# BIDUR KHANAL

Website: bidurkhanal.com bidurkhanal255@gmail.com LinkedIn: bidurkhanal5
GitHub: Bidur-Khanal Google Scholar: BidurKhanal ResearchGate: Bidur-Khanal

## RESEARCH INTEREST

**General:** Medical Image Analysis, Computer Vision, Deep Learning, Machine Learning, Artificial Intelligence
**Specific:** Robust Machine Learning for Medical Image Analysis and Healthcare Applications.

## EDUCATION

**Ph.D. in Imaging Science** *Aug 2020 - May 2025*
*Rochester Institute of Technology* Rochester, NY, USA
**Dissertation**: *Towards Robust Deep Learning for Medical Imaging with Limited and Noisy Labeled Data*

**Bachelor's in Electronics and Communication Engineering** *Nov 2013 - Dec 2017*
*Institute of Engineering, Pulchowk Campus, Tribhuvan University* Lalitpur, Nepal

## RESEARCH EXPERIENCE

**Graduate Research Assistant** *Jan 2021 - May 2025*
*Rochester Institute of Technology* Rochester, NY, USA

- Built a GI image-text dataset and benchmarks for studying hallucination in medical vision-language models.
- Investigated the impact of noisy labels on medical image classifiers in multiple datasets, analyzing how network architectures, pretraining strategies, and dataset characteristics influence robustness under label noise.
- Developed frameworks to robustly train deep learning models with limited and noisy labeled medical image data.

**Machine Learning Research Assistant** *Apr 2019 - Aug 2020*
*Nepal Applied Mathematics and Informatics Institute for Research* Lalitpur, Nepal

- Developed deep learning framework for vertebra detection, spinal curvature estimation, and scoliosis detection from X-ray images; presented the work at *MICCAI 2019 AASCE* Challenge.
- Created a colorimetric PAD image dataset for pesticide concentration estimation using smartphone cameras, and benchmarked it with various machine learning models.

## INDUSTRY WORK EXPERIENCE

**Camera Software Quality Intern** *May 20, 2024 - Aug 23, 2024*
*NVIDIA Corporation* Santa Clara, CA, USA

- Explored and developed a deep learning-based method for assessing camera image quality.
- Investigated the use of Vision Language Models for image quality assessment.

**Deep Learning Engineer** *Dec 2019 - Aug 2020*
***Zeg**, 3D AI solution Company (Worked remotely, part-time consulting job)* London, UK

- Implemented several GAN models for adding realism to computer-rendered images.
- Developed deep learning-based framework for key points detection in 2D images for 3D modeling.

**Firmware/Image Processing Engineer** *Feb 2018 - Aug 2018*
*Nepal Digital Systems (startup company)* Lalitpur, Nepal

- Integrated Raspberry Pi, PiCamera, and GSM/GPS to build an IoT home automation system.
- Built OpenCV-based computer vision pipeline for edge devices to assess material strain under force.

## TEACHING EXPERIENCE

**Teaching Lab Assistant** *Dec 10 - Dec 20, 2019*
*Second Nepal Winter School in AI* Pokhara, Nepal

- Prepared lab assignments for the Pytorch tutorial on deep learning.
- Supervised lab activities: Teaching and assigning lab works in Python to beginner students.

## PUBLICATIONS

- **Khanal*, Bidur**, Pokhrel*, S., Bhandari*, S., et al. (2025). Hallucination-aware multimodal benchmark for gastrointestinal image analysis with large vision language models. *Submitted at International Conference on Medical Image Computing and Computer-Assisted Intervention (MICCAI).* [* denotes equal contribution]
- **Khanal, Bidur**, Bhattarai, B., Khanal, B., and Linte, C. (2025). How does self-supervised pretraining improve robustness against noisy labels across various medical image classification datasets? *Submitted to Medical Image Analysis.* [Under review]
- Kundu, B., **Khanal, Bidur**, Simon, R., and Linte, C. A. (2025b). Investigating the domain adaptability of general-purpose foundation models for left atrium segmentation from MRI images. *Accepted at 13th Functional Imaging and Modeling of the Heart International Conference (FIMH).*
- Kundu, B., **Khanal, Bidur**, Simon, R., and Linte, C. A. (2025a). Assessing the performance of the DINOv2 self-supervised learning vision transformer model for the segmentation of the left atrium from mri images. *SPIE Medical Imaging.*
- **Khanal, Bidur**, Dai, T., Bhattarai, B., and Linte, C. (2024a). Active label refinement for robust training of imbalanced medical image classification tasks in the presence of high label noise. *International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI).*
- **Khanal, Bidur**, Shrestha, P., Amgain, S., Khanal, B., Bhattarai, B., and Linte, C. A. (2024b). Investigating the robustness of vision transformers against label noise in medical image classification. *46th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC).*
- Shrestha, P., Amgain, S., **Khanal, Bidur**, Linte, C. A., and Bhattarai, B. (2024). Medical vision language pretraining: A survey. *Preprint arXiv:2312.06224.*
- **Khanal, Bidur**, Bhattarai, B., Khanal, B., and Linte, C. A. (2023a). Improving medical image classification in noisy labels using only self-supervised pretraining. In *MICCAI Workshop on Data Engineering in Medical Imaging.*
- **Khanal, Bidur**, Bhattarai, B., Khanal, B., Stoyanov, D., and Linte, C. A. (2023b). M-vaal: Multimodal variational adversarial active learning for downstream medical image analysis tasks. In *Annual Conference on Medical Image Understanding and Analysis (MIUA).*
- **Khanal, Bidur**, Hasan, S. K., Khanal, B., and Linte, C. A. (2023c). Investigating the impact of class-dependent label noise in medical image classification. In *SPIE Medical Imaging 2023: Image Processing.*
- Sapkota, S., **Khanal, Bidur**, Bhattarai, B., Khanal, B., and Kim, T.-K. (2022). Label geometry aware discriminator for conditional generative networks. *International Conference on Pattern Recognition (ICPR).*
- **Khanal, Bidur**, Pokhrel, P., Khanal, B., and Giri, B. (2021). Machine-learning-assisted analysis of colorimetric assays on paper analytical devices. *American Chemical Society (ACS) omega.*
- **Khanal, Bidur** and Kanan, C. (2021). How does heterogeneous label noise impact generalization in neural nets? In *International Symposium on Visual Computing (ISVC).*

