Ketan Suhaas Saichandran

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EDUCATION

Boston University Boston, MA, USA
MS in Artificial Intelligence — **GPA: 3.96/4.00** September 2023 — May 2025
Thesis: Active feature acquisition for efficient & transparent medical diagnoses — *Advisor: Dr. Vijaya B. Kolachalama*

Indian Institute of Technology Roorkee Roorkee, India
B.Tech in Electrical Engineering — **CGPA: 8.65/10.00** July 2019 — July 2023

RESEARCH EXPERIENCE

Kolachalama Lab, Boston University Boston, MA, United States
Staff Scientist, Boston University School of Medicine—PI: Dr. Vijaya B. Kolachalama June 2025 — Present

- Led the development of a multi-agent system for scientific discovery in Alzheimer's disease, where specialized agents autonomously generate and test hypotheses by writing and executing code, orchestrating data analysis, and synthesizing literature.
- Developed a graph attention transformer–based vision-language model for visual-question-answering on neuropathology whole slide images, trained on **40,000+** labeled images from Boston Medical Center.
- Contributed to multiple projects including a curriculum learning-based training method for transformer models, improving average performance by **2-3%** across all feature missingness combinations, and a hierarchical active learning framework for clinical trials using reinforcement learning (under development).
- Contributed to manuscript writing, with publications in top venues including ICML 2025, and ongoing work targeting *Nature Medicine*.

Graduate Researcher—PI: Dr. Vijaya B. Kolachalama September 2023 — May 2025

- Introduced a state-of-the-art active feature acquisition (AFA) framework using explainable AI rankings as supervisory signals for decision-making networks, achieving **1-10%** improvement in accuracy across **9 datasets**.
- Developed CMIRL, a novel AFA method using information-theoretic metrics to guide reinforcement learning, achieving **2-3%** improvement in accuracy as part of master's thesis research.
- Built LLM systems to enable AI-augmented, interactive medical diagnoses supporting physicians in real time, achieving **10-20%** better accuracy than baseline models in predicting mixed dementia etiologies, contributing to a large-scale multimodal medical LLM project through medical data processing and LLM post-training.

Deepti Research Group, Boston University Boston, MA, United States
Graduate Researcher—PI: Dr. Deepti Ghadiyaram Sept 2024 — May 2025

- Led the development of SCoPE, a novel method to enhance alignment in diffusion models for complex scene generation, introducing a dynamic text-conditioning mechanism inspired by human artistic processes that refines coarse to fine during diffusion.
- Designed and conducted extensive experiments demonstrating that SCoPE outperforms Stable Diffusion on **83%** of benchmark samples, using mathematical methods for scheduling interpolation on the CLIP hypersphere to achieve smoother semantic transitions.
- Work accepted for oral presentation at a CVPR 2025 Workshop.

Banaji Implicit Social Cognition Lab, Harvard University Cambridge, MA, United States
Research Assistant—PI: Prof. Mahzarin Banaji May 2024 — May 2025

- Discovered alarming humanlike cognitive dissonance patterns in LLMs with effect sizes ($\mathbf{d = 2.164, 1.795, 3.775}$) significantly larger than those observed in humans, revealing that GPT-4o shows irrational decision-making patterns moderated by free choice ($\mathbf{P < 0.001}$) across **900+** experimental trials, and developed automated pipelines for multi-turn batch-processing on LLMs for research experiments.
- Contributed to manuscript writing and rebuttals, resulting in a publication and a reply letter in *PNAS*.
- Mentored an undergraduate thesis investigating complex biases in the GPT-Image-1 image generator.

Machine Learning Lab, Electrical Engineering Department, IIT Roorkee Roorkee, India
Undergraduate Researcher—PI: Dr. Ambalika Sharma August 2022 — May 2023

- Analyzed the nnU-Net architecture, validating its performance benchmarks for segmentation of cardiac MR images.
- Assisted with the training and performance analysis of Attention-guided residual W-Net, which attained comparably high dice coefficient values, reaching **0.94**.

