SAGAR SHRESTHA

shressag@oregonstate.edu | 5419089408 | [Website] | [Blogs] | Corvallis, OR, USA

EDUCATION

Ph.D. in Computer Science with AI Minor *Jan 2021 - Expected Dec 2025*
Oregon State University, Corvallis, Oregon, USA GPA : 4.0/4.0

MS in Computer Science *Jan 2021 - March 2023*
Oregon State University, Corvallis, Oregon, USA GPA : 4.0/4.0

Bachelor of Engineering in Electronics and Communications *Oct 2012 - Oct 2016*
Pulchowk Campus, Tribhuvan University, Nepal Distinction

SELECT PUBLICATIONS

Full List: [Google-Scholar]

Multimodal/Multi-domain Translation and Representation Learning *Jan 2023 – Present*

1. Towards Identifiable Unsupervised Domain Translation: A Diversified Distribution Matching Approach,
   Sagar Shrestha, Xiao Fu.
   In *International Conference on Learning Representations* (**ICLR**), 2024. [PDF]

2. Shared Component Analysis: Identifiability Without Cross-Domain Alignment
   Subash Neupane, **Sagar Shrestha**, and Xiao Fu.
   In *Neural Information Processing Systems* (**NeurIPS**), 2024. [PDF]

3. Translation Identifiability-Guided Unsupervised Cross-Platform Super-Resolution for OCT Images
   Jiahui Song*, **Sagar Shrestha***, Xueshen Li, Yu Gan, and Xiao Fu .
   In IEEE SAM, 2024 (***equal contribution**) [PDF]

4. Content-Style Learning from Unaligned Domains: Identifiability under Unknown Latent Dimensions,
   Sagar Shrestha, Xiao Fu.
   [Under Review] In *International Conference on Learning Representations* (**ICLR**), 2025. [PDF]

ML for Sensing and Communications [MS Thesis & PhD Qual.] *Jan 2021 – Jan 2023*

5. Deep Generative Model Learning For Blind Spectrum Cartography with NMF-Based Radio Map Disaggregation,
   Sagar Shrestha, Xiao Fu, and Mingyi Hong.
   IEEE **ICASSP**, 2021. [PDF]

6. Optimal Solutions for Joint Beamforming and Antenna Selection: From Branch and Bound to Graph Neural Imitation Learning,
   Sagar Shrestha, Xiao Fu, and Mingyi Hong.
   IEEE Transactions on Signal Processing (**TSP**), 2023. [PDF]

7. Communication-efficient federated MAX-VAR generalized CCA via error feedback-assisted quantization,
   Sagar Shrestha and Xiao Fu. IEEE **ICASSP** 2022. [PDF].

8. Quantized Radio Map Estimation Using Tensor and Deep Generative Models,
   Subash Timilsina, **Sagar Shrestha**, and Xiao Fu.
   IEEE Transactions on Signal Processing (**TSP**), 2023. [PDF]

9. Towards Efficient and Optimal Joint Beamforming and Antenna Selection: A machine Learning Approach,

   Sagar Shrestha, Xiao Fu, and Mingyi Hong. IEEE **ICASSP 2023**. [PDF]

10. Communication-Efficient Federated Linear and Deep Generalized Canonical Correlation Analysis.
    Sagar Shrestha and Xiao Fu.
    IEEE Transactions on Signal Processing (**TSP**), 2023. [PDF]

11. Deep Spectrum Cartography: Completing Radio Map Tensors Using Learned Neural Models,
    Sagar Shrestha, Xiao Fu, and Mingyi Hong.
    IEEE Transactions on Signal Processing (**TSP**), 2022. [PDF]

WORK EXPERIENCE

Graduate Research Assistant at OSU   *Jan 2021 – Present*
Advisor: Xiao Fu

- *Multimodal Learning / Representation learning / Generative Models*   *August 2022 - present*

  * (Ongoing work) Designing novel optimization objective for **vision-language pre-training** tailored towards noisy large-scale image-text data.

  * (Ongoing work) **Diffusion and Flow matching** based domain translation with unpaired multiview data in various domains (single cell biology data, image translation, etc) .

