

# Federico Mora

federico.morarochoa.ca  
fmora@berkeley.edu

## Education

---

- 2025 **Ph.D. Computer Science**  
Advised by Sanjit A. Seshia  
University of California, Berkeley
- 2018 **M.Sc. Computer Science**  
Advised by Marsha Chechik  
University of Toronto
- 2016 **B.Sc. Math and Computer Science**  
First Class Honours with Distinction  
Mount Allison University

## Employment

---

- 2024, **Applied Scientist Intern**
- 2021, Amazon Web Services
- 2020 Supervised by Ankush Desai
- 2017 **Research Intern, General Motors**  
Electronic Control Systems Lab  
Supervised by Ramesh S

## Research

---

I am interested in automated reasoning, programming language theory, formal methods, and distributed systems. My research mission is to create automated reasoning stacks that do not require users to be experts in automated reasoning.

## Refereed Conference Papers

---

(undergraduate mentees underlined)

- [1] **Mora**, Wong, Lepe, Bhatia, Elmaaroufi, Varghese, Gonzalez, Polgreen, and Seshia. “Synthetic Programming Elicitation for Text-to-Code in Very Low-Resource Programming and Formal Languages”. *Annual Conference on Neural Information Processing Systems (NeurIPS)*. 2024.
- [2] Shah, **Mora**, and Seshia. “An Eager Satisfiability Modulo Theories Solver for Algebraic Datatypes”. *AAAI Conference on Artificial Intelligence (AAAI)*. 2024.
- [3] **Mora**, Desai, Polgreen, and Seshia. “Message Chains for Distributed System Verification”. *Proceedings of the ACM on Programming Languages (OOPSLA)*. 2023.
- [4] **Mora**, Berzish, Kulczynski, Nowotka, and Ganesh. “Z3str4: A Multi-armed String Solver”. *International Symposium on Formal Methods (FM)*. 2021.
- [5] Pimpalkhare, **Mora**, Polgreen, and Seshia. “MedleySolver: Online SMT Algorithm Selection”. *International Conference on Theory and Applications of Satisfiability Testing (SAT)*. 2021.
- [6] Akhundov, **Mora**, Feng, Hui, and Chechik. “Verification by Gambling on Program Slices”. *International Symposium on Automated Technology for Verification and Analysis (ATVA)*. 2021.
- [7] Berzish, Kulczynski, **Mora**, Manea, Day, Nowotka, and Ganesh. “An SMT Solver for Regular Expressions and Linear Arithmetic over String Length”. *International Conference on Computer-Aided Verification (CAV)*. 2021.
- [8] Berzish, Day, Ganesh, Kulczynski, Manea, **Mora**, and Nowotka. “String Theories involving Regular Membership Predicates: From Practice to Theory and Back”. *International Conference on Words*. 2021.
- [9] Feng, **Mora**, Hui, and Chechik. “Scaling Client-Specific Equivalence Checking via Impact Boundary Search”. *IEEE/ACM International Conference on Automated Software Engineering (ASE)*. 2020.
- [10] Scott, **Mora**, and Ganesh. “BanditFuzz: A Reinforcement-Learning Based Performance Fuzzer for SMT Solvers”. *Working Conference on Verified Software: Theories, Tools, and Experiments (VSTTE)*. 2020.
- [11] **Mora**, Li, Rubin, and Chechik. “Client-Specific Equivalence Checking”. *IEEE/ACM International Conference on Automated Software Engineering (ASE)*. 2018.

## Refereed Journal Papers

---

- [12] Berzish, Day, Ganesh, Kulczynski, Manea, **Mora**, and Nowotka. “Towards more efficient methods for solving regular-expression heavy string constraints”. *Theoretical Computer Science* (2023).

---

 Refereed Short or Tool Papers
 

---

- [13] Polgreen, Cheang, Gaddamadugu, Godbole, Laeuffer, Lin, Manerkar, **Mora**, and Seshia. "UCLID5: Multi-Modal Formal Modeling, Verification, and Synthesis". *International Conference on Computer-Aided Verification (CAV)*. 2022.
- [14] Scott, Sudula, Rehman, **Mora**, and Ganesh. "BanditFuzz: Fuzzing SMT Solvers with Multi-Agent Reinforcement Learning". *International Symposium on Formal Methods (FM)*. 2021.
- [15] Blotsky, **Mora**, Berzish, Zheng, Kabir, and Ganesh. "StringFuzz: A Fuzzer for String Solvers". *International Conference on Computer-Aided Verification (CAV)*. 2018.

---

 Refereed Workshop Papers or Presentations
 

---

- [16] Li, **Mora**, Polgreen, and Seshia. "Genetic Algorithms for Searching a Matrix of Metagrammars for Synthesis". *Workshop on Synthesis (SYNT)*. 2023.
- [17] **Mora**, Cheang, Polgreen, and Seshia. "Synthesis in UCLID5". *Workshop on Synthesis (SYNT)*. 2020.

