Dr. Lava Kumar Polu

Contact Information

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Research Interests

Continual and lifelong machine learning; catastrophic forgetting and memory consolidation; memory-augmented transformers; neural differential equations; computer vision; applied deep learning and data-driven decision support; with a secondary interest in responsible and ethical AI; Natural Hazards; Optimization; Artificial General Intelligence; Cognitive Sciences; Mathematical Frameworks for AGI

Education & Academic Positions

2022-2026 **Ph.D., Data Science**
Harrisburg University of Science and Technology, Harrisburg, PA
Dissertation: Three Design Levers for Lifelong Learning: Task-Stream Regime, Solver, and Equal-Byte Memory for Continual Learning Across Perceptual and Reasoning Domains
Advisor: Dr. Maria L Vaida

2019-2021 **M.S., Computational and Applied Mathematics (Analytics)**
Harrisburg University of Science and Technology, Harrisburg, PA

2016 **M.S., Electrical Engineering**
Texas A&M University-Kingsville, Kingsville, TX

2014 **B.Tech., Electrical and Electronic Engineering**
Jawaharlal Nehru Technological University (JNTU), Hyderabad, India

Academic Appointments

02/2026-present **Colorado State University Pueblo**
Position: Lecturer
Courses: Artificial Intelligence (undergraduate and graduate); Data Analytics (introductory through advanced)
Designed lecture content and laboratory materials, built a tiered project-based curriculum, and architected cloud infrastructure for students to deploy and host their own AI applications.

08/2015-05/2016 **Texas A&M University-Kingsville**
Position: Teaching Assistant, Department of Physics

Courses: University Physics I; Sound and Acoustics Laboratory
Prepared lesson plans and class notes, authored quizzes and exams, and graded laboratory and course work.

Professional & Industry Experience

10/2025-04/2026 **Harrisburg University of Science and Technology**
Position: AI Engineer (0.5 FTE)
Built fintech AI models and a retrieval-augmented (light-RAG) chatbot backed by a knowledge graph; tuned for latency, cost, and accuracy.

08/2024-07/2025 **Whole Foods Market**
Position: Data Science Manager
Led a team of ten engineers building an enterprise analytics platform on AWS, including migration of legacy applications to an AWS data lake; designed analytics use cases for retail procurement and supply-chain spend analysis.

06/2019-11/2023 **Deloitte & Touche LLP**
Position: Senior Solution Delivery Lead, Data Science
Led deep-learning solutions for financial-sector clients (OCR, NLP) using RNNs, CNNs, transformers, BERT, and large language models with retrieval augmentation; managed and mentored data scientists, ML engineers, and analysts; deployed models on AWS SageMaker and GCP (Vertex AI, BigQuery, AutoML) and built graph neural networks for supply-chain problems.

10/2018-05/2019 **Fiserv Corporation**
Position: Data Science Program Manager
Built large-scale data pipelines on Apache Spark and a machine-learning fraud-detection system; led DevSecOps practices (Docker, Kubernetes, CI/CD).

11/2017-09/2018 **L&T Technology Services**
Position: Data Engineer
Built scalable ETL infrastructure on AWS and SQL and developed reporting tools (Tableau) surfacing operational metrics for stakeholders.

09/2016-10/2017 **Apple Inc.**
Position: Automation Consultant
Built an automated testing framework and functional, load, and performance test scripts for Java applications (Java, Selenium).

Publications

Journal Manuscripts Published

1. **Polu, Lava Kumar**, Maria L Vaida, Aditya Syal. An Equal-Byte Non-Inferiority Protocol for Storage-Aware, Reproducible Evaluation of Replay-Based Continual Learning. *Machine Learning and Knowledge Extraction* (2026).

Journal Manuscripts Under Review

1. **Polu, Lava Kumar**, Himadri Sen Gupta. How AI Systems Combine Moral Considerations: Trade-Offs, Priorities, and Imperfect Information. *Minds and Machines* (2026). Under review.

2. **Polu, Lava Kumar**. An oil shock without a food shock? World food prices after the 2026 closure of the Strait of Hormuz. *Journal of Policy Modeling* (2026). Under review.

3. Haldar, D. K.*, Himadri Sen Gupta, and **Polu, Lava Kumar**. Equitable evacuation support via conformal-robust optimization. *Transportation Research Part E: Logistics and Transportation Review* (2026). Under review.

Refereed Conference Proceedings

1. **Polu, Lava Kumar**, Maria L Vaida, Aditya Syal. Positive backward transfer under family-grouped task sequences in replay-based continual learning: A confirmatory study on an abstract-reasoning benchmark. In *Proceedings of the IEEE Conference on Responsible Artificial Intelligence (RAI)*. IEEE. Accepted, in press.

2. **Polu, Lava Kumar**, Maria L Vaida, Aditya Syal. Faster on the device, not cheaper on paper: Neural CDE vs Neural ODE. In *Proceedings of the International Conference on Artificial Intelligence, Machine Learning, and Statistics (ICAIMS 2026)*. IEEE. Accepted, in press.

3. **Polu, Lava Kumar**, Nailah Afshan, Saqib Gulzar, Md Islam. A Causal Machine Learning Framework for the Effect of Ambient Temperature on Continuous-Welded-Rail Buckling Derailments: Severity-Given-Incident and Unconditional Incidence Rate. In *Proceedings of Transportation Research Board Annual Meeting (TRB 2027)*. Accepted, in press.

4. Nailah Afshan, **Polu, Lava Kumar**, Saqib Gulzar, Md Islam, Jacqueline Hernandez. Operationalizing a Causal Machine-Learning Estimate of Heat Risk on Continuous-Welded Rail: Climate-Forward Projection and a Roadmaster Decision-Support Deployment. In *Proceedings of Transportation Research Board Annual Meeting (TRB 2027)*. Accepted, in press.

Student Mentorship & Advising

Colorado State University Pueblo (2026-present)

Student Researchers: Jacqueline Hernandez (co-author, TRB 2027 paper on heat risk to continuous-welded rail); Jonah Statezny and Billy Weisgerber (AI and sustainable civil infrastructure).

External Mentorship

SR University, India: Mahant Pothuganti (BS 2025), Gopal Thalaviya (BS 2024).

MIST, Bangladesh: Md. Shoaib Mahmud (Lecturer)

KUET, Bangladesh: Dipto Haldar (BS 2025).

Professional Service

Editorial and Peer Review

Reviewer: *Transportation Research Interdisciplinary Perspectives*

Professional Memberships

IEEE (2026-present); IEEE Industrial Electronics Society (2026-present); IEEE Computational Intelligence Society (2026-present).

Technical Skills

Programming: Python, R, SQL, SAS, Java

Machine & Deep Learning: CNNs, RNNs, Transformers, BERT, LLMs, RAG, graph neural networks; XGBoost, SVM, random forests, clustering, time-series methods

Cloud & Big Data: AWS (SageMaker), GCP (Vertex AI, BigQuery, AutoML), Azure, Databricks, Apache Spark, Kafka, Snowflake, Cassandra

MLOps & DevOps: MLflow, Kubeflow, Docker, Kubernetes, CI/CD

Analytics & BI: Tableau, Looker, Google Data Studio, Alteryx, JMP, Splunk

Databases: SQL, Oracle, BigQuery

Mentoring & Leadership

1. Built and led cross-functional data science and ML engineering teams of up to ten members, with responsibility for hiring, coaching, and career development.
2. Mentored early-career data scientists and analysts and fostered an inclusive, learning-oriented team culture.

Pueblo, Colorado, October 28, 2026