Abhishek Kumar Mishra

Contact

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

Research Area

AI in Healthcare, Spiking Neural Network, Machine Learning, Fault tolerance, Semiconductor Wafer Defect, Natural Language Processing

Education

Aug 2020 – May 2025	**Ph.D. in Electrical Engineering**, *Drexel University*, Philadelphia, PA, *GPA − 4.0/4.0* Advisors: Dr. Nagarajan Kandasamy, Dr. Anup Das
Aug 2018 – Jul 2020	**MS 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

Work Experience

Oct 2023 – Present

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 – Aug 2017

Junior Data Scientist, *Ericsson India Global Pvt. Ltd.*, Mumbai, MH, India
- 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 –
Dec 2024
Teaching Assistant, *Drexel University*, Philadelphia, PA

○ 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 –
Apr 2020
Teaching Assistant, *University at Buffalo*, Buffalo, NY

○ 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.

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)

IJCAI 2025 HypoxSpike: Ternary Spiking Neural Network for Opioid Overdose Detection. Anush Lingamoorthy, **Abhishek Kumar Mishra**, Nagarajan Kandasamy, Amanda Watson (Recently submitted)

ICML 2025 Efficient Aspect Term Extraction using Spiking Neural Network. **Abhishek Kumar Mishra**, Arya Somasundaram, Anup Das, Nagarajan Kandasamy (Recently submitted)

ICML 2025 Improving Performance of Spike-based Deep Q-Learning using Ternary Neurons. Aref Ghoreishee, **Abhishek Kumar Mishra**, Nagarajan Kandasamy, Anup Das (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 KumarMishra**, 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

- The Web Conference 2025
- AISTATS 2025
- NeurIPS 2024
- IJCAI 2024
- IEEE J. Biomedical and Health Informatics 2024
- IEEE Transactions on Computers 2024
- IJCNN 2024
- ACM TECS 2022, 2024
- Procedia Computer Science Journal 2023
- DAC 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

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.

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. 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.