Alok Bhattarai

LinkedIn • GitHub • +1 (561) 351-4718 • alokkbh26@gmail.com

Experience

Graduate Research Assistant

University of South Florida, Tampa, FL (Jan 2019 - May 2025)

- Conducted **neuroscience research** using **biophysical modeling and machine learning**, leveraging advanced **data analysis** and **simulation techniques** to analyze neuronal behavior, while **developing an automated cell segmentation tool** that improved analysis throughput by **over 50%**, bridging experimental observations with theoretical models.

Machine Learning Intern

icardio.ai, Los Angeles, CA (Jun 2024 - Aug 2024)

- **Evaluated** and **optimized** a research collaborator's **PyTorch ML model for Left Ventricle (LV) segmentation** using an in-house echocardiography dataset, facilitating integration into the in-house **MLOps prediction pipeline**.

Junior ML Engineer Volunteer

Omdena INC., CA (Nov 2023 - Jan 2024)

- Led and collaborated with multidisciplinary teams on **deep learning** projects for **healthcare** and **environmental applications**, including **brain scan analysis** for **Alzheimer's detection (99% accuracy)** and **microorganism detection in water (92% accuracy)**.
- Managed **data cleaning**, **exploratory data analysis**, and **model development** processes using approximately **5,000 imaging samples** from initial research to **deployment**, demonstrating expertise in **Computer Vision** techniques and effective communication through technical presentations.
- Co-led the microorganism detection project team of **30 members**, overseeing workflows and ensuring timely delivery of project milestones within **40–50 days**.

Graduate Teaching Assistant

WESTERN ILLINOIS UNIVERSITY (Aug 2016 - May 2018) & UNIVERSITY OF SOUTH FLORIDA (Jan 2019 - May 2025)

- **Taught** undergraduate Physics labs at two institutions, **led** large student groups while instructing on **fundamental physics concepts** and guiding students in **data collection**, **analysis**, and **interpretation** for scientific inquiry.

Education

UNIVERSITY OF SOUTH FLORIDA: Ph.D. in Computational Biophysics/Neuroscience (Jan 2019 - May 2025)
WESTERN ILLINOIS UNIVERSITY: M.S. in Physics (Aug 2016 - May 2018)

Skills

- **Computational Modeling:** Neuron/Astrocyte Modeling, Euler Method, RK4 Method, Monte-Carlo Simulation
- **Programming Languages**: Python, MATLAB, C
- **Data Analysis and Visualization**: MS Office, SQL, Power BI, Tableau, Pandas, Numpy, Scipy, Matplotlib, Seaborn, Plotly, Streamlit
- **Image Processing**: OpenCV, Scikit-image, PILLOW, ImageJ
- **Machine Learning & Deep Learning**: Python (Scikit-learn, TensorFlow, Keras, PyTorch), Statistical Modeling, Supervised & Unsupervised Learning, Dimensionality Reduction (PCA), Neural Networks (ANN, CNN)
- **Advanced ML/NLP**: Transformers, LangChain, RAG, MCP, n8n
- **MLOps & Cloud**: FastAPI, Flask, Docker, Git, DVC, GitHub Actions (CI/CD), AWS (SageMaker, EC2, S3)
- **Other Skills**: Rapid Adaptation to New Technologies, Team Collaboration, Data-Driven Decision Making

Recent Projects

- Developed an **MCP-based system to automate and batch-execute the published DL-SCAN microscopy pipeline**, allowing analysis workflows to be **triggered via natural-language prompts using an LLM (Claude)**, with a focus on **scalable and reproducible high-content image analysis**.
- **Built an end-to-end loan approval ML pipeline** with **feature engineering, preprocessing, and AWS SageMaker deployment** with **GitHub Actions CI/CD**, enabling **scalable, automated, and real-time loan decisioning**.
- Developed a **Spotify Music Recommender** using **Python**, **Streamlit**, and **KNN**, integrating **Spotify API** and **Hopsworks Feature Store** to generate **10 personalized suggestions** with one-click playlist creation.

Publications

- Bhattarai, A.; Meyer, J.; Petersilie, L.; Shah, S.I.; Neu, L.A.; Rose, C.R.; Ullah, G. Deep-Learning-Based Segmentation of Cells and Analysis (DL-SCAN). *Biomolecules* 2024, 14, 1348. https://doi.org/10.3390/biom14111348
- Meyer, J.; Eitelmann, S.; Bhattarai, A.; Bornemann, V.; Unichenko, P.; Durry, S.; Kafitz, K.W.; Henneberger, C.; Ullah, G.; Rose, C.R. Local Differences in Baseline Sodium Shape Astrocytic Potassium Uptake by the NKA. *bioRxiv* 2025. https://doi.org/10.1101/2025.11.18.687951 *(Preprint; under second-round peer review at Nature Communications).*