

# DAVID TENCH

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## EDUCATION

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**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

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**Rutgers University**, Postdoctoral Associate **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

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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

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**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%) (**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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<b>CRA/CCC/NSF CI Fellowship</b>	2021-2023
<b>President's Scholarship, Lehigh University</b>	2014
<b>Lemon Prize for Undergraduate Research, Eckardt Honors Society, Lehigh University</b>	2013
<b>TRAC Fellowship &amp; Mentor Fellowship, Lehigh University</b>	2011, 2013
<b>Williams Writing Prize, Lehigh University</b>	2011
<b>Dean's List, Lehigh University</b>	2009 - 2013

## PRESENTATIONS

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<b>Maximum Coverage in the Data Stream Model, Parameterized &amp; Generalized</b>	March 2021
International Conference on Database Theory (ICDT) 2021. Nicosia, Cyprus (virtual).	
<b>Meshing: A Theoretical Approach to "Impossible" Memory Management</b>	March 2017
NSF "Algorithms in the Field" PI meeting. Arlington, VA.	
<b>Densest Subgraph in Dynamic Graph Streams</b>	MFCS, August 2015
2015 Mathematical Foundations of Computer Science conference. Milan, Italy.	

## TEACHING

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<b>Stony Brook University</b>	Instructor	Spring 2021
<b>Course:</b> Algorithms Reading Group Seminar		
<b>Notes:</b> Lectured on graph streaming & reconstruction methods. Led student discussions on open problems in graph algorithms.		
<b>University of Massachusetts Amherst</b>	Teaching Assistant & Lecturer	2017-2019
<b>Courses:</b> Advanced Algorithms (Fall 2018 & Fall 2019), Algorithms for Data Science (Spring 2018), Artificial Intelligence (Spring 2017), Reasoning Under Uncertainty (Fall 2017)		
<b>Notes:</b> Gave guest lectures, held office hours, designed & graded assignments, led discussion sections for listed courses at the undergraduate, Masters, and PhD levels.		
<b>Lehigh University</b>	Head Co-Instructor	Fall 2013
<b>Course:</b> The TRAC Fellows Seminar		
<b>Notes:</b> A course on research methods, educational technology, writing and communication pedagogy.		

## MENTORING

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

## SERVICE

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<b>Program Committee Member</b>	2021
For SIAM Conference on Applied and Computational Discrete Algorithms (ACDA) 2021.	
<b>UMass CS Graduate Representative</b>	2018
Advocated for grad students in faculty meetings, interviewed 40 candidates for faculty positions.	
<b>UMass CICS student-run diversity and inclusion event organizer</b>	2018
Organized student programs to discuss gendered harassment in STEM workplaces.	
<b>Peer Reviewer</b>	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.	