

# SCOTT EMMONS

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## EDUCATION

### University of North Carolina at Chapel Hill

BS, *Mathematics* and BA, *Computer Science*. GPA 4.0/4.0

Expected May 2019

GRE 170/170 Verbal, 170/170 Quantitative, 6.0/6.0 Writing

## AWARDS AND HONORS

### 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

- National, research-based scholarship in the natural sciences, mathematics, and engineering.

### Alfred Brauer Award

2018

- Granted by UNC’s Department of Mathematics “to the undergraduate who... ha[s] demonstrated the greatest ability and shown the greatest promise for achievement in the fields of algebra or number theory.”

### National Merit Scholar (\$2,500)

2015

- Among top 0.6% of PSAT test takers.

### Honors Carolina

2015 - 2019

- Selected top 10% of incoming UNC class.

## PUBLICATIONS AND PRESENTATIONS

### *Submitted for Publication*

- **Scott Emmons** & Peter J. Mucha: “A Map Equation with Metadata: Varying the Role of Attributes in Community Detection.” *Submitted*, 2018.

### *Peer-Reviewed Publications*

- 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 - Present

- Analyzing reachability and concurrency on time-evolving networks to study, for example, the spread of HIV in social networks (ongoing).
- Formulating information-theoretic algorithm incorporating metadata into community detection to meet computational needs of applied researchers (ongoing).
- Developed post-processing methods for community detection in networks to gain insight from large, complex network datasets.

**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 and Owner*

June 2017 - Present

- Developing curriculum for 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***Volunteer Teacher*Tamil Nadu, India  
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***Volunteer Teacher*Sunflower, MS  
May 2016 - July 2016

- Developed standard-aligned 8<sup>th</sup>- and 9<sup>th</sup>-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***Cofounder*Bloomington, IN  
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***Student Liaison*Bloomington IN  
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.