

# Reed Oei

reed@math.ucla.edu 574-210-2171 <http://reedoei.com> <https://github.com/ReedOei>

## Education

**University of California, Los Angeles** (September 2021 - Present)

- PhD in Mathematics

**University of Illinois at Urbana-Champaign** (August 2017 - August 2021)

- BS in Mathematics, Magna Cum Laude
- BS in Computer Science, Highest Honors

## Papers

- [1] **Reed Oei**, Dun Ma, Christian Schulz, Philipp Hieronymi. Pecan: An Automatic Theorem Prover for Automatic Sequences using Büchi Automata. In preparation. <https://arxiv.org/abs/2102.01727>
- [2] Philipp Hieronymi, Dun Ma, **Reed Oei**, Luke Schaeffer, Christian Schulz, and Jeffrey Shallit. Decidability for Sturmian Words. In preparation. <https://arxiv.org/abs/2102.08207>
- [3] **Reed Oei**, Michael Coblenz, Jonathan Aldrich. Psamathe: A DSL with Flows for Safe Blockchain Assets (extended abstract). *The 23rd International Symposium on Practical Aspects of Declarative Languages (PADL)*.
- [4] **Reed Oei**. Psamathe: A DSL for Safe Blockchain Assets. *Companion Proceedings of the 2020 ACM SIGPLAN International Conference on Systems, Programming, Languages, and Applications: Software for Humanity (SPLASH Companion)*, Virtual Event, November 2020. <https://doi.org/10.1145/3426430.3428131>
- [5] Michael Coblenz, **Reed Oei**, Tyler Etzel, Paulette Koronkevich, Miles Baker, Yannick Bloem, Brad A. Myers, Joshua Sunshine, and Jonathan Aldrich. Obsidian: Typestate and Assets for Safer Blockchain Programming. *ACM Trans. Program. Lang. Syst.* 42, 3, Article 14 (November 2020). <https://doi.org/10.1145/3417516>
- [6] Wing Lam, August Shi, **Reed Oei**, Sai Zhang, Michael D. Ernst, Tao Xie. Dependent-Test-Aware Regression Testing Techniques. *International Symposium on Software Testing and Analysis (ISSTA)*, Virtual Event, July 2020. Acceptance rate: 27% (43/162)
- [7] Gauri Kambhatla, Michael Coblenz, **Reed Oei**, Joshua Sunshine, Brad A. Myers, Jonathan Aldrich. A Pilot Study of the Safety and Usability of the Obsidian Blockchain Programming Language. *The Tenth Workshop on Evaluation and Usability of Programming Languages and Tools (PLATEAU@UIST)*, New Orleans, LA, October 2019.
- [8] August Shi, Wing Lam, **Reed Oei**, Tao Xie, Darko Marinov. iFixFlakies: A Framework for Automatically Fixing Order-dependent Flaky Tests. *ACM Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering (ESEC/FSE)*, Tallinn, Estonia, August 2019. Acceptance rate: 24% (74/303)
- [9] Wing Lam, **Reed Oei**, August Shi, Darko Marinov, Tao Xie. iDFlakies: A Framework for Detecting and Partially Classifying Flaky Tests. *IEEE International Conference on Software Testing, Verification and Validation (ICST)*, Xi'an, China, April 2019. Acceptance rate: 28% (31/110)

## Research

**Carnegie Mellon University** with Michael Coblenz and Prof. Jonathan Aldrich (5/2020–Present)

Designed the smart contract programming language Psamathe

Designed and worked to formalize the *flow* abstraction, which is central to Psamathe

Resulted in publication of [3] and [4].

**Carnegie Mellon University** with Michael Coblenz and Profs. Joshua Sunshine, Jonathan Aldrich, Brad Myers (5/2019–8/2019)

Improved the Obsidian smart contract programming language by designing and implementing a generics system

Wrote and checked type safety and correctness proofs for Silica (the core calculus of Obsidian)

Improved the Obsidian compiler by fixing bugs and adding features

Resulted in the publication of [5] and [7].

**University of Illinois** with Christian Schulz and Prof. Philipp Hieronymi (1/2019–Present)

Created the automatic theorem prover Pecan to prove theorems using Büchi automata  
Used Pecan to automatically prove many theorems about Sturmian words

Resulted in [1] and [2] (both in preparation).

**University of Illinois** with Wing Lam, August Shi, and Profs. Darko Marinov and Tao Xie (9/2017–2/2019)

Developed tools to automatically fix and debug flaky tests

Evaluated ways to mitigate the effects of flaky tests in regression testing

Resulted in the publication of [6], [8], and [9].

## Teaching

**Course Assistant, Program Verification (UIUC CS 476)** (1/2021–5/2021)

**Course Assistant, Software Design Studio (UIUC CS 126)** (1/2019–12/2020)

Held code reviews and office hours to provide feedback on student code

Evaluated student written code for style and a number of software quality metrics

Led and organized workshops teaching type theory, compiler/interpreter writing, and functional programming.

## Awards

**NSF Graduate Research Fellowship** (Awarded, 2021)

**CRA Outstanding Undergraduate Researcher Award** (Runner Up, 2021)

## Invited Talks

- [1] *Design and Use of the Pecan system*. Canadian Discrete and Algorithmic Mathematics Conference (CanaDAM). May 2021. Virtual.

## Organizations

**Chair, ACM@UIUC SIGPLAN** (9/2017-5/2021)