

# Abhishek Kumar

 [Abhikumar199](#) |  [Abhishek Kumar](#) |  [abhikumar199.github.io](#) |  +91 7819992859

## RESEARCH INTERESTS

Computational Neuroscience, Neuromorphic Computing, Neural Modeling, Machine Learning, Brain-Inspired Artificial Intelligence, Brain Computer Interface, Neural Networks

## EDUCATION

**ABV-Indian Institute of Information Technology and Management Gwalior** Gwalior, MP  
*MS (Artificial Intelligence and Data Science)* Aug. 2025 - Present

**University of Delhi** Delhi  
*Bachelor of Science, Mathematics (H)* Nov. 2022 - Jun 2025

## EXPERIENCE/PROJECTS

**Winter Research Internship Offer letter** Dec. 2025 - Jan. 2026  
*Ion channel and Receptor biology lab, KSBS* Indian Institute of Technology, Delhi

- Developed neuron simulations using **NEURON** to study ion-channel and spike dynamics.
- Implemented and modified biophysical neuron models using **hoc scripting** and explored ModelDB.
- Applied supervised learning models to molecular datasets for toxicity prediction, aligning with ML-driven drug discovery.

**Spiking Neuron Simulations (Python, Brian2 / NEURON)** Dec. 2025 - Present  
*GitHub* *Self-Directed Practice Repository*

- Maintained a practice repository containing multiple implementations of spiking neuron models under varied conditions.
- Explored neuron behavior across different parameter regimes, input currents, and initial conditions.
- Used visualization of membrane potentials and spike trains to analyze model behavior.

**Ultra-Low-Power Edge Intelligence for Real-World Anomaly Detection Using SNN** Ongoing  
*Spiking Neural Networks, Edge AI, Embedded Systems* [Project info](#).

- Creating an event-driven anomaly detection framework to identify irregular patterns that indicate sewage blockages.
- Project currently under development; implementation details and results will be shared upon completion.

**Aadiyogi** Dec. 2022 - Jun. 2025  
*Team Captain* Deshbandhu College, DU

- Led the team in regional, state, and national-level yoga competitions and championships.
- Facilitated weekly practice sessions to discuss and master advanced Asanas, Pranayama & Meditation techniques.
- Acted as the primary liaison between team members, coaching staff, and competition officials.

## PUBLICATIONS

**Abhishek Kumar**, "Computational Neuroscience–Inspired Neuromorphic Computing: A Review of Models, Hardware Architectures, and Applications". ([Manuscript under preparation](#) / [Abstract accepted](#))

## CONFERENCE AND SEMINARS

**MATHSD'25 Certificate** Oct. 2025  
*Volunteering* ABV-IIITM Gwalior

- Volunteered at MATHSD 2025, hosted by ABV-IIITM Gwalior.
- Handled LaTeX typesetting and compilation of the official **Book of Abstracts**.
- Assisted faculty and research teams in documentation and on-site coordination.

- Gained insights on *Neuroscience-Inspired Scientific Machine Learning* through keynote sessions.

### **Samuchchayam 2025 Certificate**

March 2025

*Deshbandhu college, DU*

#### *Presented Paper*

- Awarded first prize in the '**Datamatrix**' paper presentation competition.
- Recognized for excellence in research, analysis, and public speaking at a competitive academic event
- Successfully developed and presented a compelling paper on a data-centric topic to a panel of faculty and peers.

### **InitMath 2024 Certificate**

March 2024

*Uttarkashi (U.K)*

#### *Mathematics Camp*

- Selected for and completed the 'Initiation into Mathematics (InitMath) 2024' training program.
- Participated in an intensive workshop sponsored by the prestigious **National Board for Higher Mathematics (NBHM)**.
- Engaged in a 6-day program focused on foundational concepts in advanced mathematics, organized by **MTTS Trust**.

## TRAINING AND CERTIFICATIONS

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### **Computational Neuroscience – University of Washington Certificate**

Nov. 2025 - Jan. 2026

- Strengthened understanding of the intersection between Neural biology and computation.
- Instructors: Rajesh P. N. Rao, Adrienne Fairhall

### **Introduction to Cognitive Psychology and Neuropsychology - University of Cambridge** Jan. 2026 - Present

- Learned theories, models and findings of cognitive functions, including memory, language, attention and perception.
- Instructors: Dr. Giulia Mangiaracina

### **Linear Algebra for Machine Learning – LDRP Institute of Technology & Research Certificate** Dec. 2025

- National Short-Term Training Program
- Hands-on experience on PCA, SVD, and image processing.

## ACHIEVEMENTS & AWARDS

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### **National Yoga Championship Runner up Certificate**

Sept. 2023

- Championship held in Haridwar and organised by **World Fitness Federation of Yogasana Sports, India**

### **Certificate of Commendation by Chief Minister of Uttarakhand Certificate**

June 2020

- Award presented to students with outstanding achievements in academics.

## SKILLS & INTERESTS

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**Languages:** Python, MySQL, R

**Tools:** Power BI, Excel, Mathematica, MATLAB

**Frameworks & Libraries:** Numpy, Pandas, Matplotlib, Seaborn, Scikitlearn, PyTorch, NEURON, Brian2

**Domains:** Computational Neuroscience, Machine Learning, Deep Learning, Neural Networks

**Others:** Kaggle, Apache Kafka , Git, GitHub