

EDUCATION

PhD in Computer Computer Science

University of Tennessee, Knoxville

Knoxville, Tennessee

August 2025 – Present

- **Relevant courses:** Computer System Organization, Interplay between RL and GenAI, Deep Learning, Software Security
- Advised by [Dr. Fnu Suya](#)

Bachelors in Computer Engineering

Pulchowk Campus, Institute of Engineering

Lalitpur, Nepal

November 2018 – April 2023

- Achieved Rank 57 in the entrance examination of 2018, out of approximately 15000 students
- Graduated in *First Division* with **78.26%**
- Undergraduate thesis: Distributed Resource Sharing Framework, supervised by [Dr. Babu Ram Dawadi](#)

RESEARCH EXPERIENCE

Multimodal Learning Lab

Research Assistant — Supervisor: [Dr. Binod Bhattarai](#)

June 2023 - May 2025

Lalitpur, Nepal

- Contributing actively to research projects focused on **Medical Imaging, Federated Learning, and Multi-modal Learning.**

NepAI Applied Mathematics and Informatics Institute (NAAMII)

Research Intern — Supervisor: [Dr. Bishesh Khanal](#)

August 2022 - April 2023

Lalitpur, Nepal

- Performed in-depth exploratory data analysis (EDA) on Nepali NLP datasets, studying their features and limitations

PREPRINTS & PUBLICATIONS

- **Amgain, S.***, Lobo, D.*, Chatterjee, A.*, Bhunia, S., & Suya, F. (2025). HAMLOCK: HArdware-Model Logically Combined attack. *USENIX (2026)* ([Link](#))
- **Amgain, S***, Shrestha, P*., Shrestha, Khanal, B., Y. R., Gyawali, P., & Bhattarai, B. (2024). Local K-Similarity Constraint for Federated Learning with Label Noise. ([Link](#))
- Poudel, P., Shrestha, P*., **Amgain, S***, Shrestha, Y. R., Gyawali, P., & Bhattarai, B. (2024). CAR-MFL: Cross-Modal Augmentation by Retrieval for Multimodal Federated Learning with Missing Modalities. *International Conference On Medical Image Computing & Computer Assisted Intervention (MICCAI), 2024* ([Link](#))
- Khanal, B., Shrestha, P*., **Amgain, S.***, Khanal, B., Bhattarai, B., & Linte, C. A. (2024). Investigating the Robustness of Vision Transformers against Label Noise in Medical Image Classification. *International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC), 2024.* ([Link](#))
- **Amgain, S.***, Shrestha, P*., Bano, S., Torres, I. D. V., Cunniffe, M., Hernandez, V., ... & Bhattarai, B. (2024). Investigation of Federated Learning Algorithms for Retinal Optical Coherence Tomography Image Classification with Statistical Heterogeneity. *International Conference on Information Processing in Computer-Assisted Interventions (IPCAI), 2024* ([Link](#))
- Shrestha, P*., **Amgain, S.***, Khanal, B., Linte, C. A., & Bhattarai, B. (2023). Medical Vision Language Pretraining: A survey. arXiv preprint arXiv:2312.06224. ([Link](#))
- Koju, S., Bastola, S., Shrestha, P., **Amgain, S.**, Shrestha, Y. R., Poudel, R. P., & Bhattarai, B. (2025, September). Surgical vision world model. In MICCAI Workshop on Data Engineering in Medical Imaging. ([Link](#))
- McLean, C. J., Amgain, S., Bhattarai, B., & Fisher, D. N. (2025). Multilevel-consistency of social behaviour in a cockroach. bioRxiv, 2025-08. ([Link](#))

TEACHING EXPERIENCE

AI4Growth *Teaching Assistant*

January, 2024

- Conducted an in-depth lab session on the principles and application of gradient descent, explaining its role in optimizing machine learning models
- Guided students in the implementing *Sentiment Classification in BERT* as their final project in PyTorch

Fourth Annual Nepal AI School *Teaching Assistant*

May, 2024

- Provided hands-on guidance and technical assistance in lab session on *Active Learning, Self-supervised Learning, and Federated Learning*

INDUSTRY EXPERIENCE

Base Gene Therapeutics Limited

October 2023 - November 2024

Machine Learning Engineer

United Kingdom

- Analyzed nucleotide sequence data to derive meaningful insight about the disease-causing variant from nucleotide sequence
- Filtered out relevant variants using external associated gene list like *Panelapp*

TECHNICAL SKILLS

Languages : Python, C/C++, CUDA, Javascript, Golang

Machine Learning : Computer Vision, Multimodal Learning, Federated Learning, Distributed Optimization

Frameworks : PyTorch, Tensorflow, Numpy, Matplotlib

Dev Tools : Slurm, Visual Studio Code, Git, Docker, Debugger, Vim

PROJECTS

Guthi-Distributed Computing Framework

[Source Code](#)

Undergraduate thesis, Supervisor — [Dr. Babu Ram Dawadi](#)

- Creation of distributed computing library in Go with support for Distributed Filesystem
- Implementation of Robust Persistent Peer to Peer Connection between nodes for communication with support for failure handling

Cockroach Tag Detection using YOLOv5 *Python, PyTorch*

- Successfully finetuned YOLOv5 to accurately detect and identify tags placed on the backs of cockroaches, for analyzing the association of cockroaches in different environmental conditions.
- Conducted detailed annotation of images to identify and label tags on cockroaches, ensuring high-quality training data for the detection model.

Pneumonia Detection *Python, PyTorch*

[Source Code](#)

- Performed multi-class classification using VGG-19 network on Chest X-Ray images to identify whether the X-ray is normal or affected by Pneumonia (Bacterial and Viral)
- Utilized **Class Activation Map (CAM)** analysis to identify and interpret specific regions of interest targeted by the model during predictions.

Old Image Restoration *Python, PyTorch, Wandb, Git*

[Source Code](#)

- Implemented a Generative Adversarial Networks (GAN) architecture for removing scratches from images achieving SSIM score of **0.69**
- Implemented **UNet** architecture as a Generator to transform old images to clean images and **PatchGAN** as a Discriminator

Casualty Extraction *Python, Transformers, NLTK*

[Source Code](#)

- Developed and maintained a comprehensive repository for extracting casualty information from unstructured Nepali text data.
- Extracted the latest news from the RSS feed and leveraged NLP to identify and extract details about casualties, such as the number of people injured or deceased, from various text sources like news articles and reports.

AWARDS AND ACHIEVEMENTS

GritFeat AI Health Hackathon - 1st Runner Up	2023
Received stipend each semester for securing top 24 position in class	2018-2023
Merit-based full tuition waiver in undergrad based on entrance exam ranking	2018-2023

VOLUNTEER EXPERIENCES

2nd Data Engineering in Medical Imaging (DEMI), MICCAI <i>Reviewer</i>	2024
IT Club, Pulchowk Campus <i>Founding Committe Member</i>	2022