

# Cyrus Omar

Computer Science and Engineering  
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## Employment

### *University of Michigan*

**Assistant Professor** (Sep. 2019-present)  
Future of Programming Lab (FP Lab)  
Computer Science and Engineering (CSE) Division  
Electrical Engineering and Computer Science (EECS) Department  
College of Engineering (CoE)

### *University of Chicago*

**Postdoctoral Scholar** (Sep. 2017-Aug. 2019)  
Department of Computer Science  
Supervisor: Ravi Chugh

### *Carnegie Mellon University*

**Postdoctoral Scholar** (May. 2017-Aug. 2017)  
Computer Science Department  
Supervisor: Jonathan Aldrich

## Education

### *Carnegie Mellon University*

**Ph.D. in Computer Science** (Oct. 2010-May 2017)  
Thesis: *Reasonably Programmable Syntax*  
Advisor: Jonathan Aldrich  
Center for the Neural Basis of Cognition  
Graduate Training Program Certificate (Oct. 2010-May 2017)  
PhD Program in Neural Computation (Aug. 2008-Oct. 2010)

### *University of Illinois at Urbana-Champaign*

**B.S. in Computer Science**, 2008  
**B.S. in Molecular & Cellular Biology**, 2008

## Internships

### *Los Alamos National Lab*

Synthetic Visual Cognition Group (May 2010-August 2010)

Supervisor: Garrett Kenyon

## Individual Awards

1. NSF CAREER Award
2. Alan J. Perlis SCS Graduate Teaching Award
3. DOE Computational Science Graduate Fellowship
4. NSF Graduate Research Fellowship
5. Inductee, University of Illinois Bronze Tablet

## Research

*Primary Research Area:* programming languages

*Secondary Research Areas:* human-computer interaction, learning technology, artificial intelligence

† = advisor during paper preparation

1. Gradual Structure Editing with Obligations  
D. Moon<sup>†</sup>, A. Blinn<sup>†</sup>, C. Omar  
*IEEE Symposium on Visual Languages and Human-Centered Computing (VL/HCC 2023)*
2. Live Pattern Matching with Typed Holes  
Y. Yuan<sup>†</sup>, S. Guest<sup>†</sup>, E. Griffis<sup>†</sup>, H. Potter<sup>†</sup>, D. Moon<sup>†</sup>, C. Omar  
*Proc. ACM Program. Lang., OOPSLA (OOPSLA 2023)*
3. Contextualized Programming Language Documentation  
H. Potter<sup>†</sup>, A. Madadi, R. Just, C. Omar  
*Proceedings of the 2022 ACM SIGPLAN International Symposium on New Ideas, New Paradigms, and Reflections on Programming and Software (Onward! 2022)*
4. RustViz: Interactively Visualizing Ownership and Borrowing  
M. Almeida<sup>†</sup>, G. Cole<sup>†</sup>, K. Du<sup>†</sup>, G. Luo<sup>†</sup>, S. Pan<sup>†</sup>, Y. Pan<sup>†</sup>, K. Qiu<sup>†</sup>, V. Reddy<sup>†</sup>, H. Zhang<sup>†</sup>, Y. Zhu<sup>†</sup>, C. Omar  
*IEEE Symposium on Visual Languages and Human-Centered Computing (VL/HCC 2022)*
5. An Integrative Human-Centered Architecture for Interactive Programming Assistants  
A. Blinn<sup>†</sup>, D. Moon<sup>†</sup>, E. Griffis<sup>†</sup>, C. Omar  
*IEEE Symposium on Visual Languages and Human-Centered Computing (VL/HCC 2022)*
6. Filling Typed Holes with Live GUIs  
C. Omar, D. Moon<sup>†</sup>, A. Blinn<sup>†</sup>, I. Voysey, N. Collins, and R. Chugh  
*42nd ACM SIGPLAN International Conference on Programming Language Design and Implementation (PLDI 2021)*
7. Hazel Tutor: Guiding Novices Through Type-Driven Development

