

PRADEEP BAJRACHARYA

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Education

Rochester Institute of Technology

August 2018 – November 2025

Ph.D. in Computing and Information Sciences

Rochester, NY

- **Coursework:** Deep Learning, Statistical Machine Learning, Image Processing and Computer Vision, Probability, Noise and System Modeling, Foundation of Software Engineering

Pulchowk Campus, Tribuvan University

November 2011 – October 2015

Bachelors in Electronics and Communications Engineering

Lalitpur, Nepal

Research Interests

Deep Learning, Machine Learning, Generative AI, Large Language Models, Vision Language Models, Active Learning, Surrogate Modeling, Reinforcement Learning

Research Experience

University of Chicago

June 2026 – Present

Postdoctoral Scholar

Chicago, Illinois

- Developed Generative Algorithm for synthesis of pediatric skull CT for understanding and intervention of Craniosynostosis

University of Illinois Chicago

November 2025 – April 2026

Postdoctoral Research Associate

Chicago, Illinois

- Developed LLM based visual models for detection and classification of skin cancers from in-house skin OCT dataset. Achieved Sensitivity of 0.95 and specificity of 0.97
- Worked with Knowledge distillation-based approaches to detect skin cancers from multi-modal skin data
- Implemented Swin Transformer based visual algorithms for Image Reconstruction (IR) of noisy photoacoustic images.

Rochester Institute of Technology

August 2019 – November 2025

Graduate Research Assistant

Rochester, New York

- **Meta Learning**
 - * Developed meta-learning-based active neural surrogate model for inverse localization of Ventricular Tachycardia based on ECG observations. Improved localization by 85% over GP based methods.
- **Active Learning and Surrogate Modeling**
 - * Developed a neural surrogate for inverse optimization of cardiac tissue parameters estimation based on ECG observations. Improved localization by 71% over passive baselines.
 - * Developed active surrogate model for oxygen diffusion modeling in retina as a cost-effective alternative.
 - * Developed novel gradient-based acquisition function for phase mapping in colloidal system. Reduced simulation time by 92%.
- **Deep Active Learning and Large Language Models**
 - * Investigated relation between DNN architectures (RESNETs, and LLM models) and active learning. Architecture optimization found more important than data optimization.

Teaching Experience

Rochester Institute of Technology

August 2019 – November 2025

Graduate Teaching Assistant

Rochester, New York

- Assisted teaching courses Image Science Fundamentals (IMGS.111.01/L1-L4) and Intro to Computing and Control (IMGS.180.01)

Pulchowk Campus, Tribhuvan University

April 2016 – September 2016

Teaching Assistant

Lalitpur, New York

- Designed and conducted lab sessions for Basic Electronics course in a class of 48 students.

Industry Experience

Kazi Studios

August 2016 – July 2018

Senior Developer

Lalitpur, Nepal

- Led 2 to 4-member team on web-based and mobile projects for clients including UNICEF Bangladesh, USAID Nepal, and UN Nepal.
- Developed web-based CRM system using Symfony and Laravel with MongoDB and SQL for database management for medical equipment logistic.

E&T Nepal Pvt. Ltd.

November 2015 – August 2016

System Engineer

Bhaktapur, Nepal

- Developed Calculation Solver software called 'MUJO' (using C++ and CUDA Programming) for Computational Fluid Dynamics (CFD) simulation with application for automobile industry.

