JONATHAN GREGORY

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EDUCATION

University of Wisconsin-Madison, Madison, WI — *Anticipated Graduation:* 2030
PhD in Computer Science — GPA: **4.0/4.0**

Central Michigan University, Mount Pleasant, MI — *Graduated:* May 2025
Bachelor of Science in Computer Science — GPA: **4.0/4.0**
Bachelor of Science in Cybersecurity — GPA: **4.0/4.0**
Bachelor of Science in Mathematics — GPA: **4.0/4.0**
Cumulative GPA: **4.0/4.0**

RESEARCH INTERESTS

Artificial intelligence, safe and trustworthy AI, AI security, privacy, cybersecurity, adversarial machine learning, cryptography, computer vision, and robust machine learning.

RESEARCH EXPERIENCE

Central Applied Machine Learning Lab, Central Michigan University — June 2022 – May 2025
Undergraduate Computer Science Research Assistant to Dr. Jesse Eickholt

- Conducted original research on fish surveillance using deep learning, which led to the creation of 6 open-source, research-grade computer vision datasets and 5 peer-reviewed publications.
- Trained and evaluated a variety of deep machine learning computer vision models for fish detection and classification as part of contracted work for the Great Lakes Fishery Commission (GLFC) and the United States Geological Survey (USGS).
- Applied machine learning technologies to support fish detection, invasive species identification, and selective fish passage at waterways managed by the GLFC and USGS.
- Developed an edge computing platform to support deep learning-assisted surveillance of fish at a selective passage site for the GLFC and USGS.
- Collaborated with researchers at Central Michigan University, the GLFC, and the USGS to author 5 manuscripts.
- Succeeded in training fish detection models that achieved a mean average precision above 96% and fish classification models that classified invasive sea lamprey and carp with high accuracy.

Independent Cybersecurity Research, Central Michigan University — Jan. 2023 – May 2024
Independent Cybersecurity Researcher with Dr. Qi Liao

- Conducted independent research with Dr. Qi Liao as part of the coursework for classes on computer security and cryptography, network security, and operating systems security.
- Published two publications as the first author in international, peer-reviewed conferences.
- Investigated applications of generative AI to spam generation and automated penetration testing.

Summer Mathematics Research Lab, Central Michigan University — June 2023 – Aug. 2023
Undergraduate Mathematics Research Assistant to Dr. Debraj Chakrabarti

- Assisted in developing a generalized formula to explicitly compute the Bergman kernels of n-dimensional monomial polyhedra in an NSF-funded summer research project.
- Developed Python programs to validate the formulas derived in this research and exhaustively compare mathematical formula outputs for equivalence.
- Presented this research at the 2023 Young Mathematicians Conference at The Ohio State University.

- Co-authored a publication on this research that was published in the Journal of Mathematical Analysis and Applications.

JOURNAL PUBLICATIONS

1. **Gregory, J.**, Auerbach, J., & Liao, Q. (2025). IoT VisPerNet: Adversarial Perturbation Visualization for IoT Networks. International Journal of Information Security, 25(1). https://doi.org/10.1007/s10207-025-01171-4
2. Eickholt, J., **Gregory, J.**, & Vemuri, K. (2025). Advancing Fisheries Research and Management with Computer Vision: A Survey of Recent Developments and Pending Challenges. *Fishes*, *10*(2), 74. https://doi.org/10.3390/fishes10020074
3. **Gregory, J.**, Miehls, S. M., Eickholt, J. L., & Zielinski, D. P. (2025). A Real-Time Fish Detection System for Partially Dewatered Fish to Support Selective Fish Passage. *Sensors*, *25*(4), 1022. https://doi.org/10.3390/s25041022
4. Jagadeesan, S. M., **Gregory, J.**, Leh, J., Eickholt, J., & Zielinski, D. P. (2024). Labeled images of emerged salmonids in a riverine environment. *BMC Research Notes*, *17*(1), 1-5. https://doi.org/10.1186/s13104-024-07012-2
5. Chakrabarti, D., Cinzori, I., Gaidhane, I., **Gregory, J.**, & Wright, M. (2024). Bergman kernels of monomial polyhedra. *Journal of Mathematical Analysis and Applications*, *531*(1), 127723. https://doi.org/10.1016/j.jmaa.2023.127723
6. Nallamothu, P., **Gregory, J.**, Leh, J., Zielinski, D. P., & Eickholt, J. L. (2023). Semi-automated inquiry of fish launch angle and speed for hazard analysis. *Fishes*, *8*(10), 476. https://doi.org/10.3390/fishes8100476