- H. Potter<sup>†</sup> and C. Omar  
*1st Workshop on Human Aspects of Types and Reasoning Assistants (HATRA 2020)*
8. Program Sketching with Live Bidirectional Evaluation  
J. Lubin, N. Collins, C. Omar, and R. Chugh  
*Proc. ACM Program. Lang.* 4, ICFP, Article 109 (ICFP 2020)
  9. Live Functional Programming with Typed Holes  
C. Omar, I. Voysey, R. Chugh and M. Hammer  
*Proc. ACM Program. Lang.* 3, POPL, Article 14 (POPL 2019)
  10. Reasonably Programmable Literal Notation  
C. Omar and J. Aldrich  
*Proc. ACM Program. Lang.* 2, ICFP, Article 106 (ICFP 2018)
  11. Toward Semantic Foundations for Program Editors  
C. Omar, I. Voysey, M. Hilton, J. Sunshine, C. Le Goues, J. Aldrich and M. Hammer  
*2nd Symposium on Advances in Programming Languages (SNAPL 2017)*
  12. Hazelnut: A Bidirectionally Typed Structure Editor Calculus  
C. Omar, I. Voysey, M. Hilton, J. Aldrich and M. Hammer  
*44th ACM SIGPLAN Symposium on Principles of Programming Languages (POPL 2017)*
  13. Programmable Semantic Fragments: The Design and Implementation of typy  
C. Omar and J. Aldrich.  
*15th ACM SIGPLAN International Conference on Generative Programming: Concepts & Experiences (GPCE 2016)*
  14. Composable and Hygienic Typed Syntax Macros  
C. Omar, C. Wang and J. Aldrich  
*30th ACM Symposium on Applied Computing (SAC 2015)*
  15. Safely Composable Type-Specific Languages  
C. Omar, D. Kurilova, L. Nistor, B. Chung, A. Potanin and J. Aldrich.  
*28th European Conference on Object-Oriented Programming (ECOOP 2014)*  
**Distinguished Paper Award**
  16. Statically Typed String Sanitation Inside a Python  
N. Fulton, C. Omar and J. Aldrich  
*1st International Workshop on Privacy and Security in Programming (PSP 2014)*  
**Best Paper Award**
  17. Collaborative Infrastructure for Test-Driven Scientific Model Validation  
C. Omar, J. Aldrich and R. Gerkin  
*47th International Conference on Software Engineering (ICSE 2014)*  
New Ideas & Emerging Results Track (18% acceptance rate)
  18. Language-Based Architectural Control  
J. Aldrich, C. Omar, A. Potanin and D. Li

*6th International Workshop on Aliasing, Capabilities and Ownership (IWACO 2014)*

19. Type-Directed, Whitespace-Delimited Parsing for Embedded DSLs  
C. Omar, B. Chung, D. Kurilova, A. Potanin and J. Aldrich  
*2013 International Workshop on the Globalization of Domain-Specific Languages (GlobalDSL 2013)*
20. Active Code Completion.  
C. Omar, Y. Yoon, T. D. LaToza and B. A. Myers  
*45th International Conference on Software Engineering (ICSE 2012)*
21. Neural correlation is stimulus modulated by feedforward inhibitory circuitry  
J. W. Middleton, C. Omar, B. Doiron and D. J. Simons  
*Journal of Neuroscience* 32(2):506–18 (**J. Neurosci.** 2012)
22. A Feedback Information-Theoretic Approach to the Design of Brain-Computer Interfaces.  
C. Omar, A. Akce, M. Johnson, T. Bretl, R. Ma, E. Maclin, M. McCormick and T. Coleman  
*International Journal of Human-Computer Interaction*, 27:1, 5–23 (**IJHCI 2011**)
23. Policies for neural prosthetic control: initial experiments with a text interface  
C. Omar, M. Johnson, T. Bretl and T. Coleman  
*2008 American Control Conference (ACC 2008)*
24. Querying the user properly for high-performance brain machine interfaces: recursive estimation, control and feedback information theoretic perspectives  
C. Omar, M. Johnson, T. Bretl and T. Coleman  
*2008 IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP 2008)*
25. Shedding the weights: more with less  
T. Achler, C. Omar and E. Amir  
*2008 International Joint Conference on Neural Networks (IJCNN 2008)*

