

# Tom Manderson

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## Education

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### University of Queensland

BE (Software)/BS (Mathematics)

Feb 2014–Jun 2019

- o Awarded the "ICT Excellence Scholarship" 2014
- o Software focus in distributed and concurrent programming, program verification
- o Mathematics focus in operations research and abstract algebra
- o Thesis: "Proving Consistency of an Abstract Algebra for Verification of Concurrent Programs"

## Work Experience

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### Wattwatchers

Consulting Software Developer

Dec 2018–Present

- o Freelance position – backend infrastructure for IoT energy monitoring
- o Architecture requirements elicitation and design for highly available data ingestion
- o Time-series PostgreSQL query and schema optimisation yielding a 70% read/30% write performance improvement
- o Implementing asynchronous concurrent patterns in a Python socket server yielding 1.5x throughput increase

### Polymathian

Developer

Dec 2015–Mar 2019

- o Diverse role including full stack web dev, system administration/DevOps, data science, client-facing consulting
- o Solely responsible for company-wide transition to deployment with Docker
- o Developed a transparent API for running tasks asynchronously in a distributed and concurrent environment
- o One of two developers on rearchitecture of core internal tooling to microservices

### University of Queensland

Tutor, Introduction to Software Engineering

Feb 2015–Nov 2015

- o Teaching Python (and programming more generally) to first-year students
- o Modified Python's unittest to provide student-friendly test results and automated marking features
- o Awarded a prize due to high performance evaluation from students

### iLab Accelerator

Technical Intern

Nov 2014–Mar 2015

- o Python web development using webapp2 and SQLAlchemy
- o Whitelabeled GitLab VCS (in Ruby on Rails) for a version control system for Microsoft Excel

### Brisbane Boys' College

Robotics Coach

Jan 2014–Nov 2015

- o Ran holiday workshops and after-school classes teaching students in years 6-12 how to build and program robots using platforms including Lego NXT, Arduino, MicroPython
- o Teams I coached were invited to compete internationally in Robocup Junior

## Volunteering

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### UQ Computing Society (UQCS)

President

Oct 2014–Oct 2017

- o Doubled membership year on year throughout presidency
- o Ran annual hackathon with >100 attendees in both 2016 and 2017
- o Managed committee of 7 members

### Robocup Junior Australia

Soccer Referee, Volunteer

Aug 2014–Sep 2018

- o Responsible for technical and safety audit of robotic soccer robots
- o Contributor to development, maintenance, and system administration of competition management system
- o Head soccer referee 2015, 2016, 2018

## Projects

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### Software Engineering Thesis

*Abstract Algebra, Formal Verification, Isabelle/HOL*

2018–2019

- Proving consistency of an abstract algebra for concurrent programs in the Jones rely-guarantee style
- Encoding an instantiation of the given abstract algebra in Isabelle/HOL
- Awarded a high distinction

### UQCS Projects and Infrastructure

*Development, Operations, Python, Ruby, JavaScript, L<sup>A</sup>T<sub>E</sub>X*

2015–2018

- Developed and maintained 6 public-facing, 1 infrastructure project for UQCS including build and deployment automation
- Sole developer on three Python/Flask based projects (membership admin, merchandise sales, deployment hooks)
- Lead contributor to development of a Python slack bot framework

### Stable Matching for Dynamic Ride-Sharing Systems

*Development, Mathematics, Python, Operations Research*

2017

- Took an existing Operations Research paper and successfully increased performance more than 3x
- Improved both mathematical formulation and software characteristics
- Included linear programming, integer programming, dynamic programming, mathematical problem decomposition

### mypy Type Checker

*Development, Python*

2017

- Open source project: official type-checker for Python
- One of two contributors to metaclass type-checking capabilities

## Skills

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This should not be considered an exhaustive list

### Programming Languages....

- Python
- Haskell
- JavaScript/TypeScript
- Java
- C/C++
- Isabelle/HOL

### Technologies.....

- SQLAlchemy
- Flask
- VCS (Git/SVN/Mercurial)
- CI (Jenkins/Travis/CircleCI)
- PostgreSQL
- TimescaleDB
- Docker
- AWS

### Knowledge Domains.....

- Concurrency and parallelism
- Asynchronous programming
- Distributed systems
- Configuration management
- Systems administration
- Operations research
- Abstract algebra
- Program verification

## Presentations

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UQ Computing Society, Apr 2016: AlphaGo and what it means for us

UQ Computing Society, Sep 2016: Introduction to Linux

BrisPy, Jul 2017: Gradual Typing in Python

PyCon Australia, Aug 2017: Gradual Typing in Python

UQ Computing Society, Aug 2018: Task Queues: A Celery Story

PyCon Australia, Aug 2018: Task Queues: A Celery Story

UQ Computing Society, Feb 2019: Student Careers Panel

UQ Computing Society, May 2019: Introduction to Python's asyncio