CONFERENCE PROCEEDINGS

1. **Gregory, J.**, & Liao, Q. (2024, September). Autonomous cyberattack with security-augmented generative artificial Intelligence. In *2024 IEEE International Conference on Cyber Security and Resilience (CSR)* (pp. 270-275). IEEE. https://doi.org/10.1109/csr61664.2024.10679470
2. Jagadeesan, S. M., Leh, J., **Gregory, J.**, Eickholt, J., & Zielinski, D. P. (2024, April). Evaluating the effectiveness of an object detection pipeline to support surveillance of unintended passage. In *2024 IEEE 3rd International Conference on Computing and Machine Intelligence (ICMI)* (pp. 1-8). IEEE. https://doi.org/10.1109/icmi60790.2024.10585634
3. **Gregory, J.**, & Liao, Q. (2023, September). Adversarial spam generation using adaptive gradient-based word embedding perturbations. In *2023 IEEE International Conference on Artificial Intelligence, Blockchain, and Internet of Things (AIBThings)* (pp. 1-5). IEEE. https://doi.org/10.1109/aibthings58340.2023.10292495

TEACHING EXPERIENCE

Graduate Teaching Assistant, University of Wisconsin-Madison Aug. 2025 – Present
Graduate Teaching Assistant for Computer Science

- Led discussion sessions for CS 240: Discrete Mathematics and CS 200: Programming I.
- Held office hours and graded written work for undergraduate students.

Supplemental Instruction, Central Michigan University Aug. 2022 – Dec. 2022
Supplemental Instruction Leader for Computer Science

- Led instructional sessions and prepared supplemental instruction activities for CPS 181: Introduction to Data Structures.
- Tutored students individually and in groups on introductory Java, data structure, and algorithm concepts.

CONFERENCES

2024 IEEE International Conference on Cyber Security and Resilience (CSR)
London, UK, Sept. 2-4, 2024

- Presented research titled "Autonomous Cyberattack with Security-Augmented Generative Artificial Intelligence" on using a large language model to automate penetration testing.
- Attended presentations on applications of generative artificial intelligence to penetration testing and cybersecurity.

2024 IEEE 3rd International Conference on Computing and Machine Intelligence (ICMI)
Central Michigan University, Mount Pleasant, MI, Apr. 13-14, 2024

- Supported the presentation of my lab's research titled "Evaluating the Effectiveness of an Object Detection Pipeline to Support Surveillance of Unintended Passage" on using object detection to assist with automated fishery surveillance.

2023 IEEE International Conference on Artificial Intelligence, Blockchain, and Internet of Things (AIBThings)
Central Michigan University, Mount Pleasant, MI, Sept. 16-17, 2023

- Presented research titled "Adversarial Spam Generation Using Adaptive Gradient-Based Word Embedding Perturbations" on applications of adversarial machine learning to spam generation.
- Attended presentations on innovative uses of artificial intelligence, blockchain, and internet of things devices.

American Fisheries Society 153rd Annual Meeting
Grand Rapids, MI, Aug. 20-24, 2023

- Delivered the presentation "Advances in Commodity Computing Software and Hardware to Aid Selective Passage" on technologies to support autonomous fish selection and monitoring activities.
- Attended presentations on other uses of technology to support innovative fisheries management.

Young Mathematicians Conference 2023
The Ohio State University, Columbus, OH, Aug. 15-17, 2023

- Presented research titled "Bergman Kernels of Higher-Dimensional Monomial Polyhedra" on a novel formula developed to explicitly compute the Bergman kernel of any n-dimensional monomial polyhedera.
- Participated in professional development workshops related to graduate school and research.
- Attended research seminars by visiting professors of mathematics.
- Attended research presented by undergraduates from around the country for summer research.

HONORS AND AWARDS

Academic Excellence Award May 2025
Honors Program, Central Michigan University

- Awarded to the student with the highest academic achievements of the graduating Honors Program cohort.

CMU Board of Trustees Award May 2025
Board of Trustees, Central Michigan University

- Awarded in recognition of outstanding academic performance at Central Michigan University resulting in a 4.0 cumulative GPA.

President's Award for Undergraduate Research and Creative Accomplishments Apr. 2025
Office of the President, Central Michigan University

- Awarded for outstanding research accomplishments as an undergraduate at Central Michigan University.

