

# JOSEPH SLOTE

joseph.slote@gmail.com ◊ (814) 282-7289  
286 Athol Avenue ◊ Oakland, CA 94606  
joeslote.com

## EDUCATION

---

|  |  |
|--|--|
| <b>University of Oxford</b> , Oxford, UK<br>MSc in Mathematics and the Foundations of Computer Science | <i>Oct 2016 - Sep 2017</i><br><i>Merit</i>           |
| <b>Carleton College</b> , Northfield, MN<br>Mathematics Major  | <i>Sep 2012 - Jun 2016</i><br><i>Magna Cum Laude</i> |

## AWARDS

---

|   |                     |
|---|---------------------|
| Steven P. Galovich Prize in Mathematics   | 2016                |
| Distinction in undergraduate thesis   | 2016                |
| Research Fulbright to the Rényi Institute of Mathematics<br>in Budapest (declined)    | 2016                |
| Phi Beta Kappa & Sigma Xi   | 2016                |
| Barry Goldwater Scholarship, Honorable Mention  | 2015                |
| Patricia V. Damon Merit Scholarship   | 2015                |
| Ford Motor Co. Scholarship  | 2015                |
| Two grants from the R. J. Kolenkow and<br>R. A. Reitz Fund for Undergraduate Research | Dec 2014 & Mar 2015 |
| Exemplary rating on sophomore writing portfolio                                       | 2014                |

## PUBLICATIONS

---

Slote, J. A. & Bertschinger, T. (2018). Knot Embeddings in Improper Foldings. Lang, R. J., Bolitho, M., & You, Z. (Eds.), *Origami<sup>7</sup>: Seventh International Meeting on Origami in Science, Mathematics, and Education* (Vol. 2, pp. 451-464). St. Albans, England: Tarquin.

Slote, J. A. & Strand, J. F. (2015). Conducting spoken word recognition research online: Validation and a new timing method. *Behav Res Methods*, May 19. DOI: 10.3758/s13428-015-0599-7.

## PRESENTATIONS

---

Slote, J. & Bertschinger, T. (2018). Knot Embeddings in Improper Foldings. *Seventh International Meeting on Origami in Science, Mathematics, and Education*, September 6th.

Slote, J. & Mastriani, M. (2016). How many ways to slice a donut? Enumerating  $n$ -torus separations with graphs. *Mathematics Association of America Sectional Meeting, North Central Section*, April 16th.

## RESEARCH

---

|   |  |
|---|--|
| <b>Master's Thesis, adv. Varun Kanade</b><br><i>Expressivity of Neural Networks</i> | University of Oxford<br><i>May 2018 - Aug 2018</i> |
|---|--|

· Surveyed current understanding of the role of depth in function representation by artificial neural networks, including universality results, upper and lower bounds, and exponential separations,

- Developed a new definition of circuit width, proved a width reduction theorem, proved the existence of certain Lipschitz-bounded functions requiring exponentially-many nodes (in the spirit of Shannon's theorem for boolean networks).

**Independent Research, adv. Rob Thompson**

*Minimally-separating Graphs on Surfaces*

Carleton College

*Jan 2018 - Present*

- Studied embeddings of graphs which partition surfaces into  $n$  regions, where for all edges  $e$  in the graph, the removal of  $e$  would decrease the number of regions,
- Characterized such graphs based on rotation systems and chromatic number; results in preparation.

**Undergraduate Thesis, adv. Deanna Haunsperger**

*Mathematics of Origami*

Carleton College

*Sep 2016 - Mar 2016*

- Studied combinatorics, geometry, and topology topics in origami (map foldings, geometric constructions, rigid- and general foldability),
- Discovered a relationship between self-intersection and the embedability of knots in a folding; a greatly enhanced version was published in the 7OSME proceedings.

**Research Assistantship, adv. Ivan Deutsch**

*Error scaling in the Boson Sampler*

CQuIC, University of New Mexico

*Dec 2014 - Sep 2015*

- Proved state preparation error scales linearly in the number of photon sources, further cementing BOSONSAMPLING as a likely candidate for the demonstration of quantum supremacy,
- Publication of results preempted by V. S. Shchesnovich (arXiv:1501.00850).