---

 Grant Writing Contributions
 

---

- 2021 **Amazon Research Award** (with Sanjit A. Seshia as PI)  
"Scalable Verification of Secure Distributed Services through Synthesis and Learning"

---

 Invited Talks
 

---

## Automated Reasoning About Distributed Systems

- Stanford Software Research Lunch (Stanford, Oct. '24)
- Programming Languages & Software Engineering Seminar (NUS, Oct. '24)
- Languages, Systems, and Data Seminar (UCSC, Nov. '24)

---

 Awards and Distinctions
 

---

- 2024 Winner of the QF\_Datatypes division of SMT-COMP 2024
- 2024 Outstanding Graduate Student Peer Mentor Award (UC Berkeley)  
Four students selected out of ~12000 graduate students. Honors "students who have shown an outstanding commitment to mentoring, advising, and generally supporting either undergraduate students or their fellow graduate students."
- 2024 Demetri Angelakos Memorial Achievement Award (UC Berkeley EECS)  
Seven students selected out of ~700 EECS graduate students. "The purpose of the award is to recognize students who, in addition to conducting research, unselfishly take the time to help colleagues beyond the normal cooperation existing between fellow students."
- 2023 Outstanding Teaching Assistant Award (UC Berkeley EECS)  
"We invite the faculty to nominate approximately the top nine percent of our GSIs and TAs from Spring, Summer and Fall semesters of the previous calendar year. From these, our Student Awards committee selects a subset for our departmental Outstanding TA awards. The remainder will be considered for nomination for the campus award."
- 2022 Outstanding Graduate Student Instructor Award (UC Berkeley)  
Honors "UC Berkeley GSIs each year for their outstanding work in teaching on the Berkeley campus."
- 2021 Qualcomm Innovation Fellowship  
16 proposals selected out of >100. For "... recognizing, rewarding, and mentoring PhD and Masters students across a broad range of technical research, based on Qualcomm's core values of innovation, execution, and teamwork."
- 2021 Chair's Graduate Award (UC Berkeley EECS)
- 2019 Department Fellowship (UC Berkeley EECS)
- 2018 C. C. Gotlieb (Kelly) Graduate Fellowship (University of Toronto CS)
- 2017 Alfred B. Lehman Graduate Scholarship (University of Toronto CS)

## Teaching and Mentoring

---

My teaching and mentoring is primarily influenced by universal design for learning (UDL) principles.

### Courses Taught

---

- 2022-24 **Guest Lectures, UC Berkeley**  
EECS 219C: Formal Methods: Specification, Verification, and Synthesis  
 - Abstraction and Verification by Reduction to Synthesis  
 - Interpolation-Based Model Checking and IC3  
 - Satisfiability Modulo Theories - Part II: Theories and Theory Solvers  
 - Syntax-Guided Synthesis  
CS 164: Programming Languages and Compilers  
 - Regular Expressions and Tokenization
- 2021-22 **Graduate Student Instructor, UC Berkeley**  
CS 164: Programming Languages and Compilers (2)
- 2016-18 **Teaching Assistant, University of Toronto**  
CSC 324: Principles of Programming Languages  
CSC 384: Introduction to Artificial Intelligence (2)  
CSC 410: Software Testing and Verification (2)
- 2015-16 **Teaching Assistant, Mount Allison University**  
 COMP 1631: Introduction to Computer Science

### Students Mentored

---

- 2020-24 **UC Berkeley Undergraduate Students**  
 Amar Shah (ACM SRC Grand Finals Runner-up), Annamira O'Toole, Selina Kim, Nikhil Pimpalkhare (co-mentored with Elizabeth Polgreen)
- 2023-24 **MiraCosta College Students**  
 Haley Lepe (NDiSTEM '23 Presentation Award Winner)
- 2022-23 **City College of San Francisco Students**  
 Isaac Chan (co-mentored with Lauren Pick)
- 2018-20 **University of Toronto Undergraduate Students**  
 Murad Akhundov (POPL '20 USRC Winner), Lukas Finnarr O'Callahan, Alex Tough

### Service

---

I prioritize service that promotes diversity, equity, and inclusion in computer science. Whether directly, like through application assistance, or indirectly, like through outreach at local schools.

### Professional Service

---

#### Organizer

- Berkeley Programming Systems Seminar Series (Summer '20)

#### Publicity Chair

- International Conference on Neuro-symbolic Systems (NeuS '24)

#### Artifact Evaluation Committee Member

- Tools and Algorithms for the Construction and Analysis of Systems (TACAS '23)

#### Reviewer

- Formal Methods in System Design (FMSD '22)

**External Reviewer or Subreviewer**

- Automated Software Engineering (ASE '17, '18, '19)
- Computer Aided Verification (CAV '18, '21)
- Formal Methods in Computer-Aided Design (FMCAD '21, '22)
- Foundations of Software Engineering (FSE '17)
- International Joint Conference on Automated Reasoning (IJCAR '18)
- Programming Language Design and Implementation (PLDI '21)
- Tools and Algorithms for the Construction and Analysis of Systems (TACAS '21, '24)
- Verification, Model Checking, and Abstract Interpretation (VMCAI '24)
- Object-Oriented Programming, Systems, Languages and Applications (OOPSLA '24)

**Conference or Workshop Student Volunteer**

- Programming Language Design and Implementation (PLDI '22)
- Bryant Discoveries Day (FLoC '22)
- Waterloo Machine Learning, Verification, and Security Workshop ('19)

**UC Berkeley EECS Departmental Service**

- CS Faculty Hiring Committee ('24)
- Equal Access to Application Assistance Reviewer ('23)
- Visit Day Coordinator ('21)
- CSGSA Social Chair ('19, '20)

Community Outreach

---

- |      |   |
|------|---|
| 2022 | <p><b><u>Citizen Clinic</u></b><br/>Worked with indigenous land rights activists to help them defend themselves and their communities from cyber threats.</p>   |
| 2022 | <p><b><u>Be A Scientist</u></b><br/>Mentored a group of four seventh grade students in Spanish. Students designed and conducted their own scientific experiment over a six-week-long lab.</p>                                     |
| 2020 | <p><b><u>Bay Area Scientists in Schools (BASIS)</u></b><br/>Developed a new bilingual “You Belong” lesson on Ynés Mexía’s research. Lesson delivered to schools serving low-income and historically marginalized communities.</p> |