James Sinclair

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EDUCATION

Master of Computer Science **Jan 2020 - Present**
The University of Melbourne
- Dean's Honours List, Faculty of Engineering and IT, 2020

Bachelor of Engineering (Aerospace) (University Medal, Hons) **Jan 2009 - Dec 2013**
UNSW
- University Medal and Honours Class 1
- Dean's Award, Faculty of Engineering, 2010-2013

Bachelor of Science (Physics) (Distinction) **Jan 2009 - Dec 2013**
UNSW
- Dean's List, Faculty of Science, 2010-2013

EXPERIENCE

Engineer/Partner **Jul 2016 - Present**
PassBox, Melbourne
- Executed the world's largest on-road study to-date of cyclist passing distance, co-authoring a peer-reviewed publication
- Designed the PassBox device to enable the study: electrical, mechanical, and software (Arduino) prototyping; testing and validation of device function; fabrication of enclosures (3D printing); PCB design (KiCAD); assembly of 20 devices; ongoing maintenance
- Developed, tested, and maintain PassBox data reduction software (Python), purpose-built to synchronise distance sensor readings to video footage to produce passing events for statistical modelling
- Presented to 3 international cycling/road safety conferences around Australia
- Produced 65% cost reduction for manual data coding with machine learning
- Created utility scripts (bash, PowerShell) for management of cloud services (AWS EC2, S3) and managing large volumes (10-100TBs) of collected data
- Maintain the PassBox online map (JavaScript, AWS)
- Delivered pedestrian safety analysis of slip lanes on Victorian roads through novel analysis methods using pedestrian operated signals data

Composites Research Engineer **Mar 2015 - Dec 2018**
Boeing Research and Technology - Australia, Melbourne
- Developed next generation manufacturing processes and materials to manufacture aerospace components using composite materials in a multi-disciplinary team
- Led an internal tooling technology development project to mature internal tooling to support dependent project, by exploring and selecting technologies through research, lab trials and demonstrator builds, knowledge sharing with the broader Boeing enterprise, and working with external suppliers
- Presented at Boeing Technical Excellence Conference in South Carolina on structural optimisation techniques and resin infused structures
- Demonstrated competitiveness of resin infusion technology through trade studies/NPV analyses of competing composite structure manufacturing processes and architectures for a variety of aircraft components
- Created novel structural analysis methods reducing test durations from months to minutes,
- Developed manufacturing analysis methods to increase manufacturing rate (Abaqus, Python)
- Captured intellectual property as patents and trade secrets, receiving the Boeing Inventor Award
- Collaborated to pass Technology Readiness Level gate reviews for resin infused structural components

COURSEWORK

- **Cluster and Cloud Computing:** as a team of 5, implemented and deployed a cloud-based web app to show visualisations of harvested tweets combined with government data to explore liveability in Melbourne. Deployed using Ansible on the Melbourne Research Cloud, using Dockerised tweet harvesters, a CouchDB (NoSQL) cluster, ReST API using Flask and a frontend using Svelte
- **Software Processes and Management:** led a team of 5 as project manager, delivering a discount voucher web app
- **Machine Learning:** implemented a tweet geolocation classifier using a variety of techniques
- **Modelling complex software systems:** as a team of 3, implemented ground-up agent-based model of wealth inequality in Java
- **Cryptocurrencies and decentralised ledgers:** as a team of 3, scraped data from blockchain APIs and analysed decentralisation across Proof of Stake cryptocurrencies

TECHNICAL SKILLS

- Primary languages: Python, Java, C, R, Haskell, JavaScript, SQL
- Competent with Linux/Windows
- Use Git for all code-based projects
- Development of novel data analysis techniques
- Deployment and use of cloud services (Ansible, AWS S3, EC2)
- Prototyping electromechanical devices: CAD (Catia), PCB design (KiCAD), Arduino development
- Composites design, analysis/finite element modelling (Abaqus, Patran/Nastran), and manufacturing
- 3D printing/design for additive manufacturing
- Trade studies and NPV analysis

PUBLICATIONS

Nolan, J., Sinclair, J., & Savage, J. (2021). Are bicycle lanes effective? The relationship between passing distance and road characteristics. Accident Analysis & Prevention, 159, 106184

PATENTS

Curved heat-shrink tubing and methods of making the same, US 10625448 Issued Apr 21, 2020