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

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 supplemental instructional materials.

Discrete Structures II: Fall 2020, Fall 2021*, Fall 2022*
Foundations of Computing: Spring 2021, Spring 2022*, Spring 2023*
Discrete Structures I: Spring 2020

*teaching lead of one or more discussion sections

Tutor (2018-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:

Navy ROTC Capital Battalion Tutor (college level) (2022-present)
Tungsten Prep (high school level) (2018-present)

Honors and awards

2022-2023, Graduate Assistantship at GW
2022-2023, Graduate Research Fellowship at GW
2022, Attendee, The Cornell, Maryland, Max Planck Pre-doctoral Research School 2022
2022, Member, Pi Mu Epsilon Mathematics Honorary Society
2021, Research Assistant, "Scheduling Real-time AI Tasks" Grant from Naval Research Laboratories, Washington DC
2021, Summer Undergraduate Program in Engineering Research (SUPER) at GW
2020, Undergraduate Research Scholarship, NSF Award 2015253
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 ICCV 2023.

Published or accepted for publication

1. Oliver Broadrick, Poorvi L. Vora, and Filip Zagòrski, "Providence: a Flexible Round-by-Round Risk-Limiting Audit". To appear, 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, and Bhagirath Narahari, "Real-Time AI: Using AI on the Tactical Edge," Elsevier book chapter in "Assured Trust and Autonomy in Human-Machine teams", invited paper based on presentation at 2022 AAAI Spring symposium.

3. 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 and accepted papers are available in PDF format on my website, oliverbroadrick.com.