Abhishek Kumar Mishra

Contact

📞 (716)-748-5383 — ✉ am4862@drexel.edu — 🌐 abhishekkumarm98.github.io — ⌗ abhishekkumarm98

Research Area

Single-cell & Spatial Transcriptomics, Tumor Heterogeneity, Multi-modal omics, AI in Healthcare, Spiking Neural Network, Semiconductor Wafer Defect

Education

Sep 2020 – Sep 2025
Ph.D. in Electrical and Electronics Engineering, *Drexel University*, Philadelphia, PA, *GPA – 4.0/4.0*
Advisors: Dr. Nagarajan Kandasamy, Dr. Anup Das

Aug 2018 – Aug 2020
MS (Thesis) in Computer Science, *University at Buffalo*, Buffalo, NY, *GPA – 3.51/4.0*
Advisor: Dr. David Doermann

Aug 2011 – Jul 2015
B.Tech in Electronics & Communication Engineering, *RCCIIT*, Kolkata, India

Professional Experience

Nov 2025 – Present
Postdoctoral Fellow (Visiting), Cancer Data Science Lab, *NIH/NCI*, Bethesda, MD, USA
- Conduct research in single-cell and spatial transcriptomics, focusing on AI/ML-driven analysis of high-dimensional and spatially resolved omics data.
- Develop scalable computational and statistical methods to extract latent biological patterns, spatial organization, and tumor heterogeneity from large multi-modal datasets.
- Integrate machine learning and data-driven approaches to uncover hidden insights relevant to cancer progression and therapeutic response.
- Collaborate with interdisciplinary teams of biologists and clinicians for ongoing research.

Oct 2023 – Oct 2025
Research Machine Learning Engineer, *AltruMed*, Philadelphia, PA, USA
- Developed a novel architecture: OxyCaps to accurately detect opioid overdose events non-invasively, achieving accuracy of 92% modeled using sleep apnea data.
- Designed and implemented predictive models to anticipate opioid use events, significantly reducing alert response times for emergency intervention.
- Led the algorithm development for DOVE, an opioid overdose detection and alert device.
- The work was published in IJCAI 2024.

Feb 2022 – Jul 2022
Graduate Data Science Intern, *Intel Corporation, MPE MDNA Team*, Austin, TX, USA
- Built machine learning models using semiconductor test parametric data to reduce yield loss.
- Created an end-to-end pipeline for pulling the data, pre-processing, training, and predicting.
- The work was published in VTS 2023.

May 2019 – Dec 2019
Research Intern, *North Park Innovation Ltd*, Buffalo, NY, USA
- Designed a pipeline for the multi-class classifier to find the cause of the malfunction of the HVAC system.
- Developed an ANN model that surpassed malfunction detection, achieving a score of 81.35% macro precision & 80.21% macro recall.

Sep 2015 – **Junior Data Scientist**, *Ericsson India Global Pvt. Ltd.*, Mumbai, MH, India
Aug 2017
- ○ Predicted the network key performance indicator (KPI) for the client by developing a classification model based on the historical data for improvement and degradation of the network.
- ○ Implemented a supervised learning model for anomaly detection based on alarms, capturing unusual base station behavior. This reduced alarms by 30% and enabled early fault prediction and proactive decision-making.
- ○ Implemented a logistic regression model to diagnose weak network connections, identifying key features. This approach improved prediction accuracy by 10% compared to the previous year.
- ○ Created interactive Dashboards and visualizations for descriptive analysis.

Teaching

Sep 2020 – **Teaching Assistant**, *Drexel University*, Philadelphia, PA
Dec 2024
- ○ Helped to structure the course and assignments and held office hours, graded homework, tests, and quizzes.
  - ECE 613: Neuromorphic computing (Summer 2024)
- ○ Held office hours and graded homework, tests, and quizzes for courses.
  - ECES 521: Probability and Random Variables (Winter 2025)
  - ECE 200: Digital Logic Design (Summer 2021)
  - ECE 350: Introduction to Computer Organization (Fall 2020, Summer 2021, Fall 2022)

Jan 2020 – **Teaching Assistant**, *University at Buffalo*, Buffalo, NY
Apr 2020
- ○ Held weekly recitations and office hours and graded homework, tests, and quizzes for the course.
  - EAS 595LEC: Fundamentals of Artificial Intelligence (Spring 2020)

Publications

See my Google Scholar page for recent updates and citation information.