Publications

- O'Hara, D., **Bajracharya, P.**, Meisenzahl, C., Gillette, K., Prassl, A. J., Plank, G., ... Wang, L. (2026). cAPM: Continual AI-Assisted Pace-Mapping with Active Learning. arXiv preprint arXiv:2606.19373.
- Vadhavkar, S., **Bajracharya, P.**, Zaman, M. S., Padmanabhan, P., Wang, L. (2026). Gradient-based active learning for intelligent discovery of colloidal phase diagrams. Molecular Systems Design Engineering, 11(6), 552-565.
- Alsaadi, A., Wang, T., Park, A., **Bajracharya, P.**, Wang, L., Sun, F., Seal, S., Jadhao, V., Fox, G. & Jha, S.. ROSE: RADICAL Orchestrator for Surrogate Exploration. 2025. In Proceedings of the SC '25. Workshops of the International Conference for High Performance Computing, Networking, Storage and Analysis (SC Workshops '25). 61–70.
- **Bajracharya, P.**, O'Hara, D. B., Meisenzahl, C., Gillete, K., Prassl, A. J., Plank, G., Sapp, J. L. & Wang, L.. Meta-learning based Active Learning Approach for Computer-Assisted Pace-Mapping. 2025. Computing in Cardiology (CinC). IEEE.
- O'Hara, D. B., **Bajracharya, P.**, Meisenzahl, C., Gillete, K., Prassl, A. J., Plank, G., Sapp, J. L. & Wang, L. AI-Assisted Pace-Mapping using Continual-Learning Methods in Bayesian Optimization. 2025. Computing in Cardiology (CinC). IEEE.
- **Bajracharya, P.**, Li, R., & Wang, L.. On the Interdependence between Data Selection and Architecture Optimization in Deep Active Learning. 2024. Transactions on Machine Learning Research.
- **Bajracharya, P.**, Toledo-Marín, J. Q., Fox, G., Jha, S., & Wang, L.. Feasibility Study on Active Learning of Smart Surrogates for Scientific Simulations. 2024. arXiv preprint arXiv:2407.07674.
- **Bajracharya, P.**, Prassl, A. J., Gillette, K., Plank, G., & Wang, L.. Parameter Estimation for Personalized Cardiac Models via Active Learning. 2023. Computing in Cardiology (CinC) (Vol. 50, pp. 1-4). IEEE.
- Zaman, M. S., Dhamala, J., **Bajracharya, P.**, Sapp, J. L., Horáček, B. M., Wu, K. C., Trayanova, N. A., & Wang, L.. Fast Posterior Estimation of Cardiac Electrophysiological Model Parameters via Bayesian Active Learning. 2021. Frontiers in Physiology, 12, 740306.
- Gyawali, P. K., Ghimire, S., **Bajracharya, P.**, Li, Z., & Wang, L.. Semi-supervised Medical Image Classification with Global Latent Mixing. In Medical Image Computing and Computer Assisted Intervention (MICCAI) 2020: 23rd International Conference, Lima, Peru, October 4–8, 2020, Proceedings, Part I 23 (pp. 604-613). Springer International Publishing.
- Dhamala, J., **Bajracharya, P.**, Arevalo, H. J., Sapp, J. L., Horáček, B. M., Wu, K. C., & Wang, L.. Embedding High-dimensional Bayesian Optimization via Generative Modeling: Parameter Personalization of Cardiac Electrophysiological Models. 2020. Medical Image Analysis, 62, 101670.

Technical Skills

Languages: Python, C++, Matlab

Technologies/Frameworks: PyTorch, Tensorflow, Scikit-learn, MLFlow, WandB, OpenCV, Pandas, Numpy, AWS, AWS SageMaker, Git, SLURM, Docker, GitHub

Independent Projects

ViT based classification of Retina OCT images | *Python, PyTorch, HuggingFace, LLM, ViT*

- Built LLM models to classify Retinal OCT images into four disease category using ViT and Swin Transformers.

RAG System using LangChain and OpenAI | *Python, LangChain, GradIO*

- Developed a RAG system with local document database for Obsidian notes coupled with OpenAI GPT-4o-mini interface

GPT2 – Large Language Model | *Python, PyTorch, tiktoken*

- Built and trained LLM model GPT2 from scratch on a small text dataset for foundational and hands-on experience

Gesture recognition for understanding American Sign Language | *Python, PyTorch, OpenCV*

- Developed a deep learning model for gesture recognition on Kaggle dataset for ASL Alphabet

Honors and Awards

- MICCAI 2021 Satellite Event Participation Grant 2021
- Prof. F.N. Trofimenkoff Academic Achievement Award 2019
- RIT Ph.D. Merit Scholarship 2018 - 2025
- NCell Scholarship and Excellence award worth \$1000 2015, 2016
- College Fellowship and Full-fee scholarship during undergraduate studies 2011 - 2015

Poster Presentationas

Computing in Cardiology, Georgia Institute of Technology, September 2023

- “Active Learning based Cardiac Tissue Parameter Estimation for Personalized Model Exploiting Predictive Uncertainty”

AI@RIT Summit, Rochester Institute of Technology, October 2023

- “Which to Optimize: On the Interdependence between Data Selection and Optimization in Deep Active Learning”

Professional Services

Reviewer: NeurIPS(2022-2023, 2025), MICCAI(2023, 2024), ICML(2023), ACL Rolling Review (2025)

Leadership: Vice President of Nepalese Student Association (NSA) at RIT 2022