Patrick Kage

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SKILLS

LANGUAGES

(Computer)
Python
HTML
CSS/Sass/SCSS
Javascript
C/C++
Rust
Java
Assembly (MIPS)
SQL
Haskell

FRAMEWORKS

Node.js/Express
Flask
SQLite (all bindings)
React.js
Redux + React-Redux
Svelte
Vue.js
Polymer
Vanilla JS
Jest.js
Three.js
SFML (C++)
SciPy/NumPy
SKLearn
PyTorch

TOOLS

Docker
(Neo)Vim
Linux (systems prog.)
Final Cut Pro
Adobe Photoshop
Adobe Illustrator
G Suite
MS Office (esp. Excel)

LANGUAGES

(Human)
English (Native)
Polish (Fluent)
Mandarin (Intermediate)

EXTRA-CURRICULAR ACTIVITIES

Computer Society (TechSec/SIGWeb)
Skydiving
SCUBA (BSAC: Ocean Diver)

EDUCATION

UNIVERSITY OF EDINBURGH | BSc.(H) Artificial Intelligence & C.S., 1st Class

2017 — 2021 | Edinburgh, Scotland, UK

- Technical Secretary at CompSoc as of summer 2018. CompSoc is the largest tech society in Scotland and largest society in the university.
- Heavily involved in organising the 2019, 2020, and 2021 Hack the Burgh events, the largest 24 hour hackathon in Scotland.
- Honours project dissertation on novel methods for detecting latent class fragmentation with deep neural classifier explanatory methods, publication version available on ArXiv (2107.01657).

EXPERIENCE

NASA JET PROPULSION LABORATORY | Soft. Eng. Intern

Summers 2016, 2017, 2018, 2019 | Pasadena, CA, US

- 2016 — Worked in JPL's 397-F (Ops Lab/Human Interfaces Group) to develop mission formulation software to enable design of satellite propulsion systems in support of Team X and Xc's model-based systems engineering modernization initiatives. Resulting project made part of JPL's long-term strategic plan.
- 2017 — Continued work from 2016 on the Integrated Modeling Environment (IME). Developed a plugin system for IME through JPL's 397-M group. Focused on data visualization and rapid development. Produced a series of demo plugins, including utilizing WebVR to display satellite models.
- 2018 — Developed CODEX, a first-pass data analytics framework for scientific data from JPL/external missions through the Machine Learning and Instrument Automation (MLIA) group. Focused on the frontend, leading a major refactor towards adding unit testing, removing bad practice code, adding documentation, and transitioning the data model to use immutable.js + Redux. Additionally, wrote a static analysis toolkit to aid refactoring of poorly written and undocumented codebases in Javascript.
- 2019 — Continued work on CODEX with MLIA, taking a leadership position on the frontend. Focused on ensuring that the CODEX application remained performant under heavy load, enabling multiple users, and enforcing data consistency. These goals required robust concurrency logic, even under limited conditions and high net/IO/CPU loads.
- 2020 — Continued work on CODEX with MLIA. Building on last year's work, enabled automatic downsampling of datasets for frontend and removed backend bottlenecks allowing for 3-4 orders-of-magnitude faster performance on large datasets.

AURORA FLIGHT SCIENCES | Soft. Eng. Intern

December 2016 – May 2017 | Cambridge, MA, USA

- Developed flight/ground station software and hardware for upcoming micro- satellite missions, focusing on software systems engineering. Created new IP
- Worked on the Deformable Mirror Demonstration mission (DeMi) cubesat flight and ground software, a joint project with MIT Space Telecommunications Astronomy and Radiation Lab (STARLab).

MASSACHUSETTS INST. OF TECHNOLOGY | Research Assistant

Summer 2015, December 2016 – May 2017 | Cambridge, MA, USA

- Summer 2015 — Developed ground/flight software for MIT Space Telecommunications, Astronomy, and Radiation Lab (STAR Lab)'s microsatellite project (MiRaTA), as well as working remotely on JPL mission formulation software. Ground software written at this time is still in use at MIT Lincoln Labs.
- 2016-2017 — Created visualization software to model satellite constellations to support ongoing research at STARLab. Represented STARLab and MIT professionally at the MIT Industry Liaison Conference in Vienna, Austria.