

# PRADEEP BAJRACHARYA

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## SUMMARY

Final-year PhD candidate in Computing and Information Sciences with a strong track record in deep learning, active learning, and large language models. Experienced in designing scalable ML pipelines, surrogate modeling, and simulation acceleration for biomedical and scientific systems. Proven ability to lead interdisciplinary research, optimize complex systems, and collaborate across scientific domains.

**RESEARCH INTEREST:** Deep Learning, Active Learning, Surrogate Modeling, Scientific Machine Learning, AI for Biomedical Applications, Graph Learning, Large Language Models, Computer Vision

## EDUCATION

**Rochester Institute of Technology, Rochester, NY**

**Aug 2019 - Present**

*PhD, Computing and Information Sciences*

*Rochester, NY*

- **GPA:** 3.94

- **Achievements:** RIT PhD Merit Scholarship, MICCAI 2021 Satellite Event Participation Grant

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

**Pulchowk Campus, Tribhuvan University, Nepal**

**Nov 2011 - Oct 2015**

*Bachelor, Electronics and Communication Engineering*

*Lalitpur, Nepal*

- **GPA:** 82.97%

- **Achievements:** NCell Scholarship and Excellence award, College Fellowship and Full-fee Scholarship, Prof. F.N. Trofimenkoff Academic Achievement Award

## RESEARCH EXPERIENCE

**Rochester Institute of Technology**

**Aug 2019 - Present**

*Graduate Research Assistant*

*Rochester, New York, USA*

- Developed **meta-learning based active neural surrogate model** for localization of source of Ventricular Tachycardia on heart, achieving over 50% improvement over Bayesian Optimization.
- Developed a **locally accurate neural surrogate** for inverse cardiac tissue parameters estimation responsible for irregular ECG signals, improving localization error by 71% over passive baselines.
- Developed **active learning-based surrogate model** for scientific simulations in an application of oxygen diffusion in retina as a cost-effective alternative.
- Explored interdependence of active learning and deep learning architectures (RESNETs to LLMs like BERT, DistilBERT and RoBERTa). Architecture optimization (via Neural Architecture Search) found to be more important than data optimization.
- Developed **novel gradient-based acquisition function** for faster and efficient phase mapping for scientific simulations in an application of a colloidal system, reducing simulation time by 92%.

## PUBLICATIONS

- Bajracharya, P., O'Hara, D. B., Meisenzahl, C., Gillette, 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)
- 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., ... & 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

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- **Languages:** Python, C++, MATLAB
- **ML Framework:** PyTorch, Scikit-Learn, Tensorflow
- **Tools & Libraries:** MLFlow, WandB, OpenCV, Pandas, Numpy, Matplotlib, OpenCV, SLURM, Docker
- **Miscellaneous:** AWS, AWS Sagemaker (Basics), LaTeX, Git

## TALKS & PRESENTATION

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### Computing in Cardiology, Georgia Institute of Technology, September 2023

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

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

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

## PROFESSIONAL SERVICES

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- Reviewer: NeurIPS(2022-2023, 2025), MICCAI(2022, 2024), ICML(2022), ACL Rolling Review (2025)
- Leadership: Vice President of Nepalese Student Association (NSA) at RIT 2022

## INDUSTRY EXPERIENCE

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### Kazi Studios

Aug 2016 - Jul 2018

#### Senior Developer

Lalitpur, Nepal

- Developed web-based CRM system for inventory management for medical equipment logistic.
- Led 2 to 4-member team on web-based and mobile projects for clients including UNICEF Bangladesh, USAID Nepal, and UN Nepal.
- Technology used: Symphony, Laravel, MongoDB, SQL

### E&T Nepal Pvt. Ltd.

Nov 2015 - Apr 2016

#### System Engineer

Bhaktapur, Nepal

- Developed Calculation Solver software called 'MUJO' for Computational Fluid Dynamics (CFD) simulation with application for automobile industry.
- Technology used: C++, CUDA Programming, Machine Learning

## EXTRA PROJECTS

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### Gesture recognition for understanding American Sign Language | [Github Link](#)

- Built and trained a deep learning-based implementation of gesture recognition on Kaggle dataset for ASL Alphabet to understand the gesture hand shapes.
- Technology used: PyTorch, Python, OpenCV

### GPT2 – Large Language Model | [Github Link](#)

- Built and trained LLM model GPT2 on a small text dataset for foundational and hands-on experience
- Technology used: PyTorch, tiktoken