## Selected Talks

1. Invited talk, IFIP Working Group 2.3 (Language Design), Jan 2023
2. Invited talk, Ink & Switch, May 2022
3. Invited talk, University of Toledo, Feb 2022
4. Invited talk, University of Washington, December 2021
5. Invited talk, Strumenta Community, December 2021
6. Invited talk, UC Berkeley, October 2021
7. Invited talk, UC San Diego, Summer 2021
8. Invited talk, Hackworth Ltd., Summer 2021
9. Invited talk, Webflow, Summer 2021
10. Invited Talk, PPIG 2020
11. Accepted talk, Midwest PL Summit 2019
12. Accepted talk, TyDe 2019

13. Invited talk, Chicago Functional Programming Meetup + Reason Meetup (joint talk), 2018
14. Accepted talk, LIVE 2018
15. Accepted talk, META 2018
16. Invited talk, CMU Principles of Programming Seminar, 2018
17. Accepted talk, Strange Loop, 2018
18. Invited talk, Ink & Switch, 2018
19. Invited talk, Purdue University, 2017
20. Invited talk, TU Darmstadt, 2017
21. Accepted talk, LIVE 2017
22. Invited talk, HARC (Y Combinator Research), 2016

## Teaching

### *University of Michigan*

#### **EECS 490: Programming Languages**

Winter 2020, Fall 2020, Winter 2021, Fall 2021, Winter 2022, Fall 2022, Winter 2023, Fall 2023

#### **EECS 598-015: User Interfaces for Programming Languages**

Fall 2019

### *Carnegie Mellon University*

#### **15-312: Principles of Programming Languages**

Spring 2013, Head TA, with Prof. Robert Harper

#### **15-150: Functional Programming**

Fall 2011, Head TA, with Prof. Dan Licata

## Advising

### *University of Michigan*

Postdocs and Research Scientists (advising period; subsequent placement)

1. Michael D. Adams (Fall 2019-Winter 2021; Assistant Professor at Yale-NUS)

PhD Students (advised)

1. David Moon (Fall 2019-present)
2. Andrew Blinn (Fall 2020-present)
3. Eric Griffis (Fall 2020-Summer 2022)
4. Matthew Keenan (incoming, Fall 2023)

PhD Students (committee membership)

1. Xiaoying Pu (CSE, 2022)
2. April Wang (School of Information, 2023)

Masters Students

1. Karan Anand (Summer 2023-present)
2. Junwei Zhou (Winter 2023-present)
3. Matthew Ruiz (Winter 2023-present)
4. Alan Yang (Winter 2023-present)
5. Jonathan Lam (MS student at Cooper Union, Fall 2021-Summer 2022; industry position)
6. Priya Thanneermalai (Summer 2021-Fall 2021; industry position)
7. Soo Yeon (Sean) Lee (Winter 2020-Summer 2021; industry position)
8. Hannah Potter (Fall 2019-Summer 2021; PhD student at University of Washington)
9. Erin Deutschman (Winter 2020-Summer 2021; industry position)

Undergraduates (the following lists students who went on to PhD programs only)

1. Luoxi (Rosie) Meng (Winter 2022-Fall 2022; PhD student at UCSD)
2. Siyuan He (Winter 2020-Summer 2021; PhD student at Purdue University)
3. Yuning Wang (Winter 2020-Summer 2021; PhD student at Rutgers University)
4. Yongwei Yuan (Fall 2019-Summer 2020; PhD student at Purdue University)
5. Ke Du (Fall 2019-Summer 2020; PhD student at UIC)
- ... (80+ other undergraduate research students as of Aug 1, 2021, see lab website for full listing)

### *Prior to Faculty Position*

Undergraduates (year; faculty advisor; subsequent placement)

1. Charles Chamberlain (2017-present; -, Jane Street Capital)
2. Andrew Benson (2016; Jonathan Aldrich; Facebook)
3. Chenglong Wang (2015; Jonathan Aldrich; PhD student, University of Washington)
4. Benjamin Chung (2014; Jonathan Aldrich; PhD student, Northeastern University)
5. Nathan Fulton (2012; Jonathan Aldrich; PhD student, Carnegie Mellon University)
6. Michael Rule (2009; Nathan Urban; PhD student, Brown University)

