Satvik Tripathi

CONTACT INFORMATION

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RESEARCH OBJECTIVES

Academic and clinical research focused on building deep learning techniques for medicine & healthcare applications.

EDUCATION

B.S. Computer Science (Honors), Drexel University **Graduation: 06/2026**
College of Computing & Informatics
Pennoni Honors College
Minors: Psychology, Neuroscience & Public Health
Nina Henderson Provost Scholar
Presidential Scholar

RESEARCH EXPERIENCE

MGH/Harvard-MIT Health Sciences and Technology

Athinoula A. Martinos Center for Biomedical Imaging, Research Assistant **April 2023 – Present**
Working with the Quantitative Translational Imaging in Medicine Laboratory, led by Christopher P. Bridge, where I utilized my skills in biomedical image analysis to assist with ongoing research projects. My responsibilities included conducting experiments, collecting and analyzing data, and preparing reports to support the lab's efforts in developing new diagnostic and therapeutic methods for various diseases.

Harvard Medical School

Division of Vascular & Interventional Radiology at MGH, Research Assistant **April 2023 – Present**
Working with Dr. Dania Daye at the Mass General Hospital, focusing on the applications of machine learning in vascular radiology scenarios. Working alongside Dr. Daye, gaining clinical experience in interventional radiology.

Zitnik Lab, Undergraduate Research Fellow **April 2022 – February 2023**
Working under Dr. Marinka Zitnik at the Machine Learning for Medicine and Science at the Department of Biomedical Informatics. Focusing on implementing Machine learning and Deep Learning techniques, Graph Neural networks specifically, for biological and medical research.

Perelman School of Medicine at the University of Pennsylvania

Diciphr Lab, Undergraduate Researcher **June 2022 – Present**
Working under Dr. Ragini Verma at the Diffusion and Connectomics in Precision Healthcare Research (Diciphr) Lab. Focusing on brain connectome development and application of deep learning pipelines in diffusion MRI sequences.

Center for Practice Transformation, Research Assistant **March 2023 – Present**
Working with Dr. Tessa Cook at the Center for Practice Transformation. Focusing on language modeling for radiology text reports and enhancing practice workflow.

Center for Global and Population Health Research, Research Scholar **March 2023 – Present**
Working with Dr. Farouk Dako as a core member of the center with the mission to develop scalable and sustainable infrastructure in low-resource settings to allow for the advancement of health information technology.

McBeth Lab, Department of Radiation Oncology, Researcher **November 2023 – Present**

Working with Dr. Rafe Mcbeth in the Department of Radiation Oncology with a focus on the development of AI in the cardiothoracic imaging division. Research focusing on building AI-based methodologies for radiomics and global health informatics.

Harvard TH Chan School of Public Health

Harvard Health Innovation Lab, Research Scholar **May 2023 – Oct 2023**

Working to establish a global Data Collaborative for Health Systems Performance (DC-HSP). This collaboration will focus on collaborating over global data to address health systems' performance for Cardiovascular Health and ultimately engaging policymakers to develop appropriate policies, responsive health systems, and better cardiovascular health outcomes.

Drexel University

Sparse Coding Lab, Research Assistant **January 2022 – Present**

Working under Dr. Edward Kim at the Department of Computer Science. Focusing on the application of advanced AI techniques for biomedical data. Currently working on AI-based Covid vaccine risk study funded by Bill Melinda Gates Foundation.

Drexel Society of AI, Researcher & Vice President **July 2021 – May 2023**

Lead several research projects on application AI, specifically in biology, healthcare, and medicine. Frequently collaborative with Penn Medicine for clinical practices. Developing AI techniques for large-scale multi modal datasets.

Ayaz Neuroergonomic Research Lab, Research Assistant **October 2021 – June 2022**

Worked under Dr. Hasan Ayaz at the Cognitive Neuroengineering and Quantitative Experimental Research Collaborative (CoNQuER CollabOrative). Researching on human subjects using near-infrared (NIR)-based functional optical brain imaging (fNIR) and electroencephalograms (EEG) for stress monitoring, analysis, and visualization of brains' cognitive response.

