Sam Friedman

samtx.dev

TECHNICAL SKILLS

Proficient: Python, Matlab, Numpy, Scipy, Cython, Starlette, FastAPI, Git, Ubuntu

Familiar: Docker, C, C++, Fortran, Javascript, Svelte, AlpineJS, Postgresql, Redis, Django, Flask

DEVELOPER PORTFOLIO

Pass Predict, Web application predicting satellite overpasses

passpredict.com (github.com/samtx/passpredict-app)

- Designed web application to be mobile-friendly, easy to use for inexperienced satellite observers, but thorough enough for enthusiasts.
- Developed custom satellite prediction algorithm based on SGP4 propagation, supplemented with Cython functions for fast computation.
- Asynchronous backend built in Python using Starlette and FastAPI. Uses Redis and Postgresql for caching and data persistence. Frontend is built with Jinja templates and AlpineJS for interactivity. Deployed on a DigitalOcean VPS with Docker.
- Exposed a public API for developers to easily integrate satellite pass predictions into other websites.

Tafelberg Rental API, Backend API for web scraping rental property availability

tafelberg-api.samtx.dev (github.com/samtx/tafelberg-api)

- Created a API server for proxy web scraping third-party rental property booking website for availability.
- Designed to asynchronously gather availability data of multiple properties at once.
- Built with Python, FastAPI, Httpx, and BeautifulSoup. Deployed on a DigitalOcean VPS with Docker.
- Developed custom rate limiter to cache web scraping results in in-memory store with time-to-live expiration.

EDUCATION

2022 **Ph.D. Mechanical Engineering**, Texas A&M University, College Station, Texas

2019 **M.S. Mechanical Engineering**, Texas A&M University, College Station, Texas

2010 **B.S. Mathematics, B.A. English**, The University of Texas at Austin, Austin, Texas

RESEARCH

2015–present **Texas A&M University**, Graduate Research Assistant, College Station, Texas

Advisor: Professor Douglas Allaire, Department of Mechanical Engineering

- Investigated uncertainty propagation in coupled multiphysics, multifidelity systems
- Evaluated the effect of model and parametric uncertainty on the stationary joint density of coupled variables using Markov chain Monte Carlo Gibbs sampling techniques
- Utilized an existing dataset of design samples for importance weighting to approximate target design sample distributions
- Funded as part of Air Force Office of Scientific Research (AFOSR) Multidisciplinary Research Program of the University Research Initiative (MURI) for “A unified mathematical and algorithmic framework for managing multiple information sources of multi-physics systems”

2019 **Sandia National Laboratories**, Graduate Intern - Research & Development, Albuquerque, New Mexico

Advisors: Mike Eldred and John Jakeman, Department of Optimization & Uncertainty Quantification

- Developed method for multifidelity uncertainty quantification within a coupled multiphysics system
- Leveraged multiphysics and multifidelity simulation components to create sparse grid surrogate with fewer function evaluations than a traditional black-box surrogate
- Gave seminar presentation to department on research progress
- Continued collaboration on surrogate method for Ph.D. disseration

2014–15 **The University of Texas at San Antonio**, Research Assistant, San Antonio, Texas

Supervisor: Professor Harry Millwater, Associate Dean for Research, College of Engineering

- Development of function library for use of multicomplex analysis in numerical methods
- Implemented overloaded variable and functions in Fortran
- Integrated overloaded numeric type into ABAQUS for custom triangle element in finite element analysis

PROFESSIONAL EXPERIENCE

2013–20 **Safen Medical Products, LLC**, Chief Information Officer, San Antonio, Texas

- Set up and maintained cloud-based application infrastructure for document management, collaboration, email, and accounting for medical device start-up company
- Created training material for employees and handle technical support issues
- Drafted language for patent applications and copy for website

2011–12 **Epic**, Technical Services Analyst, Verona, Wisconsin

- Provided technical support for professional billing application at industry-leading electronic health record company based in Verona, Wisconsin
- Coordinated issue resolution between customer technical administrators, Epic project managers, and other Epic technical support personnel
- Programmed in Caché and served as quality assurance on several software updates and managed critical development projects across application teams

PUBLICATIONS

S. Friedman, B. Isaac, and D. Allaire. "Efficient Decoupling of Multiphysics Systems for Uncertainty Propagation", 20th AAIA Non-Deterministic Approaches Conference, AIAA Science and Technology Forum and Exposition, Orlando, FL, 2018.

B. Isaac, **S. Friedman**, and D. Allaire. "Efficient approximation of coupling variable fixed point sets for decoupling multidisciplinary systems", AIAA/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference, Orlando, FL, 2018.

S. Friedman, S.F. Ghoreishi, and D. Allaire. "Quantifying the Impact of Different Model Discrepancy Formulations in Coupled Multidisciplinary Systems", 19th AIAA Non-Deterministic Approaches Conference, AIAA Science and Technology Forum and Exposition, Grapevine, TX, 2017.

S. Friedman, D. Allaire. "Quantifying Model Discrepancy in Coupled Multi-Physics Systems." ASME 2016 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference. American Society of Mechanical Engineers, Charlotte, NC, 2016.

AWARDS

Texas A&M Department of Mechanical Engineering Graduate Fellowship, 2021

Texas A&M College of Engineering Scholarship, 2015.