

SAYANTAN KUMAR

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EDUCATION

Washington University in St. Louis <i>PhD in Computer Science and Engineering</i> - GPA = 3.97	St. Louis, Missouri, USA Aug 2019 - Dec 2024
Indian Statistical Institute <i>M.Tech in Computer Science</i> - 81%, First Class Honors with Distinction	Kolkata, West Bengal, India Aug 2017 - July 2019
Jadavpur University <i>B.E in Electrical Engineering</i> - CGPA = 8.6, First Class Honors	Kolkata, West Bengal, India Aug 2013 - May 2017

WORK EXPERIENCE

Intramural Postdoctoral Fellow, National Library of Medicine, NIH - Host: Dr Jeremy Weiss	February 2025 - Present
Graduate Research Assistant, Washington University in St. Louis - Advisor: Dr Philip Payne - Dissertation: Multimodal representation learning framework for modeling heterogeneity and progression in AD	March 2020 - December 2024
M.Tech Research Student, Indian Statistical Institute, Kolkata - Advisor: Dr Swagatam Das - Dissertation: On the Choice of Appropriate Combination of Classifier and Decomposition Scheme for Multiclass Imbalanced Data Classification : A Comparative Analysis.	May 2018 - July 2019
Summer Research Fellow, Technische Universität Darmstadt, Germany - Advisor : Dr. Heinz Koepl - Project: Modeling communication in social networks by approximating Markov Chains	May 2018 - Aug 2018
Summer Internship, Indian Institute of Technology, Kharagpur, India - Advisor : Dr Ashish Dhara - Project : Using deep learning to detect diabetic retinopathy from retinal fundus images.	May 2016 - Aug 2016

PUBLICATIONS

Journal articles (* indicates under review, † indicates equal contribution)

- * Noroozizadeh, S.†, **Kumar, S†**, Chen, G and Weiss, J. C. (2025). *Temporally annotated textual time series from PubMed Open Access clinical case reports* [Nature Scientific data, **under review**]. [[Preprint](#)] [[Code](#)]
- * Qiu, P., An, Zhaoqi., Ha, SungMin., **Kumar, S.**, Yu, Xiaobing., Sotiras, A. *Hierarchical Multimodal Representation Learning For Medical Image Analysis* [Medical Image Analysis, **under review**]. [[Preprint](#)]
- Qiu, P, Yang, J, **Kumar, S**, Ghosh, S, Sotiras, A. *AgileFormer: Spatially Agile Transformer UNet for Medical Image Segmentation. Biomedical Signal Processing and Control (impact factor = 5.0)*, Elsevier [[Paper](#)] [[Code](#)]
- Lou, S, **Kumar, S**, Goss, C., Avidan, M., Kheterpal. S., Kannampallil, T. *Multi-center validation of a machine learning model for surgical transfusion risk at 45 US hospitals. JAMA Netw Open (impact factor = 13.8)*. 2025;8(6):e2517760. doi:10.1001/jamanetworkopen.2025.17760 [[Paper](#)]
- Kumar, S**, Oh, I, Schindler. S., Ghoshal. N., Abrams, Z., Payne, P. *Examining heterogeneity in dementia using data-driven unsupervised clustering of cognitive profiles. PLOS One (impact factor = 3.2)* [[Paper](#)]

