

SAMARTH (SAM) RAWAL

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Physician-Computer Scientist completing Internal Medicine residency training at Mayo Clinic, with more than a decade of clinical AI research. Pursuing a career in both clinical practice and clinical AI innovation, using my technical and clinical background to help contribute to building AI systems that augment physicians.

EDUCATION

- **Resident Physician - Internal Medicine, Mayo Clinic Arizona**
 - June 2024 - May 2027, expected
- **MD, Carle Illinois College of Medicine, University of Illinois at Urbana-Champaign**
 - Graduated: May 2024
- **MS in Computer Science with concentration in Biomedical Informatics, Arizona State University**
 - Graduated: May 2020, GPA: 4.0/4.0
 - Thesis: *Multi-Perspective Semantic Information Retrieval in the Biomedical Domain* [<https://arxiv.org/abs/2008.01526>]
- **BS in Computer Science, Arizona State University**
 - Graduated: May 2018, GPA: 4.0/4.0
 - Honors Thesis: *Prescription Information Extraction from Electronic Health Records using BiLSTM-CRF and Word Embeddings* [<https://repository.asu.edu/items/48493>]

PROFESSIONAL EXPERIENCE

BEACON Lab, Mayo Clinic AZ

June 2024 – Present

- Member of the inaugural **Artificial Intelligence in Internal Medicine track at Mayo Clinic**.
- **Co-PI of \$100K Grant**. OSLER: An AI-Powered Clinical Reasoning Workspace for Graduate Medical Education. Awarded through Mayo Clinic-Arizona State University Alliance for Health Care
- Research focus:
 - Build, evaluate, and deploy **agentic LLM systems + tools** that fit into the clinical workflows to **augment clinician reasoning**, rather than replace it
 - Creation of **evaluation systems** that **better reflect real-world clinical decision-making challenges**, to better assess capabilities of frontier models in the medical domain

Varatharajah Lab at UIUC (Natural Language Processing in Medical Records Research)

Dec 2020 – May 2024

- Research focus:
 - Make **information deep within patient medical records more easily accessible and actionable** by applying zero/few-shot Artificial Intelligence-based techniques to EMRs in order to **answer clinical questions, intelligently filter and sort data, and automatically generate reports**.
- In addition to research papers, have **published open-source Clinical AI software packages and models** which have been **downloaded over 50,000 times** in the past 5 years
- Notable works from lab include **IEEE Signal Processing in Medicine and Biology Best Paper award** and collaborations with several medical institutions such as Mayo Clinic and Barrow Neurological Institute towards **building applied AI software to improve clinical workflow**

"Artificial Intelligence in Medicine" Certificate Continuing Medical Education Course

Dec 2020 – Sept 2021

- **Developed lectures** for course in the UIUC Department of Bioengineering – the course provides a technical overview of Machine Learning and Artificial Intelligence techniques and their application to clinical domain
- Led initiative for **incorporating Teaching Assistants into course** and served as first TA; helped first batch of students through completion of the course
- This class serves as a **Continuing Medical Education (CME) course** for physicians and healthcare workers

Cognition and Intelligence Lab at ASU (Natural Language Processing Research)

Jan. 2015 – July 2020

- The overarching theme of my research under Dr. Chitta Baral was to **leverage Natural Language Processing across biomedical & clinical data** (like Electronic Medical Records) to make actionable decisions that **improve efficiency of healthcare delivery**

- o **ASU team leader for several Clinical NLP Challenges**, including **Harvard National NLP Clinical Challenge** (n2c2); team placed **#1 out of 47 teams** in n2c2 2018 Track 1 Challenge
- o **Led Clinical NLP Graduate Engineering projects** – guided about 20 Computer Science MS and PhD students from ideation to completion of academic NLP research projects in the clinical domain
- o Collaborated with institutions such as Mayo Clinic and King's College Hospital in London to **design and integrate AI systems** into data and documentation pipelines

Center for Innovation AI Researcher at Mayo Clinic, Rochester, MN, USA

July 2018 – June 2020

- o Integration of **AI-powered system to assist Mayo Clinic Oncology department workflows** that brings creation time of Cancer Survivorship Care Plan documents by nurses down from ~1 hour to a couple of minutes.
- o Worked with oncologists at the Mayo Clinic to develop a system that **automatically extracts data** from various locations in Electronic Medical Records to **auto-generate patient reports** using Natural Language Processing techniques, something that is currently done completely manually by nurses.

