Dr Brett Pennington
Robotics Software Engineer

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US citizen, EU resident visa

HIGHLIGHTS

Software Engineering

- Languages
  - Dream in: modern C++, Python, SIMULINK
  - No problem writing: C, SQL, MATLAB, C++98
  - Could stack-overflow my way through: JS, JSX, R, Go, Ruby
  - Maybe one day: Haskell, Rust
- Scientific computing: linear algebra, numerical optimization techniques, dynamical systems
- Real-time embedded systems
- Web & desktop environments
- Test-driven development
- SOLID principles
- SCRUM practices & agile methods

Control Theory & Design

- Non-linear systems: robotic control (passive and compliant) and fluid/thermodynamics
- Linear systems: from optimal LQR control to simple PI controllers
- State estimation: FIR, Kalman and Chebyshev filtering, state observers

Machine Learning

- Classification models with Ensemble & Naïve Bayes
- Transient event regression with sequential neural networks

Work Style

- Self-starter – never stop learning
- Collaboration and mentorship
- Experience in team training, university lectures

EDUCATION

Ph.D. Mechanical Engineering, University of Alabama
Jan 2011 — Dec 2015
Advanced Controls Systems, Robotics, and Computational Analysis

B.S. Mechanical Engineering, University of Alabama
Aug 2006 — Dec 2010
Thermodynamics, Physics, and Mechanical Systems

EXPERIENCE

Software Engineer – Motion Planning, Robotics & Controls

Automata Tech, London, UK since **Apr 2017**

- Built custom kinematics, controls & motion planning libraries in C and modern C++ from scratch
- Designed collision detection systems in embedded MISRA compliant C with low bandwidth constrictions
- Physical modelling and verification in Simulink/MATLAB and Python
- Introduced Agile practices: Organized a team from 5 individuals, which grew into 3 cross-functional teams with 15 members in 9 months
- Introduced TDD to Automata: maintained 95%+ code coverage in all repositories

Software Engineer

Cubic Transportation Systems, London, UK Apr 2016 — Apr 2017

- Maintained code running the London Transit (Oyster Card) environment along other global metropolitan transit systems (SF Clipper, new NYC Metrocard, Sydney Opal)
- Correlated high-speed, time-sensitive data streams in critical systems handling payments for +6 million users daily in less than 0.3 seconds each
- Delivered client-focused results quickly while adhering to sound development practices and refactoring a large and historic database along the way
- Wrote clean, modular, and tested C++ (98) code for future technology and functionality integrations
- Built CI systems with Python to integrate community workflow using Jenkins, Git and Artifactory

Controls Research Engineer

University of Alabama, Tuscaloosa, AL Jan 2011 — Dec 2015

- Built diesel engine controls to advance sustainability and performance
- Designed multiple embedded systems in different environments to enhance testing ecosystem
- Programmed and modelled safety-critical high performance systems and built adaptive and dependable systems in critical testing environments

Mechatronics Engineer Intern

Caterpillar, Inc., Peoria, IL May 2015 — Aug 2015

- Developed controller designs for large power systems in C and MATLAB
- Optimized embedded controller improving engine start up time by 90% and reduced gas & diesel mixture stabilization time from roughly 120 seconds to 1.2 seconds

PUBLICATIONS

Dissertation, University of Alabama **May 2016**

Transient Optimization Of A Medium Duty Diesel Engine Equipped With A High Pressure EGR And Variable Nozzle Turbocharger

References available upon request