- Wang, L., Xie, C., Lin, Y., Zhou, H.-Y., **Khanal, Bidur**, Khanal, B., et al. (2021). Evaluation and comparison of accurate automated spinal curvature estimation algorithms with spinal anterior-posterior x-ray images: The AASCE 2019 challenge. *Medical Image Analysis*
- **Khanal, Bidur**, Dahal, L., Adhikari, P., and Khanal, B. (2019). Automatic cobb angle detection using vertebra detector and vertebra corners regression. In *International Workshop and Challenge on Computational Methods and Clinical Applications for Spine Imaging*
- **Khanal, Bidur**, Pant, S., Pokharel, K., and Gaire, S. (2018). Mental state prediction by deployment of trained svm model on eeg brain signal. In *2018 IEEE 3rd International Conference on Computing, Communication and Security (ICCCS).*

## PROFESSIONAL SERVICE

**Reviewer,** Neural Networks 2025

**Reviewer,** International Conference on Medical Image Computing and Computer Assisted Intervention 2025

**Reviewer,** AAAI Conference on Artificial Intelligence 2025

**Reviewer,** Healthcare Technology Letters 2024

**Reviewer,** IEEE Transactions on Medical Imaging 2024

**Reviewer,** International Conference on Medical Image Computing and Computer Assisted Intervention 2024

**Reviewer, Technical Program Committee** Data Engineering in Medical Imaging Workshop, MICCAI 2024

**Reviewer,** PLOS ONE Journal 2024

**Reviewer,** AAAI Conference on Artificial Intelligence 2024

**Reviewer,** International Conference on Medical Image Computing and Computer Assisted Intervention 2023

**Reviewer, Technical Program Committee** Data Engineering in Medical Imaging Workshop, MICCAI 2023

## MENTORSHIP

- *Bipasha Kundu*, Ph.D., Lab Member, RIT.
  Provided supervision on initial research work and paper writing. *2024 - 2025*
- *Prashant Shrestha* and *Sanskar Amgain*, Research Assistants at NAAMII, Nepal.
  Mentored on two research projects. *2023 - 2024*
- *Sandesh Pokhrel* and *Sanjaya Bhandari*, Research Assistants at NAAMII, Nepal.
  Led a research project and provided mentorship. *2025*

## TECHNICAL SKILLS

| | |
|---|---|
| **Programming Languages** | Python(Proficient), MATLAB (Intermediate), C/C++ (Basics) |
| **Python Packages** | Pytorch, Tensorflow, Keras, Matplotlib, Seaborn, Numpy, Scipy, Scikit-Learn, Pandas, OpenCV, Regex, PyQt5, Jupyter |
| **Tools and Frameworks** | Git, Docker, Bash, Conda, SLURM, AWS, ITK-SNAP, Weight & Biases |

## ACADEMIC HONORS AND ACHIEVEMENTS

**Scholarship** Full Financial support for Ph.D. in Imaging Science, RIT *2021 - 2025*

**Award,** IEEE EMBC NextGen Scholar *2024*

**Award,** Graduate Student Research and Creativity Reimbursement, RIT *2023*

**Traineeship,** AWARE-AI NSF Research Trainee, RIT *Jan 2022 - May 2022*

**Scholarship,** MoGA Nepal Bachelor's Merit Scholarship for Gov't Employees' Children *2018*

**Scholarship,** Earned merit-based stipend for top 24 class rank, IOE Pulchowk Campus, TU *2013 - 2017*

## LEADERSHIP AND PERSONAL GROWTH

**Invited guest talk,** *NPLAcademia's* Second Session: *Exploring PhD/MS Opportunities in USA* *Mar 2025*

**Invited talk,** *NAAMII Annual AI School* Information session: Experience sharing *Nov 2024*

**Member,** RIT Tiger Tales Toastmasters Member *Rochester, NY, USA* *Aug 2022 - April 2025*

**Service,** Sergeant at Arms at RIT Tiger Tales Toastmasters *May 2023 - Dec 2023*

**Service,** Treasurer at RIT Tiger Tales Toastmasters *Jan 2024 - May 2024*

**Research showcase presentation**, *Industrial Associates Fall Symposium, Rochester, NY* *Oct 2023*

**Service,** First Treasurer of Nepal Student Association at RIT *Apr 2020 – Apr 2021*

**Featured speaker,** *Nepal Nirman* Idea Pitch Competition, Himalayan TV, Nepal *2017*