**Research Assistantship, adv. Julia Strand**

*Grammatical Perception*

Carleton College

*Jan 2014 - Jan 2015*

- Developed and conducted a psycholinguistics study on grammatical expectation using the Tobii Eye Tracker,
- Developed & deployed perception experiments on Amazon Mechanical Turk; contributed to the open-source PsiTurk platform. Results published in Behavioral Research Methods.

## EMPLOYMENT

---

**Dascena, Inc.**

*Director of Science & Technology*

Hayward, CA

*Jan 2018 - May 2019*

- Led an engineering team of eight to grow Dascena's sepsis early warning system from four hospital sites to 31 sites in 20 states,
- Designed & architected a category-theoretic domain-specific language for time series transformations in machine-learning pipelines,
- Designed & architected a fault-tolerant data scraping system to collect patient information from diverse environments with certain mathematical/statistical fairness guarantees,
- Designed & architected machine learning infrastructure to enable zero-downtime continuous integration of machine learning improvements into production settings,
- Redefined the governing loss function for machine-learning-based disease prediction in clinical settings,
- Hired one lead software engineer and several long-term contractors; led successful internship program. Developed a number of business procedures to improve employee morale and efficiency.

*Senior Engineer - R & D*

*Feb 2017 - Dec 2017*

- Developed and delivered early warning systems for sepsis and other diseases at hospitals around the US, powered by machine-learning techniques.

**Wheat Co.***Full-stack Developer & Consultant*

San Francisco, CA

*Jan 2016 - Dec 2016*

- Consulted with and developed custom software for clients around the US.

**Carleton College***Assistant and Safety Monitor, Art Dept.*

Northfield, MN

*Jan 2015 - Jun 2016*

- Assisted with student projects and provided instruction on tool use as needed.

*Front-end Web Developer, Web Services**Jan 2014 - Jan 2015*

- Extended and integrated a modern form creation interface into the college's open-source Reason CMS,
- Designed a responsive and content-first Art Department Blog.

**ScienceSeeds***Product Designer*

Princeton, NJ

*Jun 2013 - Dec 2013*

- Designed and prototyped a number of educational science kits for the elementary school age group.

**Channellock, Inc.***Fixture Designer*

Meadville, PA

*Jun 2011 - Aug 2012*

- Designed and prototyped high-throughput machining fixtures for hand tool manufacture that balanced ease of use, repeatability, and cost.

**EXTRA-CURRICULAR**

---

**Carleton Developers Exchange***Co-founder & President*

Carleton College

*Mar 2014 - Mar 2016*

- Co-founded Carleton College's first software development student group, remains ongoing in 2018,
- Taught numerous programming workshops and organized technical talks from regional technology companies,
- Created CarlHacks, the first hackathon at a liberal arts institution.

**SKILLS**

---

**Computer Languages**

Python, Java, Javascript,

**Technologies**

SKlearn, XGBoost, NodeJS, MongoDB, AngularJS, React,

**Scientific Computing**

NumPy &amp; Pandas, Mathematica, SageMath, NetworkX

**CAD Software**

SolidWorks 4 yrs., Pro/E 2 yrs.,

**Prototyping**

CNC and Manual milling, 3D Printing (3D Systems Project, Afinia, RepRap), Electronics assembly &amp; system design.

**REFERENCES**

---

**Varun Kanade***Graduate Thesis Advisor*

University of Oxford

## CONTACT:

Email: varunk@cs.ox.ac.uk

Phone: +44 (0) 1865 610589

## MAIL:

Department of Computer Science

University of Oxford

Wolfson Building, Parks Road

Oxford, OX1 3QD, UK

**Eric Egge***Undergraduate Academic Advisor*

Carleton College

CONTACT:  
Email: eegge@carleton.edu  
Phone: +1 (507) 222-7623

MAIL:  
Department of Mathematics and Statistics  
Carleton College  
1 North College Street  
Northfield, MN 55057, USA

**Ivan Deutsch**  
*Undergraduate Research Advisor*

CQuIC, University of New Mexico

CONTACT:  
Email: ideutsch@unm.edu  
Phone: +1 (505) 277-1502

MAIL:  
Dept. of Physics and Astronomy  
Room 24  
University of New Mexico  
800 Yale Blvd.  
Albuquerque, NM 87131-1156, USA