Aayushi Verma

aayushi.verma@uconn.edu | linkedin.com/in/aayushi-verma/ | github.com/awesomecosmos

I'm passionate about applying computer vision methods to solve complex research challenges, leveraging my astronomy and data science backgrounds to contribute innovative and interdisciplinary insights.
Professional Interests: image processing, computer vision, machine learning security, scientific computing, data management and governance, software engineering and development.

Education

Doctor of Philosophy in Computer Science and Engineering — Aug. 2024 – current
University of Connecticut — *Storrs, CT*

- Advisor: Dr. Benjamin Fuller.
- Research area: applied computer vision and security.

Master of Science in Data Science — May 2022 – Dec. 2023
Pace University — *Online Program*

Bachelor of Science (Honours) in Astronomy, Minor in Mathematics — Feb. 2018 – Nov. 2021
University of Canterbury — *Christchurch, New Zealand*

Peer-Reviewed Academic Publications

2026 Kamal, K. M. A., Eada, S., **Verma, A.**, Acharya, S., Yemin, A., Fuller, B., Mahmood, K. *Analyzing Physical Adversarial Example Threats to Machine Learning in Election Systems*. *arXiv preprint arXiv:2603.00481*.

2025 Mahmood, K., Manicke, C., Rathbun, E., **Verma, A.**, Ahmad, S., Stamatakis, N., Michel, L., Fuller, B. *Busting the Ballot: Voting Meets Adversarial Machine Learning*. *ACM Conference on Computer and Communications Security (CCS)*.

2024 **Verma, A.**, Khan, O. K. *From Text to Metadata: Automated Tagging Using Python and NLP Technqiues*. *International Journal of Test and Evaluation (ITEA)*, 45(3).

2023 **Verma, A.** *I-TREE: A Tool for Characterizing Research Taxonomies*. *International Journal of Test and Evaluation (ITEA)*, 44(3).

2022 Lister, T., Kelley, M. S. P., Holt, C. E., Hsieh, H. H., Bannister, M. T., Bodewits, D., Knight, M. M., Bauer, J., Chatelain, J., Dobson, M. M., Fernandez-Valenzuela, E., Gardener, D., Gyuk, G., Hammergren, M., Huynh, K., Jehin, E., Moulane, Y., Kokotanekova, R., Lilly, E., Man-To, H., McKay, A., Opitom, C., Protopapa, S., Schambeau, C., Schwamb, M. E., Snodgrass, C., Usher, H., **Verma, A.A.**, Wierzchos, K., Yanamandra-Fisher, P. A., Ye, Q., Gomez, E., Greenstreet, S. *The LCO Outbursting Objects Key Project: Overview and Year 1 Status*. *The Planetary Science Journal (PSJ)*, 3(7).

2022 Grasha, K., Chen, Q.H., Battisti, A.J., Ridolfo, S., Poehler, E., Mably, S., **Verma, A.A.**, Hayward, K.L., Kharbanda, A., Acharyya, A., Poetrodjojo, H., Seibert, M., Rich, J.A., Madore, B.F., and Kewley, L.J. *Metallicity, ionization parameter, and pressure variations of HII regions in the TYPHOON spiral galaxies*. *The Astrophysics Journal (ApJ)*, 929(2).

2019 **Verma, A.** *The Morphology of Galaxies.* *Southern Stars*, 58(2), 7-10.

Key Research Projects and Internships

Busting the Ballot - Voting Meets Adversarial Machine Learning — Aug. 2024 – current
UConn/Voter Center — *Storrs, CT*

- Investigate security risks (adversarial attacks) in machine learning classifiers on voting ballot marks.

- Implemented binary image classifiers (SVM, SimpleCNN, ResNet-50, ConvNeXt, vision transformers) on voting bubbles dataset, and implemented adversarial attacks on trained models.
- Developed data pipeline for training models, based on pre-existing data and synthetically-generated data. Developed a new second version of dataset.
- Developing methodology to extend physical-world explainable and adversarial machine learning.
- First work accepted at CCS 2025, tier one security venue.

Anomaly Detection Research Project Jul. 2024 – current
UConn/National Institute for Underwater Vehicle Technology *Storrs, CT*

- Implementing various approaches for anomaly detection in time series network traffic data.

Biometrics Project Aug. 2024 – Feb. 2025
UConn/Dapple *Storrs, CT*

- Developed cryptographically-secure authentication of biometrics (fingerprints, iris, face) with industry startup.
- Implemented modified U-Net autoencoder to train multiple fingerprint datasets and extract encoders to pass on to cryptography collaborators.
- Developed Dirichlet Wave Transform modules to integrate with the U-Net for fingerprint reconstruction.

MS Data Science - Final Capstone Project Sep. 2023 – Dec. 2023
Pace University *Online Program*

- Employed binary machine learning models (decision tree, gradient boosting, XGBoost) to predict the employment sector (academia vs. industry) of Ph.D. degree holders on highly-dimensional longitudinal IPUMS Higher Education survey dataset.

Undergraduate Honours Thesis Feb. 2021 – Nov. 2021
University of Canterbury *Christchurch, New Zealand*

- Developed codebase to ingest, transform, analyze and visualize image datasets for Mt. John Observatory. Co-authored Lister et al., 2022, based on my research results.