University of Maryland School of Medicine

Medical Intelligent Imaging (UM2ii) Center, Research Assistant **March 2022 – September 2022**

Worked under Dr. Paul Yi at the University of Maryland School of Medicine. Researching on applications of Deep Learning algorithms for detection, diagnosis, and predictions on musculoskeletal radiological modalities.

Professional Experience

Reviewer, Nature Portfolio **Nov 2022 - Present**

Volunteered as a Reviewer for the journal Scientific Reports, taking expertise in medical imaging and brain research applications.

Reviewer, Elsevier Publications **March 2022 - Present**

Volunteered as a Reviewer for journals publishing research in the field of AI-based medicine, taking expertise in medical imaging and brain research applications.

Reviewer, Springer-Nature Publications **March 2022 - Present**

Volunteered as a Reviewer for journals publishing research in the field of AI-based medicine, taking the expertise in global health informatics and ethical applications.

Scientific Contributor, The Yuan **August 2021 - Present**

Working as a content writer/contributor at The Yuan, a tech community platform focused on publishing articles on AI in healthcare, machine learning, and related disciplines.

Scholarly Peer Reviewer, IGI Global **November 2019 - Present**

Serving as an honorary peer reviewer for IGI Global Publications for my expertise in the field

of Artificial Intelligence and Biomedical Informatics. Reviewed multiple International book chapters on AI in Medicine, Radiology, and Biomedical Informatics.

Research Intern, Neosoma **May 2021 - September 2021**

Worked in the research team and helped in building clinician-first, deep learning neurodiagnostic solutions for neuroradiologists, radiation oncologists, neurologists, neurosurgeons, and neuroscience researchers. Worked with MRI sequences (T1, T1W, T2, GD, DW), sorting the dataset and picking up scans that would be useful in training the model. Additionally, as a part of the FDA team, sat in meetings and talked about the ethics and regulations of our model.

Clinical & Shadowing Experience

Diagnostic Radiology, Hospital of the University of Pennsylvania, Philadelphia, PA **420 Hours**
Interventional Radiology, Mass General Hospital, Boston MA **100 Hours**
Radiation Oncology, Hospital of the University of Pennsylvania, Philadelphia, PA **50 Hours**
Neuroscience Intensive Care Unit, Mass General Hospital, Boston MA **50 Hours**

Grants

Drexel Univeristy

Undergraduate Research Mini-Grant, (2024)
Received a $2000 Research Grant for the Winter Term 2024 from the Office of Undergraduate Research at Pennoni Honors College. Working on Domain-Specific Transfer Learning in Resource Constraint Settings using Deep Learning Algorithm. The project is mentored by Dr. Edward Kim at the Sparse Coding Lab.

Undergraduate Research Mini-Grant, (2023)
Received a $4000 Research Grant for the Winter and Spring Term 2023 from the Office of Undergraduate Research at Pennoni Honors College. Working on Expert-level Detection of Diabetic Retinopathy using Interpretable Deep Learning Algorithm. The project is mentored by Dr. Edward Kim at the Sparse Coding Lab.

Undergraduate Research Mini-Grant, (2022)
Received a $1500 Research Grant for the Winter Term 2022 from the Office of Undergraduate Research at Pennoni Honors College. Working on a novel bias detection test for AI-based medical imaging techniques. Working at the Sparse Coding Lab, mentored by Dr. Edward Kim. This project is also supported by Dr. Farouk Dako from Penn Medicine.

