DAVID TENCH

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EDUCATION

Ph.D., U. of Massachusetts, Amherst, Dept. of Computer Science **August 2020**
Research Areas: Algorithms (randomized, approximation, graph, streaming), systems applications
Dissertation: "Algorithms for Massive, Expensive, or Otherwise Inconvenient Graphs"

M.S., U. of Massachusetts, Amherst, Dept. of Computer Science **February 2018**
Thesis: "MESH: Compacting Memory Management for C/C++ Applications"

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

EMPLOYMENT & AFFILIATIONS

Rutgers University, Postdoctoral Associate (NSF Computing Innovation Fellow) **2021 - 2023**
Stony Brook University, Postdoctoral Associate **2020 - 2021**
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

I design and analyze randomized, approximation, and graph algorithms with a focus on streaming, external memory, and data structures. I apply these ideas to practical tasks like memory management, network measurement, filesystems, neuromorphic hardware, and external memory data structures. I use my cross-cutting theory and systems knowledge to create provably performant open source tools.

PUBLICATIONS

PredictRoute: A Network Path Prediction Toolkit. Rachee Singh, David Tench, Phillipa Gill, Andrew McGregor. In *ACM Special Interest Group on Measurement and Evalution (SIGMETRICS) 2021*. Beijing, China. June 2021. Also appears in *Proceedings of the ACM on Measurement and Analysis of Computing Systems (POMACS) 2021*. (Accept rate 17%)

Maximum Coverage in the Data Stream Model: Parameterized and Generalized. Andrew McGregor, David Tench, Hoa Vu. In *International Conference on Database Theory (ICDT) 2021*. Nicosia, Cyprus. March 2021.

Mitigating False Positives in Filters: to Adapt or to Cache? Michael Bender, Ratish Das, Martín Farach-Colton, Tianchi Mo, David Tench, Yung Ping Wang. In *SIAM Symposium on Algorithmic Principles of Computer Systems (APOCS) 2021*. Alexandria, VA (remote). January 2021.

MESH: Compacting Memory Management for Unmanaged Languages. Bobby Powers, David Tench, Emery Berger, Andrew McGregor. In *ACM Programming Languages Design and Implementation (PLDI) 2019*. Phoenix, AZ. June 2019. (Accept rate 27%) (**10 citations**)

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%) (**55 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%) (**61 citations**)

AWARDS

CRA/CCC/NSF Computing Innovation Fellowship 2021 - 2023
President's Scholarship, Lehigh University 2014
Lemon Prize for Undergraduate Research, Eckardt Honors Society, Lehigh University 2013
TRAC Fellowship & Mentor Fellowship, Lehigh University 2011, 2013
Williams Writing Prize, Lehigh University 2011
Dean's List, Lehigh University 2009 - 2013

PRESENTATIONS

Maximum Coverage in the Data Stream Model, Parameterized & Generalized March 2021
International Conference on Database Theory (ICDT) 2021. Nicosia, Cyprus (virtual).

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

Stony Brook University Instructor Spring 2021
Course: Algorithms Reading Group Seminar
Notes: Lectured on graph streaming & reconstruction methods. Led student discussions on open problems in graph algorithms.

University of Massachusetts Amherst Teaching Assistant & Lecturer 2017 - 2019
Courses: Advanced Algorithms (Fall 2018 & Fall 2019), Algorithms for Data Science (Spring 2018), Artificial Intelligence (Spring 2017), Reasoning Under Uncertainty (Fall 2017)
Notes: Gave guest lectures, held office hours, designed & graded assignments, led discussion sections for listed courses at the undergraduate, Masters, and PhD levels.

Lehigh University Head Co-Instructor Fall 2013
Course: The TRAC Fellows Seminar
Notes: A course on research methods, educational technology, writing and communication pedagogy.

MENTORING

Mentor to 6 Graduate Students Stony Brook, Fall 2020
PhD Student Peer Mentor UMass, Fall 2019
Mentor to an REU Student UMass, Summer 2017
TRAC Fellow & Mentor Fellow Lehigh, Fall 2011 - Spring 2014

SERVICE

Program Committee Member 2021
For SIAM Conference on Applied and Computational Discrete Algorithms (ACDA) 2021.

UMass CS Graduate Representative 2018
Advocated for grad students in faculty meetings, interviewed 40 candidates for faculty positions.

UMass CICS student-run diversity and inclusion event organizer 2018
Organized student programs to discuss gendered harassment in STEM workplaces.

Peer Reviewer 2015 - 2021
For ESA 2021, ICPP 2021, MFCS 2021, PODC 2020, SODA 2020, FOCS 2019, SODA 2019, STACS 2018, SODA 2018, WSDM 2016, and STOC 2015.