# .: Andrew Blinn

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## Research Interests

Programming Languages · Human-Computer Interaction · Computing Education

## Publications

**An Integrative Human-Centered Architecture for Interactive Programming Assistants** · **VLHCC** · *2022*
**Andrew Blinn, David Moon, Eric Griffis, Cyrus Omar**
A conceptual architecture for programming assistants addressing integrative design challenges, instantiated in OCaml-based prototype UIs for type & example-based interactive program synthesis

**Tylr: A Tiny Tile-based Structure Editor** · **TyDe** · *2022*
**David Moon, Andrew Blinn, Cyrus Omar**
A new kind of structure editing, maintaining term structure while retaining linear editing affordances

**Filling typed holes with live GUIs** · **PLDI** · *2021*
**Cyrus Omar, David Moon, Andrew Blinn, Ian Voysey, Nick Collins, Ravi Chugh**
Livelits allow users to fill program holes by directly manipulating user-defined GUIs embedded persistently into code, providing continuous graphical feedback

## Education

**University of Michigan** · **Ph.D Candidate, Computer Science** · *Current*
Building intelligent, multi-modal programming interfaces combining LLMs, responsive design, and type-directed formal methods at Cyrus Omar's FP Lab

**University of Michigan** · **Master's of Science, Computer Science** · *2023*
Coursework in Programming Language Theory, Category Theory, Program Synthesis, Human-Computer Interaction, & How People Learn

**University of Toronto** · **H.B.Sc, Math & Computer Science** · *2019*
Graduate coursework in abstract algebra, compilers, & graphics

## Industry Experience

**TODAQ Toronto** · **Full-stack development in Clojure** · *2019 - 2020*
Built novel front-end interfaces to sharpen the materiality of distributed digital assets.
Implemented core back-end features for a decentralized digital asset management protocol

## Conference Participation

**Invited speaker at RacketCon** · *2019* · *Salt Lake City*
Spoke about Fructure, a prototype structured editor focused on edit-time term-rewriting
Recorded Talk · Fructure Slides

**Presenter at VL/HCC** · *2022* · *Rome*
Presented an Integrative Human-Centered Architecture for Interactive Programming Assistants
Recorded Talk · VLHCC Slides

**Seat Filler** · *Rome, Chicago, Salt Lake City, Toronto, Eugene, St.Louis*
2022, 2021: VL/HCC, SPLASH/OOPSLA
2019: Racket's How to Design Languages Summer School, Clojure North.
2018: Oregon Programming Languages Summer School, ICFP, Strange Loop, RacketCon

## Research Projects

**Hazel: Experimental IDE Design, Implementation, and At-Scale Deployment** · *2020 - Current*
Led a ground-up rewrite of the Hazel IDE, extending David Moon's tylr restructuring engine into a full-fledged editor, language server, and educational tool which was deployed to 100 undergraduates. Designed & implemented novel bidirectional type system features. More about the Hazel project

**Techniques in Variability-aware Data Structures with Marsha Chechik** · *2018 - 2019*
Built & profiled Haskell data structures supporting variational analysis of software product lines.
Designed & built SpyShare, a Graphviz-based tool to visually inspect data sharing.
Created and modelled a system of GHC rewrite-rules using PLT Redex: Report · Slides

**Independent Study in Structured Editing in Racket with Gary Baumgartner** · *Summer 2017*
Self-initiated study of existing refactoring, live programming & direct manipulation tooling.
Began work on Fructure, a Racket-based polyglot structure editor, and Containment Patterns, which extend pattern matching to capture contexts as composable continuations.

## Teaching

**Course Development** · *Summer 2018* · *University of Toronto*
Designed assignments and course materials for CSC324 - Principles of Programming Languages.
Specified and built Ductile, a toy language demonstrating exhaustive pattern matching on ADTs.
Implemented an algebraic stepper to illustrate continuations and non-determinism in Scheme.

**Teaching Assistance** · *University of Michigan*

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|---|---|
| 2022 | EECS490 Programming Languages |
| 2021 | EECS490 Programming Languages |

**Teaching Assistance** · *University of Toronto*

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| 2019, 2018 | CSC324 Principles of Programming Languages |
| 2018 | CSC104 Introduction to Computational Thinking |
| 2018, 2017 | CSC324 Principles of Programming Languages |

## Mentorship

**PL x Deep Reinforcement Learning for Code Completion** · *2021 Fall - Current*
ML/PL collaboration: Mentoring two undergraduates, providing design and architecture guidance for a specialized version of the Hazel editor used for reinforcement-learning-based code completion research.

**Interfaces for Live testing in online IDEs** · *2021 - 2022*
Mentored an undergraduate who helped implement live testing features of the Hazel language and IDE, successfully deployed to a class of 100 undergraduate students for a course in Fall 2022.