SCOTT EMMONS

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EDUCATION

University of California, Berkeley
PhD, *Department of Electrical Engineering and Computer Sciences*. August 2019 - Present
Advised by Stuart Russell.

University of North Carolina at Chapel Hill
BS, *Mathematics* and BA, *Computer Science*. May 2019
Highest Honors for Thesis in Mathematics.
GPA 4.0/4.0. GRE 170/170 Verbal, 170/170 Quantitative, 6.0/6.0 Writing.

AWARDS AND HONORS

Department of Energy Computational Science Graduate Fellowship ($300,000)
- Supports 4 years of graduate study for 20 U.S. students per year researching high-performance computing.

Robertson Scholars Leadership Program ($250,000) 2015 - 2019
- Highly selective undergraduate merit scholarship providing unique "dual citizenship" at UNC and Duke.

Goldwater Scholar ($15,000) 2017 - 2019
- Awarded to 300 students in the U.S. per year for natural sciences, mathematics, and engineering research.

Archibald Henderson Medal 2019
- "A gold medal given annually to the undergraduate judged by [UNC's] Department of Mathematics to have demonstrated a high degree of mathematical ability and the greatest promise of originality in the field."

Alfred Brauer Prize 2018
- Annual award granted by UNC's Department of Mathematics "to the undergraduate who has demonstrated the greatest ability and promise for achievement in the fields of algebra or number theory."

PUBLICATIONS AND PRESENTATIONS

Peer-Reviewed Publications
- Eun Lee, **Scott Emmons**, Ryan Gibson, James Moody, & Peter J. Mucha: "Concurrency and Reachability in Treelike Temporal Networks." *Physical Review E, 2019*.
- **Scott Emmons** & Peter J. Mucha: "A Map Equation with Metadata: Varying the Role of Attributes in Community Detection." *Physical Review E, 2019*.
- Kris Hauser & **Scott Emmons**: "Global Redundancy Resolution via Continuous Pseudoinversion of the Forward Kinematic Map." *IEEE Transactions on Automation Science and Engineering, 2018*.
- **Scott Emmons**, Robert Light, & Katy Börner: "MOOC Visual Analytics: Empowering Students, Teachers, Researchers, and Platform Developers of Massively Open Online Courses." *Journal of the Association for Information Science and Technology (JASIST), 2017*.
- William H. Weir, **Scott Emmons**, Ryan Gibson, Dane Taylor, & Peter J. Mucha: "Post-Processing Partitions to Identify Domains of Modularity Optimization." *Algorithms, 2017*.
- **Scott Emmons**, Mike Gallant, Stephen Kobourov, & Katy Börner: "Analysis of Network Clustering Algorithms and Cluster Quality Metrics at Scale." *PLoS ONE, 2016*.

Oral Presentations
- **Scott Emmons**, Robert Light, & Katy Börner: "MOOC Visual Analytics: Empowering Students, Teachers, Researchers, and Platform Developers of Massively Open Online Courses." Interactive Intelligent Systems Open House. Bloomington, IN, 2015. **Best Presentation Award**.
- **Scott Emmons**, Robert Light, & Katy Börner: "MOOC Visual Analytics." Cyberinfrastructure for Network Science Center Open House. Bloomington, IN, 2014.
- **Scott Emmons**: "Mapping the Consumer Product Space." Cyberinfrastructure for Network Science Center Open House. Bloomington, IN, 2013.

RESEARCH EXPERIENCE

Carolina Center for Interdisciplinary Applied Mathematics, *Mucha Group, UNC* Chapel Hill, NC
Undergraduate Researcher November 2015 - May 2019

- Analyzed reachability and concurrency on time-evolving networks to study, for example, the spread of HIV in social networks.
- Formulated information-theoretic algorithm incorporating metadata into community detection to meet computational needs of applied researchers.
- Initiated transatlantic collaboration to implement new community detection algorithm in open-source software widely used by the international scientific community.

Intelligent Motion Laboratory, *Duke University* Durham, NC
Undergraduate Researcher August 2016 - May 2017

- Developed method for the efficient, continuous pseudoinversion of a multivariate function, which has implications for robot motion planning and applications such as teleoperation and surgical robotics.
- Optimized runtime of pseudoinversion algorithm for average of 25x speed increase, enabling the computation of order-of-magnitude greater problem definitions.
- Implemented custom cached database and parallelized, cache-aware algorithms to facilitate analysis at a scale unprecedented for its kind in the existing literature.

