

# Nicholas Schiefer

32 Vassar Street, 32-G580  
Cambridge, MA 02139  
United States of America

Phone: +1 (626) 354-9305  
Email: [schiefer@mit.edu](mailto:schiefer@mit.edu)  
Web: <http://nicholasschiefer.com>

## Education

---

2016 - present **Massachusetts Institute of Technology**, *Ph.D in Computer Science*

2012 - 2016 **California Institute of Technology**, *B.S. in Computer Science*

## Research & Work Experience

---

2016 - present **Graduate Fellow and Assistant**, *Theory of Computing Group, Massachusetts Institute of Technology*  
Graduate research on sketching methods in machine learning, advised by Piotr Indyk.

2015 - 2016 **Undergraduate Thesis Student**, *Schulman Group, California Institute of Technology*  
Thesis research on algorithms for causal inference in graphical models, supervised by Leonard Schulman.

2014 - 2016 **Undergraduate Researcher and Summer Undergraduate Research Fellow**, *DNA and Natural Algorithms Group (Winfree Lab), California Institute of Technology*  
Theoretical research on molecular computation with interacting chemical reaction networks and tile self-assembly.

2014 - 2016 **Teaching Assistant**, *California Institute of Technology*  
CS38 (Introduction to Algorithms—Spring 2014, 2015, and 2016), CS150 (Probability and Algorithms—Fall 2014), BE/CS/CNS/Bi191a (Biomolecular Computation—Winter 2015 and 2016), and Ph11 (Freshman Research Tutorial—2015-2016 academic year)

2014 **Summer Undergraduate Research Fellow**, *Preskill Group and IQIM, California Institute of Technology*  
Theoretical and computational research on thermalization models and algorithmic cooling.

2013 - **Computational Physics Research**, *in collaboration with Milo Lin at the University of California, Berkeley*  
Focus on algorithms for studying the dynamics of self-assembling systems, such as viral capsids.

2013 **Physics 11 Fellow**, *California Institute of Technology*  
Computational work on folding dynamics of meso-scale DNA globules, in collaboration with Milo Lin.

2012 **Intern**, *OANDA Corporation*  
Software development with a focus on real time profit/loss tracking and applied machine learning.

2011 - 2012 **Research Associate**, *Clarke Group, University of Waterloo*  
Research in novel document expansion techniques for information retrieval on short documents.

2010 - 2011 **Student-on-Call**, *IBM Canada, Ltd.*  
Development of distributed computing libraries for secondary and post-secondary education.

## Honors & Awards

---

2016 Akamai Presidential Fellowship

- June 2016 George W. Housner Prize (*best undergraduate research*)
- June 2016 Frederic W. Hinrichs, Jr. Memorial Award (*oustanding student leadership*)
- May 2016 Bhansali Prize in Computer Science (*best undergraduate research in computer science*)
- Nov. 2015 Rhodes Scholarship Finalist (*Ontario, Canada region*)
- Aug. 2015 ISNSCE Best Presentation Award, 21st International Conference on DNA Computing and Molecular Programming (DNA21)
- May 2015 Honorable Mention, Bhansali Prize in Computer Science
- Apr. 2015 Deans' Cup Leadership Award
- 2014 & 2015 Semifinalist, Perpall Family Public Speaking Competition
- 2014 & 2015 Caltech Alumni Association Spirit Award
- Jan. 2013 Physics 11 Fellowship
- June 2012 Top 20 under 20 (*awarded to Canadian youth for outstanding innovation, leadership, and achievement*)
- June 2012 Governor General's Academic Medal
- May 2012 Intel Foundation Young Scientist Award (*grand prize and \$50,000 scholarship at the Intel International Science and Engineering Fair*)
- May 2012 Google Award for Excellence in Computer Science, Intel International Science and Engineering Fair
- Apr. 2012 City of Pickering Special Citation Award (*awarded to a citizen of Pickering, Canada for outstanding achievement*)
- Mar. 2012 CIBC National Scholarship, University of Waterloo (declined) (*largest scholarship to the Waterloo CS department*)
- May 2011 Gold Medal and Best-in-Division, 2011 Canada Wide Science Fair

## Peer-Reviewed Publications

---

- 2016 **Nicholas Schiefer** and Erik Winfree, "Time Complexity of Computation and Construction in the Chemical Reaction Network-Controlled Tile Assembly Model", *to appear in the 22nd International Conference on DNA Computing and Molecular Programming (DNA22), 2016*
- 2015 **Nicholas Schiefer** and Erik Winfree, "Universal Computation and Optimal Construction in the Chemical Reaction Network-Controlled Tile Assembly Model", *21st International Conference on DNA Computing and Molecular Programming (DNA21), 2015, vol. 9211, pp. 34–54.*

## Talks, Posters & Presentations

---

- Jan. 2015 "Computation and Construction in the Chemical Reaction Network-Controlled Tile Assembly Model", *Molecular Programming Project Workshop (MPP 2015), Poster Session*
- Oct. 2014 "Heat-Bath Algorithmic Cooling in Noisy Open Quantum Systems", *SURF Seminar Day 2014*
- May 2012 "Markov-Chain Inspired Microsearch", *Intel International Science and Engineering Fair (ISEF 2012)*
- Feb. 2012 "Accept, Convene, Connect, and Effect" (keynote), *Science Expo 2012*
- Nov. 2011 "Cloud Computing in the classroom", *IBM Centre for Advanced Studies Conference (CASCON 2011)*
- Oct. 2011 "Markov Chain-Inspired Microsearch", *Google Tech Talk, Google Waterloo*
- Sept. 2011 "Searching for Ambiguity: Markov Chain-Inspired Microsearch", *TEDxToronto 2011*
- May 2011 "Markov-Chain Inspired Microsearch", *Canada-Wide Science Fair (CWSF 2011) and York Region Sci-Tech Fair*

## Volunteer Work & Student Leadership

---

- 2015 - 2016 Student Representative, Council on Undergraduate Education
- 2015 - 2016 Student Representative, Computer Advisory Committee
- 2015 - 2016 Student Representative, Student Life and Housing Committee
- 2013 - 2016 Upperclass Counselor, Dabney House
- 2015 - 2016 President, Dabney House
- 2014 - 2016 Student Representative, Safety Net Committee
- 2014 - 2016 Representative, Title IX Advisory Committee
- 2014 - 2016 Representative, Deans' Advisory Council
- 2014 - 2015 Treasurer, Dabney House
- 2014 - 2015 Student Representative, Upperclass Admissions Committee
- 2014 - 2015 Secretary, Head UCC Council
- 2013 - 2015 Head Upperclass Counselor, Dabney House
- 2013 - 2014 Representative-at-Large, Undergraduate Honor Code Committee
- 2013 - 2015 Student Representative, Freshman Admissions Committee
- 2013 - 2015 Student Representative, Core Curriculum Steering Committee
- 2013 - 2014 Historian, Dabney House
- 2012 - 2015 Representative-at-Large, Academics and Research Committee