6. Yang, B, Earnest, T, **Kumar, S**, Kothapalli, D, Gordon, B, Soritas, A. *Evaluation of ComBat harmonization for reducing across-tracer biases in regional amyloid PET analyses*. Human Brain Mapping (**impact factor = 4.8**)[\[Paper\]](#)
7. **Kumar, S.**, Yu, S. C., Michelson, A., Kannampallil, T., & Payne, P. R. (2024). *HiMAL: Multimodal Hierarchical Multi-task Auxiliary Learning framework for predicting Alzheimer's disease progression*. JAMIA open, 7(3), ooae087. (**impact factor = 3**) [\[Paper\]](#)
8. **Kumar, S.**, Earnest, T., Yang, B., Kothapalli, D., Aschenbrenner, A. J., Hassenstab, J., ... & Alzheimer's Disease Neuroimaging Initiative. (2025). *Analyzing heterogeneity in Alzheimer disease using multimodal normative modeling on imaging-based ATN biomarkers*. Alzheimer's & dementia: the journal of the Alzheimer's Association (**impact factor = 11.2**), 21(4), e70143.
9. Ma, W., Oh, I., Luo, Y., **Kumar, S.**, Gupta, A., Lai, A. M., ... and Michelson, A. P. (2025). Developing Approaches to Incorporate Donor Lung CT Images into Machine Learning Models to Predict Severe Primary Graft Dysfunction after Lung Transplantation. American Journal of Transplantation. (**impact factor = 8.2**) [\[Paper\]](#)
10. **Kumar, S.**, Oh, I., Schindler, S., Lai, A. M., Payne, P. R., and Gupta, A. (2021). *Machine learning for modeling the progression of Alzheimer disease dementia using clinical data: a systematic literature review*. JAMIA open, 4(3), ooab052. (**impact factor = 3**) [\[Paper\]](#)

Conference articles († indicates equal contribution)

1. ***Kumar, S**[†], Noroozizadeh, S[†], Kim, J[†], Weiss, J. C. (2025). *Text Knows What, Tables Know When: Clinical Timeline Reconstruction via Retrieval-Augmented Multimodal Alignment* [**MLHC 2026**: Under review] [\[Code\]](#)
2. **Kumar, S** and Weiss, J. C. (2026). *Temporally Phenotyping GLP-1RA Case Reports with Large Language Models: A Textual Time Series Corpus and Risk Modeling* [AMIA Annual Symposium , [**Accepted**] [\[Preprint\]](#) [\[Code\]](#)
3. Noroozizadeh, S[†], **Kumar, S**[†], and Weiss, J. C. (2025). *Forecasting from Clinical Textual Time Series: Adaptations of the Encoder and Decoder Language Model Families* [**AAAI 2026**: Special Track on AI for Social Impact, **Poster**]. [\[Paper\]](#) [\[Code\]](#)
4. Qiu, P, Zhu, W, **Kumar, S**, Chen, X, Yang, J, Sun, X, Razi, A, Wang, Y, Sotiras, A, *Multimodal Variational Autoencoder: a Barycentric View*. **AAAI 2025**, [**Oral**] [\[Paper\]](#)
5. **Kumar, S**, Payne, PR, and Sotiras, A. (2023, April). *Improving Normative Modeling for Multi-modal Neuroimaging Data using mixture-of-product-of-experts variational autoencoders*. 2024 IEEE International Symposium on Biomedical Imaging (**ISBI**). IEEE, 2024. [\[Paper\]](#) [\[Code\]](#)
6. **Kumar, S**, Payne, PR, and Sotiras, A. (2023, April). *Normative modeling using multimodal variational autoencoders to identify abnormal brain volume deviations in Alzheimer's disease*. In **SPIE Medical Imaging 2023: Computer-Aided Diagnosis** (Vol. 12465, p. 1246503). [**Oral**]**[Best paper award finalist]** [\[Paper\]](#) [\[Code\]](#)
7. **Kumar, S**, Yu, S, Kannampallil, T, Abrams, Z, Michelson, A, and Payne, PR. (2022, August). *Self-explaining neural network with concept-based explanations for ICU mortality prediction*. In Proceedings of the 13th ACM International Conference on Bioinformatics, Computational Biology and Health Informatics (pp. 1-9) (**ACM BCB**)**[Oral]** [\[Paper\]](#) [\[Code\]](#)

