DAVID TENCH

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EDUCATION

Ph.D., U. of Massachusetts, Amherst, Dept. of Computer Science **expected June 2020**
Thesis Committee: Andrew McGregor, Phillipa Gill, Cameron Musco, Markos Katsoulakis
Research Areas: Algorithms (randomized, approximation, graph, streaming), systems applications

M.S., U. of Massachusetts, Amherst, Dept. of Computer Science **February 2018**
Advisors: Andrew McGregor, Emery Berger (thesis only)
Thesis: "MESH: Compacting Memory Management for C/C++ Applications"

B.S., Lehigh University, Department of Mathematics **May 2013**

EMPLOYMENT & AFFILIATIONS

University of Massachusetts Amherst, Research Assistant **2014 - 2020**
Lehigh University, President's Scholar **2014**
Lehigh University, South Mountain College Undergraduate Researcher **Summer 2013**
Lehigh University, TRAC (Technology, Research, and Communication) Fellow **2011 - 2013**

RESEARCH INTERESTS

My research interests are in the broad area of randomized, approximation, and graph algorithms with a focus on data streams and processing massive datasets. I am particularly interested in developing new algorithms and lower bounds for massive or partially accessible graphs. I also apply these ideas to systems challenges like memory management and network measurement, creating open source tools with analytic performance guarantees.

IN-PROGRESS WORK

PredictRoute: A Network Path Prediction Toolkit. Phillipa Gill, Andrew McGregor, Rachee Singh, David Tench. To be submitted to *ACM Special Interest Group on Data Communication (SIGCOMM) 2020*.

Streaming Algorithms for Maximum Unique Coverage and Capacitated Maximum Cut. Andrew McGregor, David Tench, Hoa Vu. To be submitted to *ACM Principles of Database Systems (PODS) 2020*.

PUBLICATIONS

MESH: Compacting Memory Management for Unmanaged Languages. Bobby Powers, David Tench, Emery Berger, Andrew McGregor. https://github.com/plasma-umass/Mesh. In *ACM Programming Languages Design and Implementation (PLDI) 2019*. Phoenix, AZ. June 2019. (Accept rate 27%)

Vertex & Hyperedge Connectivity in Graph Streams. Sudipto Guha, Andrew McGregor, David Tench. In *ACM Principles of Database Systems (PODS) 2015*. Melbourne, Australia. June 2015. (Accept rate 25%) (**42 citations**)

Densest Subgraph in Dynamic Graph Streams. Andrew McGregor, David Tench, Sofya Vorotnikova, Hoa Vu. In *Mathematical Foundations of Computer Science (MFCS) 2015*. Milan, Italy. August 2015. (Accept rate 35%) (**45 citations**)

AWARDS

President's Scholarship, Lehigh University 2014
Lemon Prize for Undergraduate Research, Eckardt Honors Society, Lehigh University 2013
TRAC Mentor Fellowship, Lehigh University 2013
Williams Writing Prize, Lehigh University 2011
TRAC Fellow, Lehigh University 2011
Dean's List, Lehigh University 2009 - 2013

NOTABLE PRESENTATIONS

Meshing: A Theoretical Approach to "Impossible" Memory Management March 2017
NSF "Algorithms in the Field" PI meeting. Arlington, VA.

Densest Subgraph in Dynamic Graph Streams MFCS, August 2015
2015 Mathematical Foundations of Computer Science conference. Milan, Italy.

TEACHING

CS 611: Advanced Algorithms Teaching Assistant UMass, Fall 2018 & Fall 2019
Topics: Asymptotic analysis, divide & conquer, dynamic programming, graph algorithms, randomized & approximation algorithms, NP-completeness.
Notes: 70 M.S. and Ph.D. students.

CS 514: Algorithms for Data Science Teaching Assistant & Lecturer UMass, Spring 2018
Topics: Clustering, statistical properties of data, near neighbor search, algorithms for massive graphs and social networks, learning algorithms, and randomized algorithms.
Notes: 80 M.S. students. Gave 5 lectures on data streams, MapReduce, streaming graph algorithms.

CS 240: Reasoning Under Uncertainty Teaching Assistant UMass, Fall 2017
Topics: Basic probability theory, conditional probability, expectation and variance, common distributions, concentration bounds, and applications to data science.
Notes: 200 undergraduate students. Led weekly discussion sections with lecture component.

CS 683: Artificial Intelligence Teaching Assistant & Lecturer UMass, Spring 2017
Topics: Classical search, constraint satisfaction, resource-bounded search, adversarial search, knowledge representation and inference, Bayesian networks, decision theory, planning, reinforcement learning, multiagent systems, and computational models of bounded rationality.
Notes: 50 Ph.D. students. Gave 2 lectures on game tree search and constraint satisfaction problems.

TRAC 100: The TRAC Fellows Seminar Head Co-Instructor Lehigh, Fall 2013
Topics: Research methods, educational technology, writing and communication pedagogy. Course includes a self-directed research project.
Notes: 14 undergraduate students. Other co-instructor was a faculty member.

MENTORING

PhD Student Peer Mentor UMass, Fall 2019
Mentored two first-year computer science PhD students. Advised on research, courses, learning to work with an advisor, and living/working in the US.

Mentor to an REU Student UMass, Summer 2017
Mentored one undergraduate CS student writing a survey paper of circuit complexity results and their applications to neural networks, with focus on skills like reading technical papers, working independently, and clear technical writing.

TRAC Mentor Fellow Lehigh, Fall 2013 - Spring 2014
Advised, evaluated, and met regularly with 13 undergraduate mentees as they worked as peer research & communication tutors.

TRAC Fellow Lehigh, Fall 2011 - Spring 2013
Peer writing and research mentor for undergraduate students. Partnered with instructors on courses on topics such as internet social networks and integrated product design.

SERVICE

UMass CS Graduate Representative Spring & Fall 2018
Attended and participated in faculty meetings, interviewed 40 candidates for faculty positions, and represented the interests of grad students in CICS.

UMass CICS student-run diversity and inclusion event organizer 2018
Organized student programs to discuss gendered harassment in STEM workplaces. Liaised with other student diversity groups such as UMASS CICS Women's organization to encourage men to become workplace allies for disadvantaged groups.

Peer Review 2015 - 2019
Reviewed papers submitted to SODA 2020, FOCS 2019, SODA 2019, STACS 2018, SODA 2018, WSDM 2016, and STOC 2015.

OTHER INTERESTS

Jazz Saxophone Performance · Martial Arts · (Former) Volunteer Firefighter