  * Developed unified model for **conditional generation and translation**, with performance guarantees. (`submitted` [4])

  * Proposed a fix to the ill-posedness issue of **unsupervised domain translation**, resolving content misalignment issues in existing methods. (`published` [1])

    * Applied the method to optical coherence tomography super-resolution in medical imaging. (`published` [3])

    * Proposed theory and algorithm for representation learning from unpaired data, with strong performance on domain adaptation, single-cell multimodal alignment, and unsupervised word alignment. (`published` [2])

  * Developed **privacy-preserving, communication-efficient federated learning framework** for GCCA (a multiview dimensionality reduction method), achieving 90% communication cost reduction without compromising clustering and classification accuracy. (`published` [10],[7])

- *ML for data-driven solutions to Sensing and Communications*   *Jan 2021 - August 2022*

  * Developed a **Branch and bound (B&B)** algorithm for joint beamforming and antenna selection, and accelerated it using **GNN and imitation learning**, resulting in generalization beyond training data (16 to 128 antenna systems) (`published` [6], [9])

  * Proposed a SOTA method for spectrum cartography using **tensor decomposition and pretrained generative priors**, achieving robust generalization in heavy shadowing and crowded environments. (`published` [5], [11], [8])

- *Reviewer in the following journals and conferences:*

  * TSP, ICASSP (2021, 2022), EUSIPCO (2023, 2024), ICML (2023), NeurIPS (2024), OJSP, SIGPRO.

ML Engineer, Team Lead, and Co-founder at Paaila Technology   *Nov 2016 – Sept 2020*

- *Automated restaurant [Media]*   *Nov 2016 - Nov 2018*

* Engineered a comprehensive robotic restaurant system integrating mobile ordering, real-time database management, automated billing, and autonomous robot navigation, leveraging software development, ML, and end-to-end data pipeline implementation, resulting in a 50% reduction in waitstaff.

- *Designed and built emergency Ventilator for Covid patients during the beginning of the pandemic (Certified for emergency use in Nepal). [Media]*   *April 2020 - Sept 2020*

- *Customer Service Chatbot Agent*   *Dec 2018 - Dec 2019*

  * Developed comprehensive chatbot solutions with chat interface, admin dashboard for control and data visualization, DL-based intent recognition and query handling, and integrated chat log database system. Deployed and maintained in three of the largest banks in Nepal. [Demo]

Team Member for International Robotics Competition, ABU Robocon   *Aug 2014 - Aug 2016*

- Developed control software and electronics for 2014 and 2015 competitions, winning 2 prestigious awards each year (a first for Team Nepal). [Demo1] [Demo2]

TEACHING EXPERIENCE

Substitute Instructor at Oregon State University

- Taught some classes for the grad-level courses: *Matrix Analysis* and *Convex Optimization*

Assistant Lecturer at Thapathali Campus, Nepal   *Jan 2019- Jan 2020*

- Taught undergraduate level courses, Instrumentation II and Telecommunications, in ECE department.

RELEVANT SKILLS AND EXPERTISE

Machine Learning: Self-Supervised Learning, multimodal representation learning, Unsupervised domain translation, Generative models (Diffusion, GAN, VAE, Flow, AR/LLM/VLM), Online Learning, Dimensionality reduction and (nonlinear) factor analysis (PCA, CCA, LDA, ICA, nonlinear ICA, deep CCA), GNN, domain adaptation, federated learning, optimization, causal representation learning, SLAM (robotics),

Mathematical background: statistical learning, statistical and causal inference, convex and non-convex optimization, advanced linear algebra, probability and measure theory, real analysis, topology, differential geometry, information theory.

Programming: Python, C/C++, Pytorch, JAX, scikit-learn, ML/data science & visualization python packages (numpy, scikit-learn, pandas, scipy, matplotlib), SQL, OpenCV, Git, Matlab, ROS, Gazebo, HTML / CSS/JS/ReactJS/Flask, Bash, Linux, embedded programming.

HONORS AND ACHIEVEMENTS

- Ranked 37 out of 15000 applicants in engineering entrance exam. Received merit-based Full scholarship for undergraduate study

- Valedictorian of the class of 2012 at Nobel Academy (high school level study in Nepal).

- First Position in annual National Technological Festival LOCUS for three years in a row during my undergraduate study for software and hardware projects - 2014, 2015, 2016

- Awards for my startup: Most Creative Business Nepal (CBC Cup 2018), Best Startup Award (ICT Award 2017), Most Innovative Product Award (ICT Award 2017), Best Industry Technology Award (FNCCI 2017) [Website]