering Honors Society	2014 - Present

## PUBLICATIONS

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<b>Probabilistic Methods for Estimating Vehicle Capability in Damaged Composite Aircraft</b>	2019
<b>Nonlinear Kalman Filtering with Expensive Forward Models via Measure Change</b>	2019
<b>Analysis of UQ Techniques for Vehicle Capability in Damaged Composite Aircraft</b>	2019
<b>Multitask Aircraft Capability Estimation Using Conjunctive Filters</b>	2017
<b>A Comparison of Naive Bayes Classifiers with Application to Self-Aware Vehicles</b>	2017
<b>Mechanical Percolation in Nanocomposites: Microstructure and Micromechanics</b>	2016
<b>A Data-driven Approach to Multiple Task Capability Estimation</b>	2016