Peer-reviewed workshops and abstracts

1. Yang, B., Earnest, T., **Kumar, S.**, Gordon, B. A., & Sotiras, A. (2024, July). Harmonization of amyloid PET radiotracers using ComBat and its influence on detecting treatment effects in a simulated clinical trial. In Alzheimer's Association International Conference. ALZ.**[Poster]**
2. Lou SS, **Kumar S**, Avidan MS, Kheterpal S, Kannampallil T. External validation of a publicly available surgical transfusion risk prediction model: a multi-center perioperative outcomes group study. **World Congress of Anaesthesiologists 2024**. [**Oral**]

3. **Kumar, S.**, Kannampallil, T., Sotiras, A., and Payne, P. (2023, October). *Explaining Longitudinal Clinical Outcomes using Domain-Knowledge driven Intermediate Concepts*. In XAI in Action: Past, Present, and Future Applications Workshop **NeurIPS 2023**. [Poster] [Paper] [Code]
4. **Kumar, S.**, Payne, P., and Sotiras, A. (2023, October). *mmNormVAE: Normative Modeling on Multimodal Neuroimaging Data using Variational Autoencoders*. In Deep Generative Models for Health Workshop **NeurIPS 2023**. [Poster] [Paper] [Code]
5. **Kumar, S.**, Yu, S, Kannampallil, T, Abrams, Z, Michelson, A, and Payne, PR. *Explaining Neural Network with Plausible Explanations*. Symposium on Artificial Intelligence in Health (**SAIL 2022**).[Poster]
6. **Kumar, S.**, Abrams, Z, Oh, I, Gupta, A, Schindler SE, Ghoshal, N, Lai, AM, Payne, PRO. *Identifying Interpretable Clinical Subtypes within Heterogeneous Dementia Clinic Population*. **AMIA 2022 Informatics Summit**. [Oral]
7. **Kumar, S.**, Oh, I, Gupta, A, Oh, I, Lai, AM, Payne, PRO. *Leveraging Electronic Health Records Data for Predicting Alzheimer’s Disease Progression*. **AMIA 2021 Informatics Summit**. [Poster]
8. **Kumar, S.**, Gupta, A, Oh, I, Schindler, S, Lai, AM, Payne, PRO. *Simplified Form of Recurrent Neural Networks for Predicting Alzheimer Disease Progression*. **Pacific Symposium on Biocomputing (PSB 2021)**. [Poster]

CONFERENCE PRESENTATIONS

- Intelligent Systems for Molecular Biology (ISMB 2026) - **Talk, Poster**
- AAI 2026, Singapore - **Poster**
- IEEE ISBI 2024, Athens, Greece - **Poster**
- XAI in Action: Past, Present, and Future Applications Workshop NeurIPS 2023, New Orleans, USA - **Poster**
- Deep Generative Models for Health Workshop NeurIPS 2023, New Orleans, USA - **Poster**
- SPIE Medical Imaging 2023, San Diego, USA - **Oral**
- Symposium on Artificial Intelligence on Health (SAIL) 2022, Bermuda - **Poster**
- Interpretable Machine Learning in Healthcare (IMLH) Workshop ICML 2022 [Virtual] - **Poster**
- ACM International Conference on Bioinformatics, Computational Biology and Health Informatics 2022 - **Oral**
- AMIA Informatics Summit 2022, Chicago, USA - **Oral**
- AMIA Informatics Summit 2021 [Virtual] - **Poster**

INVITED TALKS

- **September 2024** - *Multimodal normative Modeling to examine heterogeneity in Alzheimer’s Disease*
Host: Dr Mustapha Bouhrara, National Institute on Aging, National Institute on Health, USA
- **September 2024** - *Explaining longitudinal clinical outcomes using domain-knowledge driven clinical concepts*
Host: Dr Jeremy Weiss, National Library of Medicine, National Institute on Health, USA
- **September 2024** - *Multimodal representation learning for modeling progression in Alzheimer’s Disease*
Host: Dr Ronald Summers, National Institute on Health Clinical Center, USA
- **August 2024** - *Examining heterogeneity in dementia using unsupervised clustering of cognitive profiles*
Host: Dr Suzanne Schindler, Department of Neurology, Washington University in St Louis

