Eric Bond | CV

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Education

Purdue University   **West Lafayette, IN**
M.S. Computer Science   *2018-2020*

Purdue University   **West Lafayette, IN**
B.S. Computer Science, 3.63   *2013–2017*
Minor in Mathematics

Research Interests

Type Theory, Formalized Mathematics, Mathematical Logic, Programming Language Semantics

Publications

- Yanzhe Cui, Richard Voyles, Xuexuan Zhao, Jiali Bao, Eric Bond, "A Software Architecture Supporting Self-Adaptation of Wireless Control Networks", IEEE Conference on Automation Science and Engineering (CASE 2017).

Presentations

- Modeling Automata with Coalgebras – presented as course project May 2019
- F-algebras and Cedille – presented to PurPL March 2019
- Topological Exploration of Sans-Li Potential – poster at LLNL student symposium August 2018
- Introduction to Quantum Computing – presented to PurPL and Purdue ACM March 2018
- Quantum Languages – presented to Sabre Kais QIQC group February 2018

Research Experience

Masters Thesis   **Purdue University**
                                                                             November 2018 – Current

- Interactive proof assistants represent inductive data and induction principals differently depending on the underlying type theory. The most well known proof assistant, Coq, utilizes a complicated implementation of an intrinsic calculus of inductive constructions. Cedille is a proof assistant based on a pure extrinsic type theory with a notably small core implementation in which induction principles are generically derivable for data and computation represented as lambda encoded F-algebras.
- We are investigating transformation of proof developments between these two proof assistants to study trustworthiness of formal verifications in either type theory.
- Collaborators/Advisers: Prof. Aaron Stump (Iowa), Prof. Benjamin Delaware (Purdue)

Galois **Portland, OR**
Graduate Research Intern *May 2019 – August 2019*

- Worked on various projects related to formal verification of software.
- Aided in the initial design and development of an automata based api usage checker for the Crucible symbolic simulator.
- Technologies: Haskell, Crucible

Lawrence Livermore National Lab **Livermore, CA**
Graduate Research Intern *May 2018 – August 2018*

- Member of the 2018 Data Science Summer Institute.
- Aided in the generation of simulation data for quantum chemical systems using VASP.
- Prototyped an extension of TopoMS, a tool for topological data analysis of molecular systems, which allowed for the analysis of potential fields.
- Technologies: C++, Python, Keras, TopoMS, VASP, MPI

Quantum Information and Computation Theory Group **Purdue University**
Undergraduate Researcher *August 2017 – October 2018*

- Investigated mathematical formalizations for quantum programming languages for the quantum gate/circuit model.
- Surveyed various existing languages and frameworks such as Quantomatic, Quipper, QASM, QWire, Qiskit and others.

Collaborative Robotics Laboratory **Purdue University**
Undergraduate Researcher NSF REU *January 2017 – June 2017*

- Researched and implemented methods for task based self-adaptation reasoning using an RDF ontology (Apache Jena) and semantic networks.
- Publications
  - A Software Architecture Supporting Self-Adaptation of Wireless Control Networks, IEEE CASE 2017

Work Experience

Amazon - (Alexa Machine Learning Platform) **Cambridge, MA**
Software Development Engineer Intern *May 2017 – August 2017*

- Designed and implemented a data access and visualization tool for scientists and engineers to view critical data for machine learning applications/training.
- Technologies: Java, Javascript, AWS (S3, DynamoDB, Lambda), Mockito

Amazon - (Fulfillment by Amazon Technologies) **Seattle, WA**
Software Development Engineer Intern *June 2016 – August 2016*

- Extended an FBA seller central web applications with a widget for aggregating and displaying shipping details.
- Technologies: Java, Javascript, Spring Framework, Mockito

Delphi Test Labs **Purdue Research Park**
Software Verification Engineer *May 2015 – June 2016*

- Extended functionality of web based workflow and engineering standards management tool, Polarion, via plugins.

Teaching Experience

CS 252 - **Systems Programming**   **Purdue University**
Graduate Teaching Assistant   *January 2019 – May 2019*

- Taught students entry level systems programming in C/C++.
- Organized, presented, and graded labs as well as aided in exam creation.

CNIT 105 - **Introductory C Programming**   **Purdue University**
Undergraduate Teaching Assistant   *September 2014 – December 2014*

- Taught students the fundamentals of programming in C.
- Graded homework and labs.

Languages

- Haskell, Coq, Python, Java, Javascript, C, C++

Honors and Awards

- Dean's List (All semesters)