Oliver Broadrick

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Education

2023 (expected) M.S. Computer Science (4.00 GPA) — The George Washington University

2022 B.S. Computer Science and Mathematics (3.77 GPA) — The George Washington University

4-year rower for GW Men's Rowing achieving top ten national finishes (team's highest ever)

Research

Keen to explore, I've worked on projects in security, systems, and computer vision.

Single image camera calibration with glitter (2022-present)

Camera calibration – estimation of camera pose and intrinsic properties like focal length – is a classic problem in computer vision with traditional methods requiring dozens of images for high accuracy. Using the strong geometric constraints provided by sparkling glitter, we are developing single image camera calibration.

Post-election statistical audits (2020-present)

In a Risk-Limiting Audit (RLA), a random sample of paper ballots and a rigorous statistical test are used to guarantee with known probability that incorrect election results are detected and corrected. Among other work, I have developed Providence a novel mathematical method for ballot polling RLAs, the most efficient and secure RLA of its kind.

Scheduling for real-time AI at the edge (2021-2022)

I designed and analyzed scheduling algorithms with the imprecise computation model for real-time AI tasks at the edge.

Teaching

Instructional Assistant (2020-present)

Assisted in instruction, hosted well-attended office hours, recorded suplemental instructional materials.

Teaching lead in a discussion section:

Discrete Structures II, Fall 2022
Foundations of Computing, Spring 2022
Discrete Structures II, Fall 2021

Not teaching lead in a discussion section:

Foundations of Computing, Spring 2021
Discrete Structures II, Fall 2020
Discrete Structures I, Spring 2020

Tutor (2016-present)

Tutored dozens of high school and college students for hundreds of hours, one-on-one and in groups, mainly in mathematics, physics, and computer science, in various settings:
GW Naval ROTC Unit Tutor (2022-present)
Tungsten Prep (high school students) (2018-present)
GW Athletics Department (2018-2020)

Honors and awards

2022, Attendee, The Cornell, Maryland, Max Planck Pre-doctoral Research School 2022
2022, Member, Pi Mu Epsilon Mathematics Honorary Society
2021, Summer Undergraduate Program in Engineering Research (SUPER) at GW
2020, Summer Undergraduate Program in Engineering Research (SUPER) at GW

Actions for inclusivity in CS

2022, Member: Justice, Equity, Diversity, and Inclusion (JEDI) Committee (of six founding members)
2022, Co-author of *Student Proposal: Diversity and Inclusion in the Computer Science Department*

Publications[1]

In Preparation

1. Oliver Broadrick, Adellar Irankunda, Maya Shende, Abby Stylianou, and Robert Pless. "Single-image camera calibration from glitter," in preparation to be submitted to CVPR 2023.

In Review

1. Oliver Broadrick, Poorvi L. Vora, and Filip Zagòrski, "Providence: a Flexible Round-by-Round Risk-Limiting Audit". In review, USENIX Security 2023. (A slightly different version is available at: https://arxiv.org/abs/2210.08717)
2. Hesham Fouad, Oliver Broadrick, Benjamin Harvey, Charles Peeke, Bhagirath Narahari, "Real-Time AI: Using AI on the Tactical Edge." In review, *Putting AI in the Critical Loop: Assured Trust and Autonomy in Human-Machine Teams*. Elsevier, 2023.

Accepted

1. Oliver Broadrick, Sarah Morin, Grant McClearn, Neal McBurnett, Poorvi L. Vora, and Filip Zagòrski, "Simulations of Ballot Polling Risk-Limiting Audits". Seventh Workshop on Advances in Secure Electronic Voting, in association with Financial Cryptography 2022.

[1] Published papers and preprints available as pdfs on my website, oliverbroadrick.com