Bioinformatician at Translational Genomics Research Institute (TGen), Phoenix, AZ

Jun 2016 – Jun 2017

- o Developed GeneData, a sophisticated Virtual Reality data visualization program to help doctors clearly and intuitively visualize large amounts of patient genomic information during cancer treatments.
- o Tool used by ASU Biomedical Informatics Department as a demonstration of clinical technology in BMI courses

Software Architecture Intern at Dell CTO Office, Austin, TX

May 2017 – Aug 2017

- o Worked in the Office of the Chief Technology Officer (CTO) on developing consumer technology 2-5 years from commercial deployment
- o Developed software for voice assistants like Amazon Alexa to help users communicate with their PCs intuitively
- o Presented work to a board of Dell technical and executive management, including the **Chief Technology Officer**

SELECTED PUBLICATIONS & PRESENTATIONS

Full publication list on [Google Scholar](#). Highlighted publications marked with []*

- o **AI in Geriatric Medicine and Serious Illness Care.** S. Rawal and A. A. Shah. Current Geriatrics Reports, 2025.
- o [*] **[preprint] MIRIAD: Augmenting LLMs with Millions of Medical Query-Response Pairs.** Q. Zheng, S. Abdullah, S. Rawal, C. Zakka, S. Ostmeier, M. Purk, E. Reis, E. J. Topol, J. Leskovec, and M. Moor. *arXiv (cs.CL)*, 2025.
- o [*] **[grant] \$100K Grant. OSLER: An AI-Powered Clinical Reasoning Workspace for Graduate Medical Education.** Co-PI. Awarded through the 2026 Mayo Clinic–Arizona State University Alliance for Health Care.
- o [*] **SCORE-IT: A Machine Learning Framework for Automatic Standardization of EEG Reports.** S. Rawal, Y. Varatharajah. 2021 IEEE Signal Processing in Medicine and Biology Symposium (SPMB) – **🏆 Best Paper Award**
- o [*] **Evaluating Latent Space Robustness and Uncertainty of EEG-ML Models under Realistic Distribution Shifts.** N. Wagh, J. Wei, S. Rawal, B. Berry, Y. Varatharajah. NeurIPS 2022.
- o **[preprint] Assessing Robustness of EEG Representations under Data-Shifts via Latent Space and Uncertainty Analysis.** N. Wagh, J. Wei, S. Rawal, B. M. Berry, and Y. Varatharajah. *arXiv*, 2022.
- o **[preprint] SCNER: Scoring Negative Candidates Before Training Neural Re-Ranker for Question Answering.** M. Luo, M. Parmar, J. S. Mahendran, S. Jain, S. Rawal, and C. Baral. *OpenReview*, 2022.
- o **Domain-guided Self-supervision of EEG Data Improves Downstream Classification Performance and Generalizability** N Wagh, J Wei, S Rawal, et. al. Machine Learning for Health 2021.
- o **Tensor Decomposition of Large-scale Clinical EEGs Reveals Interpretable Patterns of Brain Physiology.** T. Gupta, N. Wagh, S. Rawal, B. Berry, G. Worrell, Y. Varatharajah. Accepted to 11th International IEEE EMBS Conference on Neural Engineering (NER'23)
- o [*] **[MS Thesis] Multi-Perspective Semantic Information Retrieval in the Biomedical Domain.** S. Rawal. *MS Thesis*, 2020.
- o **Novel evidence synthesis system to support living systematic reviews and living guidelines for cancer immunotherapy.** IB. Riaz, S. Rawal, R. Siddiqi, et. al. Journal of Clinical Oncology, 2020.
- o **Innovation in Evidence Synthesis: A Living Systematic Review of Immune Checkpoint Inhibitors in Cancer Patients.** I. B. Riaz, S. C. Rawal, R. Siddiqi, N. Asghar, M. Akhtar, O. Gajic, Z. Wang, V. Montori, V. Herasevich, R. S. Go, C. Baral, S. V. Rajkumar, and M. H. Murad. *Journal of Global Oncology*, 2019.
- o **Semi-automated clinical lexicon induction and its use in cohort selection from clinical notes.** S. Rawal, A. Prakash, S. Adhya, S. Kulkarni, S. Anwar, C. Baral, M. Devarakonda. 2020 IEEE International Conference on Healthcare Informatics (ICHI).

