# 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

**Stony Brook University**, Postdoctoral Associate **2020 - present**
**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, & external memory data structures. I use my cross-cutting theory & 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%) (**8 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%) (**60 citations**)

## AWARDS

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| **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

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| **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 - 2019
For PODC 2020, SODA 2020, FOCS 2019, SODA 2019, STACS 2018, SODA 2018, WSDM 2016, and STOC 2015.