

ABIGAIL V. MATTHEWS

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EDUCATION

University of Wisconsin - Madison

August 2019 - Present

Masters (May 2023) and Ph.D. (In Progress) in Computer Science

Research in system locking patterns and file system optimization

Clarkson University

August 2015 - May 2019

B.S. in Computer Science, Minor in Mathematics

Miller/Davis Service Award for Computer Science, Honors Program, Presidential Scholar, Dean's List

PUBLICATIONS

- **Politicians, Pundits, and Platform Migration: A Comparison of Political Polarization on Parler and Twitter**
A. Matthews, J. Ojala, E. Wali, G. Kurtic, L. Millington, M. Simpson, J. Matthews, G. Madraki. *Northeast Journal of Complex Systems*, Volume 5, No. 1, Article 5, July 2023.
- **Using Tratr to Tame Adversarial Synchronization**
Yuvraj Patel, Chenhao Ye, Akshat Sinha, Abigail Matthews, Andrea C. Arpaci-Dusseau, Remzi H. Arpaci-Dusseau, and Michael M. Swift. 31st USENIX Security Symposium. Boston, MA, August 2022.
- **Comments on NIST Artificial Intelligence Risk Management Framework**
ACM US Technology Policy Council (US-TPC), January 27 2022.
- **Gender Bias in Natural Language Processing Across Human Languages**
Abigail Matthews, Isabella Grasso, Christopher Mahoney, Yan Chen, Esma Wali, Thomas Middleton, Mariama Njie and Jeanna Matthews. *TrustNLP: First Workshop on Trustworthy Natural Language Processing*, Annual Conference of the North American Chapter of the Association for Computational Linguistics, June 10 2021.
- **Gender Bias and Under-Representation in Natural Language Processing Across Human Languages**
Yan Chen, Christopher Mahoney, Isabella Grasso, Esma Wali, Abigail Matthews, Thomas Middleton, Mariama Njie and Jeanna Matthews. *Proceedings of the 2021 AAAI/ACM Conference on Artificial Intelligence, Ethics and Society (AIES)*, May 19-21 2021.
- **Applying Algorithmic Accountability Frameworks with Domain-specific Codes of Ethics: A Case Study in Ecosystem Forecasting for Shellfish Toxicity in the Gulf of Maine**
Isabella Grasso, David Russell, Abigail Matthews, Jeanna Matthews, and Nicholas R. Record. *Proceedings of the 2020 ACM-IMS on Foundations of Data Science Conference (FODS 2020)*, October 19-20 2020.
- **When Trusted Black Boxes Don't Agree: Incentivizing, Iterative, Improvement, and Accountability in Critical Software Systems**
Jeanna Matthews, Graham Northup, Isabella Grasso, Abigail Matthews, Stephen Lorenz, Marzieh Babaeianjelodar, Hunter Bashaw, Sumona Mondal, Mariama Njie, and Jessica Goldthwaite. *Proceedings of the AAAI/ACM Conference on Artificial Intelligence, Ethics and Society (AIES 2020)*, New York, NY, USA, February 7-8 2020.

- **The Right To Confront Your Accuser: Opening the Black Box of Forensic DNA Software**
Jeanna Matthews, Marzieh Babaeianjelodar, Stephen Lorenz, Abigail Matthews, Mariama Njie, Jessica Goldthwaite and Clinton Hughes. Proceedings of the AAAI/ACM Conference on Artificial Intelligence, Ethics and Society (AIES 2019), Honolulu, Hawaii, USA, January 27-28 2019.

EXPERIENCE

Head Teaching Assistant - Operating Systems

August 2023 - Present

Dr. Louis Oliphant - UW Madison

- - Managed the development and grading of systems programming projects using xv6 & C.
 - Provided direction for and coordinated schedules of the other teaching staff and peer mentors.
 - Taught multiple weekly discussion sections and corresponded with students to resolve issues.

Operating Systems Teaching Assistant

August 2019 - May 2020, August 2022 - May 2023

Dr. Andrea Arpaci-Dusseau, Dr. Shivaram Venkataraman, Dr. Michael Swift, & Dr. Remzi Arpaci-Dusseau - UW Madison

- - Taught weekly discussion sections with approximately 30 students each.
 - Managed kernel level programming assignments in xv6 and user level assignments in C.

Polarization Research Assistant

August 2021 - July 2022

Dr. Golshan Madraki - Clarkson University

- - Collected and analyzed data from Twitter and Parler on social media usage of U.S. Congressional Representatives
 - Examined impact of platform migration on polarized networks

Head Teaching Assistant - Intro to Computer Systems

January 2021 - May 2021

Instructor Michael Doescher - UW Madison

- - Took the lead in the development and grading of assignments and projects.
 - Provided direction for and coordinated schedules of the other teaching assistants and peer mentors.

