# Tristan Knoth | Curriculum Vitae

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## Research Interests

Computers are changing the world and I would like to make it easier for everybody to leverage this power. Thus, I'm interested in ways in which language design can make it easier for programmers to develop fast and correct software. I enjoy working on functional programming, type systems, and formal methods. As we work to make computing more accessible, computer science education and efforts to improve diversity in the field are at least as important as technical research projects.

## Education

**UC San Diego** **San Diego, CA**
*Computer Science Ph.D. Student* *2017-Present*
- Researching programming languages with the ProgSys research group.

**Grinnell College** **Grinnell, IA**
*B.A., Computer Science and Mathematics* *2013-2017*
- Researched high-performance algorithms for selecting multiple order statistics with distributed networks of GPUs under Dr. Jeff Blanchard.
- Trustee Honors scholar

## Professional Experience

**UC San Diego** **San Diego, CA**
*Graduate Student Researcher* *2017-Present*
Conduct research on programming languages, including the following projects:
- Resource-aware program synthesis: Improving current general-purpose program synthesis techniques to generate correct and efficient implementations
- Program synthesis for provably safe hybrid systems: Synthesizing correct-by-construction control algorithms for cyber-physical systems. The tool generates a program alongside a proof of its unbounded correctness.

**Fluxx Labs** **San Francisco, CA**
*Software Engineering Intern* *2016-2017*
- As the lead developer on the project, designed, implemented, and shipped beta version of a native Android client for Fluxx's Grantmaker platform from scratch in the course of one summer.
- Enhanced Android application with support for SAML Single Sign-on.
- Improved and documented Javascript API for future Fluxx mobile developers.
- Integrated large-scale Ruby on Rails web application with Docusign's template functionality.

**Grinnell College** **Grinnell, IA**
*Student Researcher* *2015-2016*

- Developed parallel algorithm with CUDA C++ and Open MPI to select multiple order statistics from distributed data sets using NVIDIA GPUs.
- Improved upon existing order statistic selection algorithms by guaranteeing correct responses instead of relying upon approximate statistical methods.
- Mitigated security concerns by performing data analysis locally instead of passing potentially sensitive data over the network.
- Non-optimized software package can select one-tenth percentiles from $2^{27}$ random data points in approximately 70ms.

## Technical and Personal skills

- **Computer Languages:** C++, C, Java, CUDA, MATLAB, Haskell, Scheme, Ruby, JavaScript, R
- **Other:** Mathematica, Stata, MPI, LaTeX, Arduino, Linear Programming, Woodworking, Machining, Spanish