PUBLICATIONS & PRE-PRINTS

1. **Saichandran, K. S.**, Elzokm, K., Guney, O. B., & Kolachalama, V. B. (2025). Agentic AI for automated hypothesis testing in Alzheimer's disease and related dementias. *Alzheimer's & Dementia* (under review). `https://www.medrxiv.org/content/early/2025/12/04/2025.12.02.25341517`
2. Lehr, S. A., **Saichandran, K. S.**, Harmon-Jones, E., Vitali, N., & Banaji, M. R. (2025). Reply to Cummins et al.: GPT reveals cognitive dissonance that is both irrational and alarmingly humanlike. *Proceedings of the National Academy of Sciences, USA*, *122*(20), e2501823122. `https://doi.org/10.1073/pnas.2518613122`
3. Singla, P., Singh, A., Garg, S., **Saichandran, K. S.**, & Garg, I. (2025). Thinking About Thinking: Evaluating Reasoning in Post-Trained Language Models. *ACL* (to be submitted). `https://arxiv.org/abs/2510.16340`
4. **Saichandran, K. S.**, Guney, O. B., Elzokm, K., & Kolachalama, V. B. (2025). Conditional mutual information-guided reinforcement learning for active feature acquisition. *IEEE Transactions on Artificial Intelligence* (under review).

5. Guney, O. B., **Saichandran, K. S.**, Elzokm, K., Zhang, Z., & Kolachalama, V. B. (2025). Active feature acquisition via explainability-driven ranking. *International Conference on Machine Learning (ICML)*. https://icml.cc/virtual/2025/poster/45710
6. **Saichandran, K. S.**, Thomas, X., Kaushik, P., & Ghadiyaram, D. (2025). Progressive prompt detailing for improved alignment in text-to-image generative models. *AI for Content Creation Workshop, Conference on Computer Vision and Pattern Recognition (CVPR)*. https://arxiv.org/abs/2503.17794 (oral presentation)
7. Lehr, S. A., **Saichandran, K. S.**, Harmon-Jones, E., Vitali, N., & Banaji, M. R. (2025). Kernels of selfhood: GPT-4o shows humanlike patterns of cognitive dissonance moderated by free choice. *Proceedings of the National Academy of Sciences, USA*, *122*(20), e2501823122. https://doi.org/10.1073/pnas.2501823122
8. **Saichandran, K. S.** (2024). A Comparative Analysis of U-Net-based models for Segmentation of Cardiac MRI. *arXiv preprint*. https://arxiv.org/abs/2401.09980

TALKS & PRESENTATIONS

International Conference on Machine Learning (ICML) — Vancouver, Canada
Poster presentation — July 15th, 2025

AI for Content Creation Workshop, Computer Vision and Pattern Recognition (CVPR) — Nashville, TN
Oral & poster presentation — June 12th, 2025

3rd Workshop on Generative Models for Computer Vision, CVPR — Nashville, TN
Poster presentation — June 11th, 2025

Graduate School of Arts & Sciences, Boston University — Boston, MA
Master's Thesis Defense — May 17th, 2025

TEACHING EXPERIENCE

Faculty of Computing & Data Sciences, Boston University — Boston, MA, United States
Teaching Assistant — DS 320: Algorithms for Data Science — January 2024 — April 2024

- Customized course curriculum aimed at enhancing students' competitive programming skills.
- Conducted discussions, facilitated office hours, assessed assignments, and helped with student questions online/offline.
- Designed and organized additional assignments and interactive sessions to support students.

HONORS AND ACHIEVEMENTS

- **Agentic AI Prize for Alzheimer's Disease Research (2025)**
  Selected as one of the **Top 10 Finalists** worldwide in the ADDI Agentic AI Prize for ADRD Research.
- **International Collegiate Programming Contest (ICPC) – Asia Regionals (2021)**
  Represented **IIT Roorkee** at the Asia Regional Contest.
- **International Collegiate Programming Contest (ICPC) – Asia Regionals (2020)**
  Represented **IIT Roorkee** at the Asia Regional Contest.
- **JEE Advanced 2019 (AIR 1640) – FIITJEE Award**
  Achieved an **All India Rank 1640** among 250,000+ candidates selected from JEE Main; awarded a 100,000 INR merit prize.
- **JEE Main 2019 (AIR 1390)**
  Secured an **All India Rank 1390** among 1.2M+ candidates.
- **KVPY Scholar 2018 (AIR 1237)**
  Achieved **AIR 1237** in KVPY, securing admissions to India's top research institutes.
- **Indian National Physics Olympiad (INPhO) – 2019**
  Qualified for INPhO after securing top 0.75%ile in National Standard Examination in Physics (NSEP).