Honors & Awards

American Association for the Advancement of Science (AAAS)

Honorable Mention in Poster Competition, 2024 AAAS Annual Meeting (02/2024)

Travel Grant Award, 2024 AAAS Annual Meeting (02/2024)

Third Prize in Poster Competition, 2023 AAAS Annual Meeting (03/2023)

Travel Grant Award, 2023 AAAS Annual Meeting (03/2023)

Harvard Medical School

Undergraduate Research Fellow, SIBMI (03/2022)

Harvard University

Winner of CS50 Puzzle Day 2022 (04/2022)
Winner of CS50 Puzzle Day 2020 (08/2019)

Drexel AI Research Conference 2021

Plenary Speaker (05/2021)
The Best Research Paper Award (05/2021)
The Best Scientific Content Award (05/2021)
The Most Practical Research Award (05/2021)

The 3rd Best Research Submission Award (05/2021)

Drexel University

Nina Henderson Provost Scholar 2022 (10/2022)
STAR (Students Tackling Advanced Research) Scholar (04/2021)
Presidential Scholar (04/2021)
Cohort of Honors Program 2021 (04/2021)

Conferences & Workshops Organized

Core Organizer – Harvard Site, Harvard Health Systems Innovation Lab 2023 Hackathon	**05/2023**
Organizing Committee, Philadelphia Codefest 2023	**04/2023**
Co-General Chair, 2023 Drexel AI Symposium (Data Centric AI Theme)	**05/2022**
Co-General Chair, 2022 Drexel AI Symposium (Medicine Theme)	**05/2022**
Organizing Committee, Philadelphia Codefest 2022	**04/2022**
Mentor, Drexel Winter AI Workshop	**10/2021**
Mentor, Drexel Fall AI Workshop	**08/2021**

Research Publications

18. **Satvik Tripathi**, Rithvik Sukumaran, Suhani Dheer, Tessa S. Cook. "Promptwise: Prompt Engineering Paradigm for Enhanced Patient-Large Language Model Interactions Towards Medical Education." *Available at SSRN*.
17. **Satvik Tripathi**, Liam Mutter, Meghana Muppuri, Suhani Dheer, Emiliano Garza-Frias, Komal Awan, Aakash Jha et al. "PRECISE Framework: GPT-based Text For Improved Readability, Reliability, and Understandability of Radiology Reports For Patient-Centered Care." *arXiv preprint*, arXiv:2403.00788 (2024).
16. **Satvik Tripathi**, Rithvik Sukumaran, Tessa S Cook. "Efficient healthcare with large language models: optimizing clinical workflow and enhancing patient care," *Journal of the American Medical Informatics Association*, 2024, ocad258.
15. **Satvik Tripathi**, Kyla Gabriel, Pushpendra Kumar Trupathi, Edward Kim. "Large Language Models Reshaping Molecular Biology and Drug Development," *Available at SSRN*.
14. **E**dward Kim, Lucy Robinson, Isamu Isozaki, Noreen Robertson, Charles B. Cairns, **Satvik Tripathi**, and Vicki Seyfert-Margolis. "A Coronavirus Cohort Case Study-Dataset Trends using Machine Learning Methods," *2023 IEEE International Conference on Bioinformatics and Biomedicine (BIBM)*, pp. 4213-4219. IEEE, 2023.
13. Dania Daye, Regina Parker, **Satvik Tripathi**, Meredith Cox, Sebastian Brito Orama, Christopher Bridge, Raul N. Uppot. "Cascade: Context-Aware Data-Driven Ai for Streamlined Multidisciplinary Tumor Board Recommendations in Oncology," *Available at SSRN*,4676193.
12. **Satvik Tripathi**, Azadeh Tabari, Arian Mansur, Harika Dabbara, Christopher P. Bridge, Dania Daye, "From Machine Learning to Patient Outcomes: A Comprehensive Review of AI in Pancreatic Cancer," *Diagnostics*, 14, no. 2: 174.
11. **Satvik Tripathi**, Kyla Gabriel, Suhani Dheer, Aastha Parajuli, Alisha Augustin, Ameena Elahi, Omar Awan, Farouk Dako, "Understanding Biases and Disparities in Radiology AI Datasets: A Review," *Journal of the American College of Radiology*, 20.9 (2023): 836-841.
10. **Satvik Tripathi**, Suhani Dheer, Edward Kim "Neuro-Psychological Approaches for Artificial Intelligence." Multidisciplinary Approaches in AI, Creativity, Innovation, and Green Collaboration=*IGI Global*, 2023. 29-43.
9. **Satvik Tripathi**, Alisha Augustin, Adam Dunlop, Alex Zavalny, Suhani Dheer, Rithvik Sukumaran, Owen Haslam, Edward Kim "Recent Advances and Application of Generative Adversarial Networks in Drug Discovery, Development, and Targetingr", *Artificial Intelligence in the Life Sciences*.
8. **Satvik Tripathi**,Alisha Isabelle Augustin, Farouk Dako, Edward Kim, "Turing Test Inspired Method for Analysis of Biases Prevalent in Artificial Intelligence-Based Medical Imaging," *AI Ethics*, 2022.

