

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 Evaluation (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%) (**11 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%) (**59 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%) (**64 citations**)

AWARDS

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| 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

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| 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

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| 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 7 Grad and 3 Undergrad Students | Stony Brook & Rutgers, 2020 - present |
| Master's Thesis Defense Committee Member | Stony Brook, 2021 |
| 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

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| 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. | |