NICE 2026	Fuzzy Encoding-Decoding to Improve Spiking Q-Learning Performance in Autonomous Driving. Aref Ghoreishee, **Abhishek Kumar Mishra**, Lifeng Zhou, John MacLaren Walsh, Anup Das, Nagarajan Kandasamy (Recently submitted)
AAMAS 2026	New Spiking Architecture for Multi-Modal Decision-Making in Autonomous Vehicles. Aref Ghoreishee, **Abhishek Kumar Mishra**, John MacLaren Walsh, Lifeng Zhou, Nagarajan Kandasamy (Recently submitted)
DATE 2026	A Reinforcement Learning Framework for Good Die in Bad Neighborhood Analysis. Mohammad Ershad Shaik, **Abhishek Kumar Mishra**, Nagarajan Kandasamy, Nur A. Touba (Recently accepted)
DFTS 2025	A Multi-Modal Attention-Based Framework for Good Die in Bad Neighborhood Methodology. Mohammad Ershad Shaik, **Abhishek Kumar Mishra**, Nagarajan Kandasamy, Nur A. Touba **(Best Paper Award)** (Recently accepted)
UbiComp 2025	GLUmos: Noninvasive Glucose Monitoring Using a Wearable Spectroscopy Device. Anush Lingamoorthy, **Abhishek Kumar Mishra**, Tarek Hamid, Claire Kendell, Junpeng Zhao, Jacob Brenner, Nagarajan Kandasamy, Amanda Watson (Recently submitted)
AAAI 2026	HypoxSpike: Ternary Spiking Neural Network for Opioid Overdose Detection. Anush Lingamoorthy, **Abhishek Kumar Mishra**, Nagarajan Kandasamy, Amanda Watson (Recently accepted)
TKDD 2025	Efficient Aspect Term Extraction using Spiking Neural Network. **Abhishek Kumar Mishra**, Arya Somasundaram, Anup Das, Nagarajan Kandasamy (Recently submitted)
NeurIPS 2025	Improving Performance of Spike-based Deep Q-Learning using Ternary Neurons. Aref Ghoreishee, **Abhishek Kumar Mishra**, John Walsh, Nagarajan Kandasamy, Anup Das (Recently submitted)

DSN 2025	Hierarchical Model-Based Approach for Concurrent Testing of Neuromorphic Architecture. Suman Kumar, **Abhishek Kumar Mishra**, Anup Das, Nagarajan Kandasamy (Recently accepted)
ITC 2025	Wafer Map Pattern Recognition using Ternary Spiking Neural Network. **Abhishek Kumar Mishra**, Anup Das, Nagarajan Kandasamy (Recently submitted)
IJCAI 2024	Drug Overdose Vital-Signs Evaluator using Machine Learning. Anush Lingamoorthy, **Abhishek Kumar Mishra**, Suman Kumar, David Gordon, Jacob Brenner, Nagarajan Kandasamy, Amanda Watson
PRDC 2024	Model-Based Approach Towards Correctness Checking of Neuromorphic Computing Systems. **Abhishek Kumar Mishra**, Anup Das, Nagarajan Kandasamy
ITC 2024	Wafer2Spike: Spiking Neural Network for Wafer Map Pattern Classification. **Abhishek Kumar Mishra**, Suman Kumar, Anush Lingamoorthy, Anup Das, Nagarajan Kandasamy
ICONS 2024	Neuromorphic Computing for the Masses. Shadi Matinizadeh, Arghavan Mohammadhassani, Noah Pacik-Nelson, Ioannis Polykretis, Krupa Tishbi, Suman Kumar, M. L Varshika, **Abhishek Kumar Mishra**, Nagarajan Kandasamy, James Shackleford, Eric Gallo, Anup Das
MWSCAS 2024	A Fully-Configurable Digital Spiking Neuromorphic Hardware Design with Variable Quantization and Mixed Precision. Shadi Matinizadeh, Arghavan Mohammadhassani, Noah Pacik-Nelson, Ioannis Polykretis, **Abhishek Kumar Mishra**, James Shackleford, Nagarajan Kandasamy, Eric Gallo, Anup Das
VTS 2024	WaferCap: Open Classification of Wafer Map Patterns using Deep Capsule Network. **Abhishek Kumar Mishra**, Mohammad Ershad Shaik, Anush Lingamoorthy, Suman Kumar, Anup Das, Nagarajan Kandasamy, Nur A. Touba
VTS 2023	Predicting the Silent Data Error Prone Devices Using Machine Learning. Mohammad Ershad Shaik, **Abhishek Kumar Mishra**, Yonghyun Kim
ETS 2023	Online Performance Monitoring of Neuromorphic Computing Systems. **Abhishek Kumar Mishra**, Anup Das, Nagarajan Kandasamy
ASPDAC 2023	Hardware-Software Co-Design for On-chip Learning in AI Systems. M.L.Varshika, **Abhishek Kumar Mishra**, Nagarajan Kandasamy, Anup Das
Electronics 2022	Built-In Functional Testing of Analog In-Memory Accelerators for Deep Neural Networks. **Abhishek Kumar Mishra**, Anup Das, Nagarajan Kandasamy
RANLP 2021	Does local pruning offer task-specific models to learn effectively? **Abhishek Kumar Mishra**, Mohna Chakraborty