Cyberinfrastructure for Network Science Center, *Indiana University* Bloomington, IN
Research Intern September 2013 - April 2017

- Collaborated on international research project to map scientific publication.
- Analyzed massively open online course data to empower students, teachers, researchers, and platform developers of massively open online courses.
- Designed statistical computing and visual analytics studies to advance the fields of network science and online learning dynamics.
- Optimized computational experiments on supercomputer via parallel programming for 100x speed increase.

Arnosti Laboratory, *Department of Marine Sciences, UNC* Chapel Hill, NC
Research Assistant October 2015 - February 2016

- Developed interactive software for the hierarchical visualization of microbial community composition data used in making oceanography discoveries.
- Programmed scripts that automated supercomputing workflows for DNA sequencing to increase the research lab's operational efficiency.

Graph and Map Algorithms Group, *University of Arizona* Tucson, AZ
Visiting Scholar December 2014 - January 2015

- Collaborated directly with Dr. Stephen Kobourov to design study answering previously unresolved questions in the field of network science.
- Implemented computational experiments on 4 algorithms and 6 metrics that can be applied to research in disciplines ranging from the social sciences to the biological sciences.

SERVICE AND PROFESSIONAL EXPERIENCE

Empower: Educate & Inspire Chapel Hill, NC
Cofounder June 2017 - Present

- Developing curriculum used in classrooms for over 200 high school students to identify their values, learn about global issues, recognize their strengths, and make a social impact (ongoing).
- Granted financial and other backing from local and national funders, including fellowship with UNC's CUBE incubator for social justice and innovation.

Information Technology Services, *University of North Carolina at Chapel Hill* Chapel Hill, NC
Residential Computing Consultant August 2017 - May 2018

- Supported on-site IT needs of 70 university students to ensure a high-quality residential experience.
- Solved issues independently and autonomously to provide fast, reliable service to clients.

Robertson Community Coordinators, *Robertson Scholars Leadership Program* Chapel Hill, NC
Service Committee Member August 2015 - May 2017

- Organized volunteer opportunities that drove civic engagement amongst Robertson Scholars.
- Oversaw logistics and funding for 4 community service projects that improved local living conditions.

Sparq Creative Solutions, LLC Bloomington, IN
Cofounder and Owner December 2013 - December 2015

- Created strategic plans, brand identities, logos, and websites to grow local businesses.
- Consulted with clients to identify needs, plan projects, and finalize contracts to meet business objectives.

TEACHING AND MENTORING EXPERIENCE

Shanti Bhavan Children's Project Tamil Nadu, India
Volunteer Teacher July 2017 - August 2017

- Taught approximately 80 students from families who make less than $2 / day in subjects ranging from English literature to physics to provide an educational foundation towards eliminating the cycle of poverty.
- Mentored 10 students in quantitative subjects such as mathematics and computer science in preparation for national examinations.
- Coached students in preparation for public speaking to an audience of 50 members to develop students' confidence and communication skill.
- Instructed 20 students in resume writing for a Goldman Sachs workshop preparing them to seek and attain high-impact careers.
- Collaborated with school's founder to draft detailed budget proposal requesting hundreds of thousands of dollars per year in funding for new initiative.

Sunflower County Freedom Project Sunflower, MS
Volunteer Teacher May 2016 - July 2016

- Developed standard-aligned 8^{th}- and 9^{th}-grade math curriculum designed for under-performing middle school students who sought over the summer to enrich their education.
- Taught two math classes that saw an average increase in performance of 9% on state standard test.
- Developed a three-day coding seminar for middle school students that used active learning with puzzles to introduce the fundamentals of computer science.
- Led fitness group in dieting and exercise that resulted in average mile time decrease of over 60 seconds.

Life Skills Academy Bloomington, IN
Cofounder January 2014 - May 2015

- Negotiated terms with school principal to run program 3 times a week during the school day and help students at risk of failing to pass core, academic classes required to earn a high school diploma.
- Oversaw development of "life skills" in 25 mentor-mentee pairs to support classroom achievement.

Information Visualization Massively Open Online Course Bloomington, IN
Student Liaison Spring 2014, Spring 2015

- Facilitated online discussion of nearly 2,000 enrolled students from over 50 different countries to augment lecture material.
- Reviewed student-facing materials such as examinations to ensure that online coursework maintained the high quality of an in-person university class.