

# Ranysha Ware

PhD Student  
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## Research Interests

Network Congestion Control, Internet Measurement, Transport Protocols, Network Management, Network Security.

## Education

- **Ph.D. in Computer Science**, Carnegie Mellon University (*in-progress*)  
*Co-Advisors:* Justine Sherry, Srinivasan Seshan  
*Selected coursework:* Advanced and Distributed Operating Systems, Computer Networks, Computer Architecture, Programmable Networks
- **M.S. in Computer Science**, University of Massachusetts Amherst, May 2015  
*Overall GPA:* 3.8/4.0  
*Selected coursework:* Computer Networking, Compiler Techniques, Formal Language Theory, Information Retrieval, Logic in Computer Science, Security Engineering, Statistics I
- **B.S. in Computer Science**, State University of New York at New Paltz, May 2013  
*Minor:* Mathematics  
*Overall GPA:* 3.78/4.0, *Major GPA:* 3.9/4.0

## Honors and Awards

- **IRTF Applied Networking Research Prize** (2020)
- **Facebook Emerging Scholars Award** (2019)
- **SUNY New Paltz 40 Under Forty Alumni Award** (2017)
- **National GEM Consortium PhD Fellowship** (2017)
- **MS Presentation Competition, 2nd Place**, GEM Annual Board Meeting and Conference (2014)
- **National GEM Consortium MS Fellowship** (2013)
- **SUNY New Paltz Outstanding Graduate** (2013)
- **LSAMP Outstanding Scholar's Award** (2010, 2013)

## Publications


- [1] **R. Ware**, M. K. Mukerjee, S. Seshan, and J. Sherry. [Beyond Jain's Fairness Index: Setting the Bar For The Deployment of Congestion Control Algorithms](#). In *Proceedings of the 18th ACM Workshop on Hot Topics in Networks*. HotNets '19, pages 17-24, New York, NY, USA, 2019. ACM.  
🏆 **IRTF Applied Networking Research Prize**
- [2] **R. Ware**, M. K. Mukerjee, S. Seshan, and J. Sherry. [Modeling BBRs Interactions with Loss-Based Congestion Control](#). In *Proceedings of the Internet Measurement Conference*, IMC '19, pages 137-143, New York, NY, USA, 2019. ACM.

## Posters

- [3] **Invited:** J. Slaughter, **R. Ware**, S. Seshan, and J. Sherry. Using Non-Congestive Loss to Differentiate TCP Reno and TCP Westwood. CMU ISR REUSE Poster Session, Aug 2019

- [4] **Invited:** M. Pardeshi, **R. Ware**, and J. Sherry. Reverse Engineering FastTCP. CMU Spring 2019 Meeting of the Minds Symposium, May 2019
- [5] **Invited:** **R. Ware**, A. Kholbrenner, M. K. Mukerjee, S. Seshan, and J. Sherry. Battle for Bandwidth: Fairness and Heterogeneous Congestion Control. CRA URMD Workshop 2019, March 2019
- [6] **Invited:** **R. Ware**, A. Kholbrenner, M. K. Mukerjee, S. Seshan, and J. Sherry. Battle for Bandwidth: Fairness and Heterogeneous Congestion Control. Google Networking Research Summit, March 2019
- [7] **R. Ware**, M. K. Mukerjee, J. Sherry, S. Seshan. Battle for Bandwidth: Fairness and Heterogeneous Congestion Control. NSDI 2018, April 2018.

## Invited External Talks

- WOC STEM Brunch and Panel. SUNY New Paltz LSAMP/CSTEP. March 2020  
 **\$200 Honorarium**
- Battle for Bandwidth: Fairness and Heterogeneous Congestion Control. Facebook Networking & Communications Faculty Summit, June 2019
- How To Apply to Grad School. SUNY New Paltz LSAMP/CSTEP Meeting. November 2016.
- pySPG: Graph Signal Processing Software in Python. Research Competition at GEM Annual Board Meeting and Conference. August 2014.