Graduate Operating Systems Teaching Assistant

August 2020 - December 2020

Dr. Andrea Arpaci-Dusseau - UW Madison

- - Helped to develop and grade research-based student projects.
 - Aided students in understanding advanced operating systems topics.

COSI Lab Director

March 2017 - March 2019

Clarkson Open Source Institute, Applied Computer Science Lab with emphasis on free software

- - Ran weekly meetings, resolved conflicts, organized technical workshops, secured resources, organized events, oversaw budget and purchases. Interfaced with faculty, businesses, and administration on behalf of the labs.
 - Maintainer for TOR exit node, Cowrie honeypot, backup server, and software testing VMs.
 - Organizer of Hack Potsdam event (40-120 participants in 2017-2018).

Conferences & Hackathons

- Symposium of Operating System Principles (SOSP '17)(Diversity Workshop '17)(SOSP'19) AAAI/ACM Conference on Artificial Intelligence, Ethics, & Society (AIES'19)(AIES'20)(AIES'21)
- DEFCON 24 & 26 CNYHackathon '17 (2nd Place)
- Hackers on Planet Earth (HOPE '18, '20, & '22) ANYCON '17 (4th Place)
- BSides Las Vegas '18 HackPotsdam '17(Best use of AWS) & '18

RESEARCH

Investigation of Kernel Locking

December 2020 - Present

Advisors: Dr. Andrea Arpaci-Dusseau, Dr. Remzi Arpaci-Dusseau

- - Static analysis of the Linux kernel source code to detect and quantify features of critical sections and locking usage.
 - Analyzing the security and performance risks introduced by the usage of a variety of locking methodology in various scenarios.

Criminal Justice Software Testing

January 2018 - Present

Advisor: Dr. Jeanna Matthews, Dr. Dan Krane

- - Adversarial testing and evaluation of accuracy and fairness of probabilistic genotyping systems.
 - Compared results from various probabilistic genotyping software to evaluate biases.

Social Media Polarization

July 2021 - January 2023

Advisors: Dr. Golshan Madraki

- - Collected and analyzed social media data of politicians on Twitter & Parler
 - Studied characteristics of polarized networks

Accountability & Transparency

January 2020 - August 2021

Advisor: Dr. Jeanna Matthews

- - Quantified gender bias in Wikipedia corpora across 9 human languages.
 - Developed methods of detecting, quantifying, and comparing political bias in corpora.
 - Applied algorithmic accountability frameworks to ecosystem forecasts.

DenseFS

January 2020 - October 2020

Advisors: Dr. Andrea Arpaci-Dusseau, Dr. Remzi Arpaci-Dusseau

- - Development and testing of cache-compact file system.
 - Targeting reductions in cache footprint size and therefore cache pollution and the corresponding performance penalties.

Device Level File System Development

May 2018 - December 2018

Advisors: Dr. Sudarsun Kannan, Dr. Andrea Arpaci-Dusseau

- - Developed a device level file system that implements RAID protocols.
 - Simulated using a kernel level in memory file system.

LEADERSHIP & PROFESSIONAL SERVICE

ACM US Technology Policy Committee Member (ACM USTPC)

October 2021 - Present

Association for Computing Machinery

- - Participating in the AI & Algorithmic Accountability Subcommittee and the Law Subcommittees.
 - Participated in feedback to NIST on their AI Risk Management Framework (January 2022)

Intro to Computing Teaching Lead

August 2022 - December 2022

UW Madison & Van Hise Elementary

- - Guided local elementary students in a semester long intro to computing after school program
 - Designed curriculum and developed course resources based in Scratch covering basics computer science concepts

Clarkson CS Outreach Team Lead*The Computer Science Department*

November 2016 - May 2019

Clarkson University

- - Organized and ran local educational computer science programs for libraries and schools, and Saturday courses for high school students.
 - Developed curricula and organizing student volunteers.
 - Partnered with the Google Ignite CS program to cultivate interests in computing.

SKILLS

Computer Languages	C/C++, Python, Java, Golang, Bash, SQL, MATLAB
Operating Systems	Linux(Ubuntu, Debian), MacOS, xv6
Software & Tools	Git, LaTeX, Tableau, Adobe Premiere Pro, Adobe Photoshop, Adobe Illustrator, Adobe After Effects, Maya
Github	https://github.com/AVMatthews