Academic Service

Reviewer

- TMLR 2026
- AAAI 2026
- ICLR 2026
- ICML 2025
- The Web Conference 2025
- AISTATS 2025, 2026
- Engineering Applications of Artificial Intelligence, Elsevier 2025
- NeurIPS 2024
- IJCAI 2024

- ○ IEEE J. Biomedical and Health Informatics 2024, 2025
- ○ ACM Transactions on Computing for Healthcare 2025
- ○ IEEE Transactions on Computers 2024
- ○ IJCNN 2024
- ○ ACM Transactions on Embedded Computing Systems 2022, 2024
- ○ Procedia Computer Science Journal 2023
- ○ Design Automation Conference 2022, 2023
- ○ ICCAD 2021, 2022, 2023
- ○ ASPDAC 2022
- ○ DATE 2021, 2022, 2025
- ○ Cases Journal 2021
- ○ Computing Frontiers 2021
- ○ NEUNET Journal 2020
- ○ IEEE CONECCT 2020

Membership
- ○ IEEE, IJCAI, ACM, AAAI, Frontiers, OpenReview, Microsoft CMT, Elsevier, ResearchGate

Awards & Achievements

Poster Presentation	**IBM IEEE CAS/EDS – AI Compute Symposium, Oct 2022**. Selected to present the "IBM IEEE CAS/EDS – AI Compute Symposium 2022" poster.
Poster Presentation	**National Defense Industry Association's Naval Nuclear Submarine and Aircraft Carrier Suppliers Conference, Dec 2024**. Won the poster session at the conference, receiving a USD 2,000 award in recognition of the achievement.
Grant Funding	**VentureWell E-Team Propel Funding, May 2-3, 2024**. Procured student-led innovation fund (USD 20,000) for the development of the DOVE device capable of overdose detection. Attended the workshop at The Keenan Center for Entrepreneurship at Ohio State University to learn topics like business model development, and customer discovery.
Open-source contributor	Contributed to snntorch, a widely used open-source library with 1.4K+ GitHub stars, supporting advancements in spiking neural networks.
Judge & Mentor	Served as a judge and mentor at the 22nd Annual Philadelphia AMP Research Symposium, evaluating student research presentations and providing constructive feedback.
Editorial & Manager	Served as Editorial Manager for Engineering Applications of Artificial Intelligence (Elsevier) in 2025, overseeing the online submission and peer-review tracking system.
Best Paper Award	Received the Best Paper Award at DFTS 2025, along with a €1,000 honorarium.

Skills

Languages	Python, C++, SQL, R, Matlab
Tools/IDE	Jupyter, Visual Studio, Sublime, Tableau, Anaconda, AWS, Google Cloud Platform

Libraries & Frameworks	NumPy, Pandas, scikit-learn, Matplotlib, Tensorflow, Keras, Pytorch, snnTorch, Dash, Scipy, Plotly, SpaCy, NLTK, VADER, TextBlob, Gensim, Beautiful Soup, Regex, Bokeh, Folium, Hadoop, MapReduce, Spark

Current Research Projects

- Analyzing real-world physiological biomarkers across multiple opioid use disorder patients to classify opioid and non-opioid events using machine learning.

- Developing a Machine Learning framework for real-time monitoring of neuromorphic program execution using model-based redundancy. This software-based monitor detects discrepancies between hardware neuron behavior and predictions, reducing hardware overhead and minimizing intrusion on applications.

References

- **Dr. Lichun Ma** – Supervisor, NIH/NCI. Email: lichun.ma@nih.gov

- **Dr. Nagarajan Kandasamy** – Professor (Advisor), Drexel University. Email: nk78@drexel.edu

- **Dr. Anup Das** – Associate Professor (Co-advisor), Drexel University. Email: ad3639@drexel.edu

- **Dr. Amanda Watson** – Assistant Professor, University of Virginia. Email: aawatson@virginia.edu

- **Mohammad Ershad shaik** - DFT & Product Development Engineer, Tesla, Email: moshaik@tesla.com

- More references will be available upon request.