AWARDS AND HONORS

- **Awarded 1500\$ travel grant for winning the Three-Minute-Talk (TMT) competition** at National Library of Medicine, USA, 2026

- **Intramural Postdoctoral Visiting Fellow Award**, National Library of Medicine, National Institutes on Health (NIH), 2025.
- **Student Travel Award**, SPIE Medical Imaging 2023
- **Robert F. Wagner All-Conference Best Paper Award Finalist** - Computer-Aided and Diagnosis track, SPIE Medical Imaging 2023
- **Honors (top 5%)** - Annual Review of Doctoral Students (PRODS) **2024**, **2023** and **2022**, Department of Computer Science and Engineering, Washington University in St. Louis
- **Prize money for outstanding academic performance (>90% aggregate marks)** in 3rd and 4th semesters of M.Tech, Indian Statistical Institute, Kolkata applicants.

PROFESSIONAL SERVICE

- **Conference co-organizer:** Machine Learning for Health (ML4H 2022)
- **Member:** SPECTRA, SPIE Student Chapter, Washington University in St. Louis
- **Reviewer (journal):** Journal of Biomedical Informatics (JBI), IEEE Access, Medical Physics, JMIR Medical Informatics, Communications medicine, IEEE Journal of Biomedical and Health informatics, JAMIA Open, IEEE Transactions in Biomedical Engineering, JMIR medical informatics
- **Reviewer (conference/workshops):** AAAI 2026, MLHC 2025, MICCAI 2024-2025, ISBI 2024, MICCAI 2023, IJCNN 2023, ML4H 2022, ICLR Workshop TS4H 2024, 2022, EMNLP 2022 Workshop BlackboxNLP, ICML 2022 Workshop IMLH, AMIA Annual Symposium 2020-2023, AMIA Informatics Summit 2020-2023

TEACHING EXPERIENCE

Washington University in St. Louis

Aug 2021 - Dec 2021

Assistant Instructor, Introduction to Machine Learning

- Supervised undergraduate graders with grading assignments and held weekly office hours to help students in assignments.

Washington University School of Medicine

Aug 2020 - Dec 2020

Teaching Assistant, Introduction to Biomedical Data Science II

- Presented tutorials on dimensionality reduction and feature extraction algorithms on electronic health records and imaging data, supervised and unsupervised models for predictive modeling.
- Guided students in homeworks and final projects on machine learning with real-world healthcare datasets.

TECHNICAL SKILLS

- **Programming:** Python, MATLAB, R, C/C++
- **Deep Learning & Computer Vision:** Supervised, Unsupervised and Self-supervised Learning, Deep Generative Models, GAN, VAE, U-Net
- **Frameworks and Tools:** PyTorch, Tensorflow, Keras, Sklearn
- **Databases:** MySQL, PostgreSQL

RELEVANT COURSES

Natural Language Processing, Data Mining, Bayesian Machine Learning, Introduction to Machine Learning, Human-in-the Loop Computation, Artificial Intelligence, Cognitive Science, , Computer Vision, Pattern Recognition and Image Processing, Advanced Pattern Recognition

REFERENCES

- [Dr Jeremy C. Weiss](#), Tenure Track Investigator, Computational Health Research Branch, National Library of Medicine, National Institutes on Health
- [Dr Philip Payne](#), Director, Institute for Informatics, Data Science and Biostatistics (I2DB), Associate Dean for Health Information and Data Science, School of Medicine and Affiliated Faculty in CS, Washington University.
- [Dr Thomas Kannampallil](#), Associate Professor of Anesthesiology, Washington University School of Medicine.
- [Dr Aristeidis Sotiras](#), Assistant Professor, Department of Radiology and affiliated faculty at Institute for Informatics, Data Science and Biostatistics (I2DB), Washington University School of Medicine.