Work Experience

Data Science Fellow Jul. 2022 – Jul. 2024
Institute for Defense Analyses *Alexandria, VA*

- Primarily part of company's Data Strategy team. Designed and implemented numerous data science solutions to enhance research operations, including data curation pipelines, dashboards, and NLP pipelines. Actively contributed to data management and governance initiatives as part of Data Strategy.
- Contributed to Department of Defense-sponsored projects by developing data pipelines to perform analyses.
- Developed framework for Department of State organization to improve their recruiting and hiring processes.
- Contributed to a Human Capital research project by web-scraping Reddit posts, organizing and structuring the data, and feeding text corpus to LLM using RAG method to perform topic modeling.
- Regularly presented at department seminars and conferences, and founder/leader of a Data Science Reading Group at the company to promote an academically-focused approach to data science.

Data Scientist Mar. 2022 – Jul. 2022
SmartGreen Solar *Providence, RI*

- Built data pipelines to integrate with database, and created executive dashboards for quantifying sales insights. Established a company GitHub repository to centralize data pipelines, promoting collaboration.

Python Programmer Apr. 2021 – Jun. 2022
CallCruncher, Inc. *United States (Remote)*

- Developed pipelines for analyzing daily call records, agent performance, identifying outliers, and tracking KPI metrics.

Academic Service

2026 Peer Reviewer (invited), Synthetic and Adversarial Forensics (SAFE) Workshop #2 (co-located with CVPR 2026).

2025 Peer Reviewer (invited), Synthetic and Adversarial Forensics (SAFE) Workshop #1 (co-located with WACV 2026).

Conference Presentations and Posters

Busting the Paper Ballot: Voting Meets Adversarial Machine Learning Mar. 2026
New England Security Day 2026 *UMass Amherst*

- Presented talk at New England Security Day.

Busting the Paper Ballot: Voting Meets Adversarial Machine Learning Oct. 2025
ACM CCS *Taipei, Taiwan*

- Paper accepted at this conference. Presented talk.

Scholarships and Fellowships

Synchrony Fellowship Fall 2025 2025
UConn - Connecticut Advanced Computing Center *Fellowship*

UConn School of Computing Graduate Fellowship 2024-2025 2024
UConn Department of Computer Science and Engineering *Fellowship*

Graduate Merit Scholarship 2022-2023
Pace University Seidenberg School of Computer Science and Information Systems *Tuition Assistance*

Summer Research Scholarship 2020-2021
University of Canterbury School of Physical and Chemical Sciences *Scholarship*

UC Excellence Scholarship 2018
University of Canterbury *Scholarship*

Awards and Honors

Pre-Doctoral Honorable Mention May 2026
UConn Department of Computer Science *(Award)*

Pre-Doctoral Honorable Mention May 2025
UConn Department of Computer Science *(Award)*

Outstanding Achievement & Commitment to Leadership Excellence Award May 2025
UConn College of Engineering - John Lof Leadership Academy (JLLA) *(Award)*

Department Winner - College of Engineering Annual Poster Competition Mar. 2025
UConn College of Engineering *(Award)*

Teaching and Mentoring Experience

Instructor Mar. 2025 – Feb. 2026
University of Connecticut/NTIA Techbridge Program

- Instructor and TA for NTIA TechBridge program for underserved high school students in the Hartford area. Prepare and teach content on introductory programming in Python. Supervise undergraduate TAs on team.

Mentor Oct. 2024 – current
University of Connecticut

- Mentor for 2 junior members of team for Busting the Ballot research project. In charge of helping them when they started working in the team, helping them with resources, and answering their questions, in addition to designing experiments for them to contribute to research.

Mentor Mar. 2023 – Jul. 2024
Institute for Defense Analyses

- Mentor for junior members of team. In charge of helping them when they started working in the team, helping them with resources, and answering their questions.

Extracurricular Leadership Experience and Professional Service

Chair Jun. 2025 – current

CSE GradLife Committee *University of Connecticut*

- Serving on GradLife Committee in my department to improve graduate student life. Planned and executed several initiatives since joining to foster a stronger sense of community amongst computer science graduate students in my department.

Co-Finance Director Oct. 2024 – Oct. 2026

UConn John Lof Leadership Academy *University of Connecticut*

- Selected as a John Lof Scholar to develop leadership and professional skills by organizing professional development workshops, and engaging with internal and external communities to provide mentoring and support for graduate students in the UConn College of Engineering.
- Spearheading and leading Outreach Committee to design framework for broader interaction with College of Engineering, UConn, and the general public.
- Serving as co-Finance Director on 2025-2026 Executive Board.

Founder Aug. 2023 – Jul. 2024

Institute for Defense Analyses - Data Science Reading Group *Institute for Defense Analyses*

- Founded this group at my workplace to facilitate a more academic view of data science by discussing journal articles in a round-table format, while encouraging participation from all members, whether junior analysts or seasoned researchers.

Co-Founder Apr. 2023 – current

Women In GovTech *Online Community*

- Co-founded this online community to create a space for young professional women working in the Government and Tech (GovTech) industry, like myself, to share our experiences and opportunities, to network, and to support each other.

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