Richtmeyer-Foust Award Apr. 2025
Department of Mathematics, Central Michigan University

- Awarded to one outstanding undergraduate senior majoring in mathematics at Central Michigan University.

President's List Fall 2020 – Spring 2025
Central Michigan University

- Conferred on the basis of maintaining a 4.0 while enrolled in a minimum of 12 letter-graded credit hours.

Centralis Gold Award Aug. 2020 – June 2024
Honors Program, Central Michigan University

- Full tuition scholarship to Central Michigan University and admission to the Central Michigan University Honors Program.

- Achieved based on merit, academic achievement, and high performance in the Honors Centralis competition.

Daniel and Barbara Wardrop Endowed Fund for Statistics, Actuarial and Data Science Oct. 2024
Department of Statistics, Actuarial and Data Sciences, Central Michigan University
- Awarded on the basis of high academic standing and the intent to pursue a graduate degree after graduation from Central Michigan University.

Narayan Mathematics Scholarship Sept. 2024
Department of Mathematics, Central Michigan University
- Awarded on the basis of merit in mathematics and high academic achievement.

Roger and Kay Lee Endowed Scholarship in Computer Science Sept. 2024
Department of Computer Science, Central Michigan University
- Awarded on the basis of merit in computer science and high academic achievement.

Hackathon: Reimagined – Best in Category Winner Apr. 2024
Central Michigan University
- Presented to the Central Michigan University IEEE registered student organization team for its proposal of smart biophilic workspaces for students to support sustainability and mental health on campus.

Harold W. and Dorothy V. Zeoli Award in Computer Science Sept. 2021
Department of Computer Science, Central Michigan University
- Awarded on the basis of merit in computer science.

ACADEMIC AND PROFESSIONAL AFFILIATIONS

Central Michigan University Honors Program Aug. 2020 – May 2025
Centralis Scholar
- Senior member of the Honors Program at Central Michigan University.
- Engaged in over 120 hours of community service to improve my community.
- Excelled in challenging Honors Program classes, including completing rigorous graduate coursework in computer science as an undergraduate.
- Completed an independent, research-grade capstone project that was published in a MDPI *Sensors*, a peer-reviewed, Q1 journal.
- Participated in an immersive study abroad course to Germany during the summer of 2024 focused on cultural interchange and historical analysis.

Association for Computing Machinery Registered Student Organization Aug. 2023 – May 2025
Member of the Executive Board, Student Government Association Representative
- Planned meetings and organized sessions aimed at increasing member coding capabilities.
- Led sessions on the history and applications of artificial intelligence for students.
- Helped prepare group members to participate in regional coding competitions.
- Promoted the club at campus-wide events.

Institute of Electronics and Electrical Engineers Registered Student Organization Aug. 2023 – May 2025
Student Member
- Attended meetings and local IEEE conferences.
- Participated in Hackathon competitions, resulting in one “Best in Category” award for the club.

LEADERSHIP

Central Michigan University College of Science and Engineering Student Advisory Board Aug. 2024 – May 2025
Student representative for the Department of Mathematics

- Collaborated with student representatives from other departments in the College of Science and Engineering (CSE) to improve student experiences and increase engagement.
- Repeatedly met with the associate dean of the CSE for monthly meetings to discuss improvements in the CSE and plan events to raise awareness of opportunities for students in the CSE.

Central Michigan University Student Government Association Sept. 2023 – May 2025

Representative for the Association for Computing Machinery Student Organization

- Engaged with other representatives and senators in the Student Government Association (SGA) to create legislation and address campus-wide issues.
- Assisted in planning events aimed at campus sustainability as a member of the SGA Sustainability Committee.
- Represented the interests of the Association for Computing Machinery student branch in SGA.

VOLUNTEER SERVICE

PoWeR! Book Bags Mar. 2016 – Aug. 2025

Inventory and Transportation Volunteer

- Assisted with unloading, organizing, and delivering shipments of literacy materials for PoWeR! Book Bags, a children's literacy nonprofit in northern Michigan.
- Assisted with IT operations as needed for the nonprofit.

Grand Traverse Regional Land Conservancy Nov. 2021 – Aug. 2025

- Assisted with trail building and maintenance for the Grand Traverse Regional Land Conservancy, a conservation nonprofit.

TECHNICAL SKILLS

Python | TensorFlow | Keras | OpenCV | NumPy | SymPy | Java | JavaScript | C Programming | Algorithms | Data Structures | Image Processing | Natural Language Processing | Adversarial Machine Learning | LaTeX