INDUSTRY EXPERIENCE

Clairyon — CA, United States
AI Engineer — May 2025 — Present

- Built and deployed predictive diagnostic models integrated with EHR systems via FHIR on AWS with **24/7** availability, currently working with UCSD Health through Clairyon (founding team from UCSD), scaling to serve **50k+** patients.
- Contributed to a prompt-based AI agents platform with FHIR MCP tools to access EHR data, enabling **20+** specialized automation agents for clinical reports, discharge summaries, quality measures for **10+** diseases/emergencies, and clinical documentation, achieving **3x** speedup and **80%** accuracy in readmission risk prediction based on EHR data.
- Designed the backend for a triage app that collects and summarizes patient data pre-visit through interaction, significantly speeding up information acquisition and increasing patient inflow.

NourishedRx — Stanford, CT, United States
AI Engineer Intern — May 2024 — August 2024

- Developed and deployed **3** AI-powered applications and LLM automation workflows, including *AskBetty* chatbot using AWS Bedrock and RAG for personalized health insights, and LLM agents for automated querying of BigQuery and FHIR data sources, serving **1,000+** users.
- Deployed scalable backend infrastructure with AWS Lambda REST APIs and cloud monitoring, ensuring **99.9%** uptime and seamless integration across systems.

- Automated Amazon Connect call transcription and summarization via AWS Bedrock LLMs, processing **500+** calls monthly and streamlining clinical documentation and patient note generation, reducing documentation time by **50%**.

Slice Bengaluru, Karnataka, India
Software Development Engineer Intern May 2022 — July 2022

- Designed and optimized RESTful APIs in Java Spring Boot for Juspay payment integration, developing **3+** critical endpoints for order creation, status retrieval, and payment authentication, handling **10M+** transactions monthly.
- Ensured high-throughput and low-latency performance, processing millions of transactions with **sub-100ms** response times and **99.9%** uptime.
- Collaborated with front-end, DevOps, and security teams to enhance payment reliability, reducing transaction failures by **15%** through improved error handling and retry logic, improving overall system reliability.

SELECTED PROJECTS

Zero-shot EEG classification September 2024 — Jan 2025
Kolachalama Lab, Boston University

- Developed a zero-shot classification framework enabling inference with any new EEG channel without retraining.
- Conceptualized that trained channel embeddings lie on a manifold resembling physical scalp positions, enabling geometric interpolation.
- Introduced a training method using channel embedding interpolation for zero-shot inference, eliminating the need for channel-specific training.

Gesture Controller February 2024 — April 2024
CS 585: Image and Video Computing

- Created a pioneering gesture-based video-game controller package for RPG, FPS, and Racing games, designing custom gestures that sync with real movements (walking, steering, striking, blocking).
- Optimized code to process movement of every body landmark and recognize custom gestures with high accuracy.
- Developed user interface to map gestures to keyboard keys, enabling seamless game control.

OPEN-SOURCE CONTRIBUTIONS

- **AWS Strands Agents** PR: Contributed to a major PR that introduces new functionalities to fetch and list the prompts from MCP servers.

TECHNICAL SKILLS

- **Programming Languages:** Python, C++, SQL, JavaScript, TypeScript
- **Tools/Software:** Anaconda, VS Code, Git, Docker, Terminal, WandB
- **AI Techniques:** QLoRA, CLIP, VLMs, RAG, RLHF, Quantization, LoRA, Attention, Agentic AI
- **Full-Stack Development:** ReactJS, NodeJS, Git, Docker, Gradio, Streamlit, AWS Bedrock, GCP Vertex AI, Lambda, Amplify, ReactJS, NodeJS, Spring Boot, Kubernetes, BigQuery, FHIR, AWS, GCP, Kubernetes
- **AI tech stack:** vLLM, Langchain, LlamaIndex, Pinecone, HuggingFace, MCP, unsloth, PyTorch, PyTorch Lightning, CUDA, TorchServe, Keras, TensorFlow, FastAI, Scikit-learn, OpenCV, Mastra