Aishani Pathak

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EDUCATION

Arizona State University   Tempe, Arizona
Bachelor of Science in Computer Science   *Expected Spring 2026*

- GPA: 3.88
- Dean's List recipient for all semesters, Fall 2022 – Spring 2025.
- Awarded $12,000 Provost's Scholarship in recognition of academic excellence.
- Recognized as an NAE Grand Challenges Scholar, Class of 2026.

EXPERIENCE

Los Alamos Dynamics Summer School Fellow   June 2025 – August 2025
Los Alamos National Laboratory   *Los Alamos, New Mexico*

- Conducted a 10-week research project on state estimation of a robotic arm, focusing on bridging the gap between simulation and real-world dynamics.
- Developed and trained models using ResNet-18 and additional machine learning architectures for robust motion and state estimation.
- Collected simulation and real-world datasets for robotic arm experiments, leveraging an understanding of robotic kinematics to enable effective sim-to-real transfer through domain randomization and noise modeling.
- Results submitted and currently under review for publication at IMAC 2026 (International Modal Analysis Conference).

Research Intern   May 2024 – August 2024
Los Alamos National Laboratory   *Los Alamos, New Mexico*

- Conducted research on generative modeling for wildfire simulations within the Data Science at Scale team, advancing AI applications for scientific domains.
- Designed and implemented a Generative Adversarial Network (GAN) training pipeline using TensorFlow and Python, integrating simulation data for realistic scenario generation.
- Developed AI workflows to enhance efficiency and scalability of computational wildfire simulations, reducing cost and runtime of large-scale scientific experiments.
- Applied expertise in the machine learning lifecycle to adapt generative models for domain-specific scientific use cases.

Research Intern   Aug 2024 – Present
National Science Foundation – ExpandAI Project, Arizona State University   *Tempe, AZ*

- Awarded NSF ExpandAI funding for four consecutive semesters to support ongoing undergraduate research in the Geometric Media Lab.
- Conducting research on innovative machine learning approaches aimed at broadening the accessibility and impact of AI across scientific and applied domains.
- Collaborating with faculty and peers to design and evaluate methods that advance the project's mission of expanding trustworthy and scalable AI technologies.

Data Science Intern   Jan 2025 – July 2025
Upstream (Nonprofit) – Grand Canyon Project   *Grand Canyon, AZ*

- Contributed to a nonprofit sustainability initiative with the vision of replacing single-use utensils with reusable alternatives across the Grand Canyon.
- Collected, cleaned, and preprocessed multi-source stakeholder and field data to analyze utensil usage and inform data-driven decision making.
- Developed a predictive AI model to forecast reusable adoption versus disposable utensil use, integrating stakeholder reports and environmental factors to optimize infrastructure planning.

Projects

Leveraging Topological Guidance for Improved Knowledge Distillation | *PyTorch, Topological Data Analysis, Knowledge Distillation, Machine Learning Algorithms*
Jan 2024 – May 2024

- Proposed the Topological Guidance-based Knowledge Distillation (TGD) framework to incorporate topological features into knowledge distillation for image classification tasks.

- Utilized persistence images derived from topological data analysis as input to a secondary teacher model, enabling multi-teacher distillation with complementary features.

- Designed strategies to integrate intermediate-layer similarity maps and applied annealing to reduce the knowledge gap between teachers and student models.

- Demonstrated robustness of distilled lightweight models under noise and perturbations through extensive evaluation on CIFAR-10 and CINIC-10.

- Publication: Eun Som Jeon, Rahul Khurana, **Aishani Pathak**, Pavan Turaga; Accepted at *Geometry-grounded Representation Learning and Generative Modeling Workshop (ICML 2024)*. Link

AI/ML Workflow for Domain Scientists | *Python, TensorFlow, OpenCV, Generative Networks, SQL/SQLite, Visualization*
May 2024 – Aug 2024

- Developed robust Generative Adversarial Networks (GANs) for scientific simulations, enabling more realistic and efficient generative techniques for domain-specific problems.

- Designed and integrated workflow methodologies to streamline large-scale data handling and generative model training pipelines.

- Implemented end-to-end ML cycle—including training, prediction, and evaluation—using TensorFlow, Python, and database management systems to improve usability for domain scientists.

Identification of Communication Channel Perturbations Using NASA JPL Simulated Data | *Spatio-temporal Data Analysis, Graph-based Learning, PyTorch, ConvKAN*
June 2024 – Present

- Transformed multivariate time-series telemetry into graph-based adjacency matrices to capture temporal and structural dependencies between communication channels.

- Proposed a two-step training process and Kolmogorov–Arnold Network (ConvKAN) framework with knowledge distillation to perform well under limited anomaly data conditions.

- Validated approach on NASA JPL's Layered Dynamics simulator across Mars Rover, ISS DELTA, and ISS Charlie communication logs, with classification at both 3-class and 8-class levels.

- First-authored research work *under review* for publication in **IEEE Transactions on Aerospace and Electronic Systems**.

Vision-Based State Estimation for Robotic Manipulators | *Transfer Learning, Computer Vision, PyTorch, Robotics*
June 2025 – Aug 2025

- Developed during the Los Alamos Dynamics Summer School fellowship, focusing on alternative state estimation methods where sensor/encoder integration is infeasible due to cost, complexity, or operational constraints.

- Proposed a transfer learning–based framework to estimate 3D joint configurations of robotic manipulators directly from images.

- Established groundwork for robust visual servoing and sensorless robotic control, with implications for low-cost and field-deployable robotic systems.

- Publication: **Aishani Pathak**, James Halverson, Kenny Decay, Ani Iyer, Josh Templeman, Ricardo Mejia; Accepted at *IMAC 2026*.

Community & Leadership

Women in Machine Learning – ASU
Co-President

Jan 2024 – Present

Tempe, AZ

- Led initiatives to support underrepresented groups in AI/ML through mentorship programs, technical workshops, and professional development events.

- Organized fireside chats and speaker series with industry professionals to highlight real-world applications of emerging AI technologies.

Women in Data Science – Stanford
Ambassador

Jan 2024 – Present

Remote

- Served as an ambassador for the Stanford WiDS global program, promoting data science outreach and engagement across diverse communities.

- Coordinated events and facilitated research discussions to broaden access to AI/ML resources and opportunities for underrepresented groups.

Breakthrough Tech AI – Cornell
Cohort Member

Apr 2024 – Dec 2024

Remote/Hybrid

- Completed an intensive applied AI training program focused on solving real-world problems through industry partnerships.

- Collaborated with a multidisciplinary cohort to design projects that bridged technical AI development with societal impact.

Technical Skills

Machine Learning & Deep Learning: Neural Networks, Generative Adversarial Networks (GANs), Transfer Learning, Knowledge Distillation, Graph Neural Networks (GNNs), ConvKAN, Topological Data Analysis (TDA)
Frameworks & Libraries: PyTorch, TensorFlow, Keras, Scikit-learn, OpenCV, NetworkX, NumPy, Pandas, Matplotlib
Research Tools: PyBullet (robotics simulation), Jupyter Lab, LaTeX, Git, Linux/Docker for reproducible experiments
Data Systems: SQL, SQLite, Data Preprocessing, Pipeline Development, Spatio-temporal Data Analysis