## External Service

1. Reviewer, Wiley Publishing 2023
2. Reviewer, ACM Transactions on Programming Languages and Systems (TOPLAS), 2023
3. Program Committee, SPLASH-E 2023
4. Co-chair, Midwest PL Summit (MWPLS) 2023
5. Steering Committee Chair, TyDe (2022-2024)
6. Program Committee, PLDI 2023
7. Program Committee, ECOOP 2023
8. Program Committee, VL/HCC 2023
9. Program Committee, HATRA 2023
10. Program Committee, IFL 2023
11. Program Committee and Area Chair (Brave New Ideas and Pearls), ECOOP 2023

12. Panelist, NSF SHF Core Panel 2023
13. Panelist, European Research Council (ERC) 2023
14. External Reviewer, UIST 2023
15. Reviewer, MIT Press 2022
16. Mentor, PLMW at SPLASH 2022
17. Program Committee, IFL 2022
18. Program Committee, HATRA 2022
19. Program Committee, SPLASH Student Research Competition (SPLASH SRC) 2022
20. Program Committee, VL/HCC 2022
21. Program Committee, HATRA 2021
22. External Reviewer, UIST 2021
23. Program Committee, ICFP 2021
24. Program Committee, LIVE 2020
25. Program Committee, HATRA 2020
26. Co-Chair, Midwest PL Summit (MWPLS) 2020 [canceled due to COVID]
27. Co-Chair, Type-Driven Development (TyDe) workshop at ICFP 2020
28. External Review Committee, ICFP 2020
29. Student Research Competition Committee, ICFP 2020
30. Program Committee, HATRA 2020
31. Program Committee, Onward! Papers 2019
32. Program Committee, LIVE 2019
33. Program Committee, META 2019
34. Program Committee, ML Family Workshop 2019
35. Artifact Evaluation Committee, ICFP 2019
36. Program Committee, LIVE 2018
37. Program Committee, SPLASH Student Research Competition 2018
38. Referee, Journal of Visual Languages and Computing 2018
39. Program Committee, META 2017
40. Publicity Chair and Program Committee, GPCE 2017
41. Program Committee, DSLDI 2015
42. Artifact Evaluation Committee, ECOOP 2015

## Internal Service

1. Member, CSE Diversity Committee, Fall 2019-present
  - (a) External engagement (ongoing)
  - (b) Coordinated engagement with MS Admissions (ongoing)

- (c) Led development of the CSE Departmental Broadening Participation in Computing (BPC) Plan
  - (d) Participated in the development of the Summer 2020 Graduate Student Individual Check-In program
  - (e) Wrote Faculty Recruiting section of DEI Committee Annual Report (each year)
2. Member, CSE Hosting Committee, Fall 2020-present
  3. Organizer, CSE New Faculty Handbook project, Fall 2022-present
  4. Organizer, MPLSE (Michigan PL + SE) Group, Fall 2019-present
  5. Proposal Reviewer, Michigan Institute for Computational Discovery and Engineering (MICDE), 2023
  6. Mentor, Girls Encoded / Explore CS Research program, Winter 2021
  7. Mentor, African Undergraduate Research Adventure (AURA) program, Summer 2021
  8. Mentor, Summer Undergraduate Research in Engineering (SURE) program, Summer 2020-2023

## Funding

Michigan Engineering Seeding to Accelerate Research Themes (START):  
Interactively Deriving Formal Proofs (2023-2024)

Co-PI: Jean-Baptiste Jeannin

Total: \$30,000, My portion: \$15,000

CSE Course Development Funding for EECS 490

Total: \$7,280

NSF support for Midwest Programming Languages Summit (2023-2026)

Total: \$15,000

Provost Early Tenure Track Faculty Research Support Initiative (2023)

Total: \$3,000

CAREER: Live and Direct Programming Environments (2023-2028)

Total: \$550,000

NSF Cloudbank Supplement: \$6,000

Infrastructure for Developing Interactive Rust Learning Material (2022-2023)

Futurewei via Portland State University (subcontract)

Total: \$52,000

College of Engineering COVID Support Funding (2022)

Total: \$50,000

NSF Small: Semantic Foundations for Hole-Driven Development (2018-2021)

Total: \$500,000 / My portion: \$192,635 (subcontract from CU Boulder)