- o **Identification of Adverse Drug Reaction Mentions in Tweets—SMM4H Shared Task 2019.** [S. Rawal](#), S. Rawal, S. Anwar, & C. Baral. Proceedings of the Fourth Social Media Mining for Health Applications Workshop. 2019.
- o **[BS Thesis] Prescription Information Extraction from Electronic Health Records Using BiLSTM-CRF and Word Embeddings.** [S. Rawal](#), A. Saadat, and C. Baral. BS Thesis, Arizona State University, 2018.
- o **Selected Posters and Presentations:**
 - **CAPE-Bench: Clinical Actions & Planning Evaluation Benchmark** – Poster at Mayo Clinic AI Summit, Rochester, MN 2025. [S. Rawal](#), et al.
 - **SCORE-IT: A Machine Learning Framework for Automatic Standardization of EEG Reports** – Carle Illinois College of Medicine Research Day, 2021. [S. Rawal](#), Y. Varatharajah.
 - **Semantic Search of Medical Records** – Carle Illinois College of Medicine IDEA Course, 2022. [Samarth Rawal](#); Abigail Adams, MD; April Yasunaga, MD; Ujjal Mukherjee, PhD.
 - **Semi-automated clinical lexicon induction and its use in cohort selection from clinical notes** – Phoenix Symposium on Data Analytics in Healthcare at University of Arizona School of Medicine, 2019. [S. Rawal](#) et al.
 - **Uncovering insights about effective palliative care via Machine Learning methodology applied to city-level data** – PLuS Alliance Symposium at King's College Hospital, London, UK, 2019. [S. Rawal](#), A. Mitra, C. Baral.
 - **BioParser: A Knowledge Parser for Biomedical Text.** [S. Rawal](#), A. Sharma, and C. Baral. Poster presentation, Fulton Undergraduate Research Initiative Symposium, Tempe, AZ, 2015.
 - **Improving and Evaluating the BioParser: A Knowledge Parser for Biomedical Text.** [S. Rawal](#), A. Sharma, and C. Baral. Poster presentation, Fulton Undergraduate Research Initiative Symposium, Tempe, AZ, 2016.

SELECTED SOFTWARE

- o **Osler (getosler.com)** - Creator and Lead Developer: A workspace and copilot for physicians to augment the process of developing clinical plans, tracking ongoing care, and improving notes. \$100K Grant recipient.
- o **Pearls (samrawal.com/pearls)** - Creator: An app for capturing clinical pearls while on rounds or studying, with built-in AI agent that can automatically fetch additional context, latest guidelines, and augment the pearl.
- o **Clinitokenizer ([GitHub](https://github.com))** - Creator: BERT-based tokenization package (model + inference software) designed for sentence tokenization of poorly-formatted medical notes. Core model with over 50,000 downloads.

AWARDS AND ACHIEVEMENTS

- o **Best Paper Award at 2021 IEEE Signal Processing in Medicine and Biology Symposium (SPMB)**
 - Best Paper out of 35 accepted and presented papers
 - *SCORE-IT: A Machine Learning Framework for Automatic Standardization of EEG Reports.* [S. Rawal](#), Y. Varatharajah. 2021 IEEE Signal Processing in Medicine and Biology Symposium (SPMB).
- o **#1 in Harvard National NLP Clinical Challenge (n2c2) out of 47 teams total**
 - ASU team leader for n2c2 2018 Track 1 competition
 - Built a system to flag potential patients for 13 different clinical trials based off their clinical records with over 90% accuracy
- o **#1 at Clinton Global Initiative University (CGI-U) 2017 Codeathon**
 - Ideated and developed Patient Record Access Network (PRAN), a low-cost hardware and software package to address the issue of lack of reliable patient identification methods in rural India.
- o **Arizona State University Dean's List:** Fall 2014 – Spring 2018 (8 semesters); graduated Summa Cum Laude (B.S.)

MUSIC

- o **Hindustani Classical Music (2003 – Present) – Vocal and Tabla**
 - **Visharad Degree (equivalent to Bachelor's Degree) in Hindustani Classical Vocal Music** - Awarded by the Indian Institute of Classical Music, following 10 years of intensive training and performances in classical vocal music
 - **Accomplished player of Tabla (North Indian drum instrument)** – accompanied various artists in 20+ public performances over the past ten years. Studied Tabla for 13 years under a senior disciple of Ustad Alla Rakha, one of the most revered, eminent Tabla artists of all time.

- Have given over 30 Indian classical and light vocal and instrumental public performances over the past 10 years

INSTRUCTOR AND TA EXPERIENCE

- o **Course Development & Teaching Assistant; AI in Medicine Certificate CME Course, UIUC** (Summ 2021 – Fall 2021)
 - Helped create lectures and served as TA for course with UIUC Dept of Bioengineering that served as a Continuing Medical Education (CME) course for physicians and healthcare workers
- o **Instructor for FSE 100 – Introduction to Engineering** undergraduate course at ASU (Fall 2018 – Fall 2020)
 - Responsible for creating and presenting weekly lectures and running weekly labs, as well as student grading
- o **Teaching Assistant for CSE 576 – Natural Language Processing** graduate course at ASU (Fall 2018 – Spring 2020)
 - Responsible for developing class projects and working with student teams throughout the project, along with grading
- o **Math Tutor** at ASU's University Academic Success Programs (UASP) (2015-2016)
 - Worked at the largest math tutoring center among ASU campuses and focused on helping students on a variety of math courses, ranging from Calculus to Discrete Math to Applied Linear Algebra