

# Aaron Craig

CV

## Languages

Proficient C, Java, Prolog, Python, Rust  
Familiarity Bash, C++, Haskell, Isabelle, L<sup>A</sup>T<sub>E</sub>X, SPARK Ada, SQL

## Frameworks, Tools, Libraries, Platforms, Protocols

Alloy, Berkeley Sockets, Cargo, cJSON, curses, DNS, Git, GNU Make, HTTP, JSON, JUnit, Linux, LTSA, matplotlib, nltk, numpy, pandas, SDL2, Swing, Unity, XML, XStream

## Experience

- 2017 **Intern, Oracle Labs**, Brisbane, Australia.  
Worked in the secure languages group to investigate the feasibility and limitations of languages such as Rust in secure software development.  
◦ Ported from C to Rust [a library](#) for open-nested transactions in non-volatile memory.
- 2015-2017 **Research Assistant, Victoria University of Wellington**.  
Worked on the compiler and effect system of [Wyvern](#).  
◦ Implemented Wyvern intermediate language semantics and dynamic typing  
◦ Added and updated integration tests for module system (JUnit).  
◦ Developed a lightweight capability-based effect system and proved it sound.
- 2014-2017 **Tutor, Victoria University of Wellington**.  
Marking tests and assignments; invigilating; running tutorials, labs, lectures, and helpdesks.  
◦ Intro to Computer Science (2014)  
◦ Engineering Modelling & Design (2014)  
◦ Data Structures & Algorithms II (2015)  
◦ Formal Foundations of Programming (2015)  
◦ Programming Languages (2016)  
◦ Data Structures & Algorithms II (2017)
- 2014-2016 **Research Intern, New Zealand Registry Services**, Wellington.  
Data analysis and visualisation of New Zealand's DNS traffic.  
◦ Data analysis on a Hadoop cluster using Python, pandas, numpy, matplotlib, and SQL.  
◦ Analysis of routing data in Python. This was used to generate a [BGP topology map](#).  
◦ Anomaly and botnet detection on domain names using clustering techniques and natural language processing (nltk, Python).
- 2013-2014 **Business Processing Clerk, Converga Ltd.**, Petone.  
Data entry, verification, sorting files (I used Radix and insertion sort).
- 2010-2013 **Storeman, Target Furniture**, Porirua.  
Furniture removal, delivery, assembly, and repair; managing inventory; driving forklift.

## Personal Projects

- automata** A visualisation of cellular automata in C with curses.
- fsms** The Miller-Rabin powerset construction in Prolog, which proves non-deterministic state machines and deterministic state machines are computationally equivalent.
- minifx** A Java interpreter for an effect-conscious LISP dialect.
- pxljam** pxljam is a game jam event in Wellington. Over the years I've made several kinds of games, such as a **platformer** (Java, Swing), a **lane-runner** (Java, Swing), and a **3D horror game** (Unity, C#).
- trustines** A collaborative project to build an emulator for the NES (and 6502 microprocessor).

## Publications & Talks

*Capability-Based Effects*. Aaron Craig, Lindsay Groves, Alex Potanin, Jonathan Aldrich. OCAP Workshop, SPLASH, Vancouver, 2017.

*Jumping Into a Pool of Data*. Aaron Craig. New Zealand Internet Research Forum, Auckland, New Zealand, 2015.

## Education

- 2017 **B.Sc. Hons. Computer Science**, *Victoria University of Wellington*.  
Thesis: [Capability-Flavoured Effects](#)  
Supervisors: Alex Potanin, Jonathan Aldrich (Carnegie Mellon), Lindsay Groves
- 2016 **B.Sc. Computer Science & Mathematics**, *Victoria University of Wellington*.
- 2011 **Tawa College**, *Tawa, Wellington*.  
NZQA Outstanding English Scholarship  
NCEA Level 3 (Merit Endorsement)

## Volunteering

- 2016-2017 **Volunteer**, *Samaritans*, Wellington.  
Providing emotional comfort and support to callers at the 24-hour crisis hotline.

## Personal

- Interests Type/effect systems, logic, computability theory, programming languages, capabilities
- Hobbies Reading, writing, guitar, boxing, history, videogames
- Languages English (fluent), Māori (elementary)

## References

Available upon request.