7. **Satvik Tripathi**, Ethan Jacob Moyers, Alisha Augustin, Alex Zavalny, Suhani Dheer, Rithvik Sukumaran, Daniel Schwartz, Farouk Dako, Edward Kim "RadGenNets: Deep learning-based radiogenomics model for gene mutation prediction in lung cancer", *Informatics in Medicine Unlocked*, 2022, 101062, ISSN 2352-9148,.
6. **Satvik Tripathi**, Alisha Isabelle Augustin, Rithvik Sukumaran, Suhani Dheer, Edward Kim, "HematoNet: Expert level classification of bone marrow cytology morphology in hematological malignancy with deep learning," *Artificial Intelligence in the Life Sciences*, Volume 2, 2022, 100043, ISSN 2667-3185.
5. **Satvik Tripathi**, Ethan Jacob Moyers, Alisha Augustin, Ansh Aashish Dholakia, Andy Nguyen, Isamu Mclean Isozaki, Daniel Schwartz, Edward Kim "EvoSTS Forecasting: Evolutionary Sparse Time-Series Forecasting."*arXiv preprint arXiv:2204.07066*.
4. **Satvik Tripathi**, Alisha Augustin, and Edward Kim,"Longitudinal Neuroimaging Data Classification for Early Detection of Alzheimer's Disease using Ensemble Learning Models."*TechRxiv*.
3. **Satvik Tripathi**,"Early Diagnostic Prediction of Covid-19 using Gradient-Boosting Machine Model."*arXiv preprint arXiv:2110.09436*.
2. **Satvik Tripathi** and Thomas Heinrich Musiolik, "Fairness and Ethics in Artificial Intelligence-based Medical Imagining" *Ethical Implications of Reshaping Healthcare with Emerging Technologies*: 1-16.
1. **Satvik Tripathi**, "Artificial Intelligence: A Brief Review." *Analyzing Future Applications of AI, Sensors, and Robotics in Society Book*: 1-16.

