# Dietrich Geisler

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## *Education*

Cornell University, Computer and Information Science, Started August 2017, Expected Graduation May 2024
PhD Candidate in Computer Science – Programming Languages and Compilers

University of Utah School of Computing and College of Science, Graduated May 2017 GPA: 3.56
Honors Bachelor of Science Computer Science, Applied Mathematics, and Physical Chemistry

## *Work Experience*

- Research Assistant: Cornell University, Graphics Compiler Development (June 2018-Present)
- Teaching Assistant: Cornell University, CS 1110 Summer 2023
  - Mentoring rising instructor
- Instructor of Record: Cornell University, CS 1110 Fall 2022
  - Co-instructor, lectures + course material development
- Instructor of Record: Cornell University, CS 1110 Summer 2022
  - Solo instructor, lectures + course material development
- Intern: Facebook/Meta, Move (internal systems language) Mutation Testing (May 2021-August 2021)
- Intern: NVIDIA, Slang (internal graphics language) Compiler Development (May 2020-August 2020)
- Teaching Assistant: Cornell University, CS 3110 Spring 2018
- Teaching Assistant: Cornell University, CS 2110 Fall 2017
- Research Assistant: University of Utah, various positions (January 2015-June 2017)

## *Publications*

- Geometry types for graphics programming, 1st author of six
- Online verification of commutativity, 2nd author of three

## *Project Experience*

- Research Project: Heterogeneous Language IR (Caiman) (August 2020-Present)
  - Ongoing project to develop a compiler for reasoning about optimizations across various devices
  - Focus on reasoning automatically about decomposable heterogeneous multithreaded schedules
  - Currently targeting submission for ASPLOS 2024
- Research Project: Heterogeneous Design in Slang (May 2020-May 2022)
  - Developed language feature for basic heterogeneous programming model in Slang
  - Ongoing research to explore static and dynamic dispatch interactions with heterogeneity
- Research Project: Geometry Types for Graphics Programming (February 2018-October 2020)
  - Developed language (Gator) and semantics for type checking linear-algebraic operations and spaces
  - Implemented compiler from Gator to GLSL from the ground up in OCaml and TypeScript
  - Managed undergraduate students on multiple aspects of project, including a separate publication
- Research Project: Translation Validation of the Packet Processing P4c Compiler (September 2017-June 2018)
  - Constructed a system for translating P4 HLIR and P4c-generated JSON to an SMT representation
  - Validated a large part of the compiler on the standard P4c test suite
- Research Project: Introduction of Floating-Point Types to Boogie and SMACK (January 2015-August 2017)
  - Created a formal floating-point type for Boogie, a Microsoft language written in C#
  - Added an equivalent floating-point type to SMACK, an academic C/C++ verifier written in C++
- Research Project: ML Approximation of DFT-Modeled Thermodynamic Systems (January 2016- August 2017)
  - Converted Leonard-Jones modelled thermodynamic data to neural network readable data
- Research Project: Construction of the Lie Groups from Associated Lie Algebras (September 2016- August 2017)
  - Professor-guided research project to classify differential manifolds and their associated tangent spaces

## *Skills*

Programming Languages: Rust, Python, OCaml, C/C++, C#, Java, GLSL, TypeScript, Verilog, Racket, Lua
Areas of Interest: Intro Programming, Compiler Design, Graphics, Architecture, Formal Verification, Algorithms

## *Miscellaneous*

- 2017-2019 University Assembly and Graduate and Professional Student Assembly Representative
- Mentored 12-15 undergraduate students (depending on how you count) on research projects, not listed here