BRIAN BURROWS

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Brian has six years of experience implementing algorithms and developing APIs in Python and Matlab. He created and implemented machine learning algorithms for autonomous aircraft, performed statistical modeling for natural disasters and nuclear fusion research. He is now developing web apps for orienteering using Python, Flask, Postgresql.

SKILLS

Languages	Python, Javascript, Matlab, R, HTML, CSS, Bash
Developer Tools	AJAX, Flask, Node.js, Express, SQL-Alchemy, Jasmine, Python unittest, Heroku, DrawIO.
Data Tools	SQL, NoSQL, ArcGIS, Tableau, Numpy, Scipy, Pandas, PySpark, scikit-learn, multiprocessing, Seaborn, matplotlib, statsmodels, Tensorflow.

EXPERIENCE

Recent Projects 2020-Present

- Authored a research proposal for wake steering (finalist for NREL's director's fellowship $\sim$ 400 applicants).
- Implemented algorithms for optimal sensor placement, extremum seeking control, and information fusion.
- Developed the full stack for a social media site for orienteering (Python/Flask/JS/jQuery/CSS/HTML/Heroku).
- Created Amazon S3 account and authorized users to upload and serve user images using presigned urls.
- Implemented unit and integration tests using Python's unittest package.
- Created weather forecasting UI using javascript and axios to query OpenWeatherMap's REST API.
- 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 statistical modeling of earthquakes and simulating wildfires.
- 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.
- Efficiently identified errors in physics simulations by using Python's multiprocessing to process big datasets.

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

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

AWARDS AND HONORS

South Carolina Life Scholarship 2006 - 2010

Tau Beta Pi Engineering Honors Society 2013 - Present

Pi Tau Sigma Mechanical Engineering Honors Society 2014 - Present

PUBLICATIONS

Probabilistic Methods for Estimating Vehicle Capability in Damaged Composite Aircraft 2019

Nonlinear Kalman Filtering with Expensive Forward Models via Measure Change 2019

Analysis of UQ Techniques for Vehicle Capability in Damaged Composite Aircraft 2019

Multitask Aircraft Capability Estimation Using Conjunctive Filters 2017

A Comparison of Naive Bayes Classifiers with Application to Self-Aware Vehicles 2017

Mechanical Percolation in Nanocomposites: Microstructure and Micromechanics 2016

A Data-driven Approach to Multiple Task Capability Estimation 2016