Conferences Poster/Talks

24. *Deep-Learning-based Outcome Prediction using Diffusion MR in Mild Traumatic Brain Injury Patients*, 41st Annual Symposium of the National Neurotrauma Society (NNS 2024).
23. *Early Detection of Intraductal Papillary Mucinous Neoplasm in the Pancreas using A Multi-channel Deep Convolutional Neural Network*, 2024 MIT/MGB AI Cures Conference
22. *Session: Navigating Bias in AI in Imaging and Medicine*, 2024 Society for Imaging Informatics in Medicine (SIIM) Conference
21. Session: Integration of LLMs in Radiology Clinical Workflow, 2024 Society for Imaging Informatics in Medicine (SIIM) Conference
20. *PRECISE Framework and Evaluation for Enhanced Radiology Reporting Using ChatGPT For Patient-Centered Care*, 2024 Society for Imaging Informatics in Medicine (SIIM) Conference
19. GPT-4 Self Assessment of Response Readability to Common Questions about Cancer Screening Imaging, 2024 Society for Imaging Informatics in Medicine (SIIM) Conference
18. *Domain-Specific Transfer Learning for Diabetic Retinopathy Classification in Resource-Constrained Settings*, 2024 National Conference on Undergraduate Research.
17. *Deep Learning-Based Natural Language Processing for Classification of Renal Surgical Pathology Outcomes in a Multi-Site Dataset*, 2024 National Conference on Undergraduate Research.
16. *Transfer Learning For Diabetic Retinopathy Classification In Resource-Constrained Settings*, 2024 AAAS Annual Meeting.
15. *A Coronavirus Cohort Case Study - Dataset Trends using Machine Learning Methods*, 2023 IEEE International Conference on Bioinformatics and Biomedicine (BIBM).
14. *PromptWise: Prompt Engineering Paradigm for Enhanced Patient-Large Language Model Interactions Towards Medical Education*, Radiological Society of North America 2023.
13. *Transforming Radiology with Large Language Models: Opportunities and Challenges*, Radiological Society of North America 2023.
12. *CASCADE: Context-Aware Data-driven AI for Streamlined Multidisciplinary Tumor Board Recommendations in Oncology*, 2023 ACR Quality and Safety + Informatics Conference.
11. *ChatGPT Enhanced Radiology Reporting using PRECISE Framework For Patient-Centered Care*, 2023 SIIM Conference on Machine Intelligence in Medical Imaging (CMIMI).

10. *Deep Learning-Based Natural Language Processing for Classification of Renal Surgical Pathology Outcomes in a Multi-Site Dataset*, 2023 SIIM Conference on Machine Intelligence in Medical Imaging (CMIMI).
9. *Deep-Learning Based Brain Age Deviation Index: A Neuroimaging Marker of Neurodegeneration Following mild-TBI,* 40th Annual Symposium of the National Neurotrauma Society.
8. *Deep Learning-based Automated Approaches for Diabetic Retinopathy Detection*,Research Grant Awardee, Week of Undergraduate Excellence Drexel 2023.
7. *Deep learning-based radiogenomics model for gene mutation prediction in lung cancer*,2023 Northeast Bioengineering Conference.
6. *OsteoNet: Deep Learning-based Early Detection of Osteosarcoma in Adolescents*, 2023 Northeast Bioengineering Conference.
5. *Deep learning-based Tumor Tissue Assessment for Osteosarcoma in Adolescents* , 2023 AAAS Annual Meeting.
4. *Deep-perturbations: Modeling Genetic and Chemical Perturbations Using Causally-Inspired GNNs*, Harvard Medical School (SIBMI), 2022.
3. *Turing Test Inspired Method for Analysis of Biases Prevalent in AI-Based Radiology*, Research Grant Awardee, Week of Undergraduate Excellence Drexel 2022.
2. *Going Back to the 1950s to Unveil the Future of AI in Radiology*, Drexel AI Symposium, 2022.
1. *Early Diagnostic Prediction of Covid-19 using Gradient-Boosting Machine Model*, Drexel AI Research Conference, 2021.

Skills

Languages – Proficient in Julia, Python, MATLAB, Linux, C
Libraries – Keras, NumPy, PyTorch, Theano, MedPy, Flux, Mocha.jl
Medical Imaging – EEG, MRI, fMRI, DICOM, CT, DTI, Nifti

Professional Positions

Staff Manager, The Triangle Newspaper
Hub Member, Kelly Writers House
Climate Leader, Climate Year, Academy of Natural Sciences of Drexel

Professional Membership

Member, Radiological Society of North America (RSNA)
Member, American College of Radiology (ACR)
Member,American Society of Clinical Oncology (ASCO)
Member, National Neurotrauma Society (NNS)
Member, Society for Imaging Informatics in Medicine (SIIM)
Member, American Association for the Advancement of Science (AAAS)
Member, Association for the Advancement of Artificial Intelligence (AAAI)
Member, American Society of Neuroradiology (ASNR)

References

Dania Daye, MD, PhD
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Massachusetts General Hospital (MGH)
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