## Research Experience

*Descriptions below include unclassified content of prior research.*

- **Research Assistant**, Carnegie Mellon University  
 Aug 2017 - Present  
*Fairness and Congestion Control Heterogeneity.* We aim to understand the state of bandwidth allocation (and various metrics for measuring fairness) given heterogeneous congestion control algorithms (CCA) in use today. Our project goal is threefold: (1) to measure what known and previously unknown CCAs are in use today; (2) to evaluate CCAs in controlled experiments in contention with other protocols; and (3) develop a testing methodology for declaring a new CCA is deployable on the Internet today in the era of heterogeneity.
- **Research Intern**, Microsoft Research  
 May 2019 - August 2019  
*100 x 100 RDMA.* We run experiments to determine how to make RDMA work well in datacenter networks with 100 gbs, 100 meter long links.
- **Associate Technical Staff**, MIT Lincoln Laboratory, Cyber Analytics and Decision Systems Group  
 Jun 2015 - Aug 2017  
*Predicting Cyber Threats.* We built big data analysis pipelines for network logs and open-source cyber threat intelligence. We also conducted an extensive literature survey on predictive modeling and analytics for cyber security.
- **Research Assistant**, UMass Amherst  
 Aug 2014 - May 2015  
*Parallel Algorithms for Short Division.* Division of a multiple-precision dividend by a single-precision divisor, short division, is fundamental arithmetic. Improving the execution time of short division can improve the performance of its many applications. Several parallel algorithms for short division have been proposed, with authors proving their theoretical arithmetic bounds and demonstrating their speedup in practice in a particular parallel environment. In this work, we developed and benchmarked efficient implementations of short division algorithms for a comprehensive set of parallel architectures.
- **Summer Research Intern**, MIT Lincoln Laboratory, Cyber Systems and Technology Group  
 May 2014 - Aug 2014  
*Dynamic Cyber-Defense.* We designed and developed a user-friendly tool for end-to-end management and analysis of a dynamic cyber-defense prototype.

- **Summer Research Intern**, MIT Lincoln Laboratory, Computing and Analytics Group  
Jun 2013 - Aug 2013  
*pySPG: Graph Signal Processing Software in Python*. Researchers at MITLL had developed a novel framework for detecting anomalies in massive graphs using signal processing techniques. Addressing the need for a uniform code base, we designed and developed a modular software framework for graph signal processing in million-edge graphs.
- **Research Assistant**, SUNY New Paltz  
Sep 2011 - Dec 2011  
*The Gaussian Quadrature Rule in Multiple Dimensions*. Using Mathematica, we explored the applications of the Gaussian Quadrature Rule to multivariate problems.

## Teaching Experience

- **Teaching Assistant & Guest Lecturer**, Computer Networks (15-441/641), Carnegie Mellon University  
*Semesters*: Spring 2019  
Led weekly recitations, held weekly office hours, and graded assignments.  
Led guest lecture: “TCP Part 2: Performance, Fairness, & Modern Congestion Controllers.”
- **Guest Lecturer**, Computer Networks (15-441/641), Carnegie Mellon University  
*Semesters*: Fall 2017  
Led guest lecture: “Battle for Bandwidth: Fairness and Congestion Control Heterogeneity.”
- **Guest Lecturer**, Machine Learning (SDS 293), Smith College  
*Semesters*: Fall 2016  
Led guest lecture: “Data Wrangling with Python”.
- **Grader**, Programming with Data Structures (CMPSCI 187), UMass Amherst  
*Semesters*: Fall 2013, Spring 2014  
Graded homework and exams.
- **Tutor**, SUNY New Paltz , Mathematics Laboratory  
*Semesters*: Fall 2010, Spring 2011, Fall 2011, Spring 2012, Fall 2012, Spring 2013  
Assisted students in walk-in tutoring center with algebra and calculus courses.
- **Tutor**, SUNY New Paltz , AMP/CSTEP Community  
*Semesters*: Spring 2010, Fall 2010, Spring 2011, Fall 2011, Spring 2012, Fall 2012, Spring 2013  
Tutored underrepresented STEM students taking calculus and computer science courses.
- **Technology Counselor**, Emagination Computer Camps  
Summer 2012  
Led Java workshop and Programming Fundamentals workshop.

## Advising and Mentoring

*Undergraduate student projects supervised at CMU.*

- 2019: Monica Pardeshi, Megan Yu, Joshua Slaughter (CMU ISR REUSE student from Univ. Maryland Baltimore County)

## Service

- **CMU ISR REUSE Admissions Committee** (2020)
- **Python Introductory Workshop Co-Facilitator**, Carnegie Library of Pittsburgh (July - August 2018)
- **Network Reading Group Coordinator**, Carnegie Mellon University (Fall 2017 - Summer 2018)
- **Membership Chair**, GEM Alumni Association (2015)

## Media Coverage

- **Asia Pacific Network Information Centre (APNIC) blog:** [Modelling BBRs interactions with loss-based congestion control](#). January 24, 2020.
- **Packet Pushers podcast:** [Heavy Networking 489: Is BBR Too Unfair An Algorithm For The Internet?](#). November 27, 2019.
- **Vice Motherboard:** [Google's network congestion control algorithm isn't fair, researchers say](#). October 31, 2019
- **Wired Italian:** [Un algoritmo di Google "monopolizza" il traffico web](#). October 28, 2019.
- **Telegraph:** [Google algorithm 'hogs' internet traffic, researchers show](#). October 10, 2019.

Last updated: March 2020