

# Cyrus Omar

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## Education

### *Carnegie Mellon University*

Ph.D. in Computer Science (October 2010-May 2017)

Advisor: Jonathan Aldrich

Thesis: *Reasonably Programmable Syntax*

Thesis Committee: Jonathan Aldrich, Robert Harper, Karl Crary and Eric Van Wyk

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

B.S. in Computer Science, *summa cum laude*, 2008

B.S. in Molecular & Cellular Biology, *summa cum laude*, 2008

GPA: 3.99 / 4.00

## Internships

### *Los Alamos National Lab*

Synthetic Cognition Group (May-August 2010)

Advisor: Garrett Kenyon

## Fellowships & Individual Awards

1. Alan J. Perlis SCS Graduate Student Teaching Award
2. DOE Computational Science Graduate Fellowship
3. NSF Graduate Research Fellowship
4. Inductee, University of Illinois Bronze Tablet
5. Duncan H. Lawrie Leadership Award
6. Franz Hohn and J. P. Nash Scholarship

## Research

*Research Interests:* Programming languages, intelligent and adaptable program editors, applied type theory

*Peer-Reviewed Full Papers*

1. 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)*
2. 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)*
3. 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**
4. Active Code Completion.  
C. Omar, Y. Yoon, T. D. LaToza and B. A. Myers  
*45th International Conference on Software Engineering (ICSE 2012)*
5. 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)
6. 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**)

*Peer-Reviewed Short Papers*

7. 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)*
8. Composable and Hygienic Typed Syntax Macros  
C. Omar, C. Wang and J. Aldrich  
*30th ACM Symposium on Applied Computing (SAC 2015)*
9. 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**
10. 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)
11. Language-Based Architectural Control

J. Aldrich, C. Omar, A. Potanin and D. Li

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

12. 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)*

13. 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)*

14. 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)*

15. Shedding the weights: more with less

T. Achler, C. Omar and E. Amir

*2008 International Joint Conference on Neural Networks (IJCNN 2008)*

### *Working Drafts*

16. Reasonably Programmable Syntax

C. Omar and J. Aldrich

Dissertation and accompanying journal paper in preparation

**2nd Place, ICFP 2015 Graduate Student Research Competition**

17. Hazelnut Live: Semantic Foundations for Evaluating Incomplete Programs

C. Omar, I. Voysey, M. Hilton, J. Aldrich and M. Hammer

18. Statistical Models of Typed Syntax Trees

C. Omar, S. Joshi and F. Cruz

**3rd Place, SPLASH 2014 Graduate Student Research Competition**

19. Tidy: A Modularly Programmable Bidirectionally Typed Translation Semantics

C. Omar and J. Aldrich

### *Selected Talks*

1. Modularly Programmable Type Structure

Invited talk, TU Darmstadt (scheduled January 2017)

2. Hazel: Semantic Foundations for Interactive Programming Tools

Invited talk, HARC (Y Combinator Research), 2016

IBM Programming Languages Day, 2016

3. Modular Syntax

Parsing@SLE Workshop, 2015

4. Modularly Programmable Syntax and Type Structure

CMU Principles of Programming Seminar, June 2015

5. Composable and Hygienic Typed Syntax Macros  
Domain-Specific Language Design and Implementation Workshop (DSLDI 2014)
6. Active Typechecking and Translation  
Domain-Specific Language Design and Implementation Workshop (DSLDI 2013)  
nVidia GPU Technology Conference 2013
7. Open Science  
Joint talk with Shreejoy Tripathy  
Center for the Neural Basis of Cognition Brain Bag
8. Sound, Usable and Flexible Foundations for Scientific and High-Performance Languages and Tools  
SIAM Conference on Parallel Processing for Scientific Computing (PP 2012)
9. End-User Programming by Scientists  
Lecture, Human Aspects of Software Development (Spring 2011)
10. How do people naturally think about computation?  
Lecture, Human Aspects of Software Development (Spring 2011)

### *Selected Press Coverage*

1. GigaOm (Aug. 7, 2014)
2. Motherboard (Aug. 8, 2014)
3. ACM TechNews (Aug. 11, 2014)
4. Gizmodo (Aug. 11, 2014)
5. SD Times (Aug. 13, 2014)
6. ITBusinessEdge (Aug. 14, 2014)
7. The Tartan (Aug. 24, 2014)

## Teaching

### *Carnegie Mellon University*

Principles of Programming Languages (15-312)  
Head TA, Spring 2013 with Prof. R. Harper  
Functional Programming (15-150)  
Head TA, Fall 2011 with Prof. D. Licata

## Service

1. Publicity Chair and Program Committee, GPCE 2017
2. Program Committee, DSLDI 2015
3. Artifact Evaluation Committee, ECOOP 2015
4. CSD Graduate Admissions Committee, 2013
5. CNBC Social Committee, 2011

## Advising

Undergraduates (year; co-advisor; subsequent placement)

1. A. Benson (2016; Prof. J. Aldrich; Facebook)
2. C. Wang (2015; Prof. J. Aldrich; PhD student, University of Washington)
3. B. Chung (2014; Prof. J. Aldrich; PhD student, Northeastern University)
4. N. Fulton (2012; Prof. J. Aldrich; PhD student, Carnegie Mellon University)
5. M. Rule (2009; Prof. N. Urban; PhD student, Brown University)

Last updated: May 16, 2017