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
Research Scientist 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 literature synthesis.
- Developed a **graph attention transformer–based vision-language model** for **neuropathology**, pretrained with **JEPA**.
- Built LLM systems to enable AI-augmented, **interactive medical diagnoses** supporting physicians in real time.
- Contributing to a hierarchical active learning framework for **clinical trials** and discovery.
- Contributed to a **multimodal** medical LLM project, including large-scale medical data curation and LLM post-training.
- Contributed to manuscript writing, with publications in top venues such as **ICML**, and ongoing work targeting ***Nature Medicine*** & ***Nature Communications***.

Graduate Researcher September 2023 — May 2025

- Introduced an explainability-driven **active feature acquisition (AFA**) framework, achieving **1-10%** improvement in performance.
- Developed a novel method for AFA by using information theoretic metrics to guide reinforcement learning, showing **2-3%** improvement.
- Designed a **zero-shot classification** framework for new EEG channels and introduced a novel training strategy.
- Contributed to a large-scale **multimodal medical LLM** project by processing large-scale medical data and LLM post-training.

Deepti Research Group, Boston University Boston, MA, United States
Graduate Researcher Sept 2024 — May 2025

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

Banaji Implicit Social Cognition Lab, Harvard University Cambridge, MA, United States
Research Assistant May 2024 — May 2025

- Discovered alarming **humanlike cognitive dissonance** patterns in **LLMs**, with a larger effect size than humans.
- Developed automated pipelines for multi-turn batch-processing on LLMs for research experiments.
- Mentored an undergraduate thesis investigating complex biases in the GPT-Image-1 image generator.
- Co-founded SHASM (The Science of Human and Artificial Social Minds) as a researcher.
- Contributed to **manuscript writing and rebuttals**, resulting in a publication and a reply letter in ***PNAS***.

Machine Learning Lab, Electrical Engineering Department, IIT Roorkee Roorkee, India
Undergraduate Researcher 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.**, Guney, O. B., Elzokm, K., & Kolachalama, V. B. (2025). Multi-agentic AI for data-driven discovery in Alzheimer's disease and related dementias. *To be submitted to Nature Communications.*
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 *AAAI Conference on Artificial Intelligence (AAAI)*. `https://arxiv.org/abs/2510.16340`. (under review).
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** in the global Agentic AI Prize for Alzheimer's Disease and Related Dementias (ADRD) Research, organized by the Alzheimer's Disease Data Initiative (ADDI).
- **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**
  Secured an **All India Rank (AIR) of 1640** out of more than 250,000 students selected from JEE Main, and received a cash prize of 100,000 INR.
- **JEE Main 2019 (AIR 1390)**
  Secured an **All India Rank (AIR) of 1390** out of more than 1,200,000 students in the national-level Physics, Chemistry, and Mathematics entrance examination.
- **KVPY Scholar 2018 (AIR 1237)**
  Secured an **All India Rank (AIR) of 1237** in the Kishore Vaigyanik Protsahan Yojana (KVPY) exam (Physics, Chemistry, and Mathematics), earning admission offers from top research institutions in India.
- **Indian National Physics Olympiad (INPhO) – 2019**
  Ranked in the **Top 10 in the State** in the National Standard Examination in Physics (NSEP) and qualified for the Indian National Physics Olympiad (INPhO).

INDUSTRY EXPERIENCE

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

- Built and deployed **predictive diagnostic models** integrated with **EHR systems** via **FHIR**.
- Created **automation agents** to generate clinical reports, summaries, and documentation.
- Designed a **prompt-based AI platform** with a UI to add and track prompt versions.
- Enabled easy extension to new **diseases** and **clinical tasks** using shared tools and workflows.
- Contributed to a **triage app** that collects and summarizes patient data pre-visit.
- Deployed secure, scalable systems on **AWS** across multiple hospitals.
- Working with **UCSD Health** through **Clairyon**, a UCSD-led clinical AI initiative.

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

- Developed and deployed **Generative AI applications** and **LLM automation workflows** to enhance efficiency and user experience.
- Built *AskBetty*, an AI chatbot using **AWS Bedrock**, **RAG**, and **ReactJS** for personalized health insights.
- Engineered **LLM agents** for automated querying of **BigQuery** and **FHIR** data sources.
- Deployed scalable backends with **AWS Lambda REST APIs** for seamless integration.
- Automated **Amazon Connect** call transcription and summarization via **AWS Bedrock LLMs**.
- Streamlined clinical documentation and patient note generation through AI-driven workflows.

- Managed cloud deployment and monitoring on **AWS** for scalability, reliability, and security.

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.
- Developed endpoints for **order creation**, **status retrieval**, and **payment authentication**.
- Ensured high-throughput and low-latency performance for all payment operations.
- Collaborated with **front-end**, **DevOps**, and **security teams** to enhance payment reliability.

UNIVERSITY EXPERIENCE

Outreach Cell, IIT Roorkee Roorkee, India
Member Oct 2020 — Oct 2021

- Volunteered within the Outreach Cell at IIT Roorkee, a student-led initiative operating under the purview of the Dean of Students' Welfare, IIT Roorkee. Assumed a pivotal role in facilitating connections between the external world and the distinctive culture and ethos of IIT Roorkee.

Esports IITR, IIT Roorkee Roorkee, India
Co-founder Dec 2020 — May 2023

- Co-founded a gaming group for students and organized university-level events that improved our visibility in the national-wide gaming communities.

Watch Out!, IIT Roorkee Roorkee, India
Multimedia Editor Oct 2020 — Oct 2021

- Shot, edited and designed multiple media releases, hosted several events on campus for our student media body at IITR.

NSO, IIT Roorkee Roorkee, India
Tennis Team Member Oct 2019 — May 2023

- Participated in and organized tennis competitions and represented IIT Roorkee.

Music Section, IIT Roorkee Roorkee, India
FOS Member Oct 2019 — May 2023

- Participated in and hosted multiple Friends of Section (FOS) shows as a pianist and singer.

PROJECTS

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

- Developed a framework that can zero-shot classify with any new EEG channel during inference.
- Conceptualized that trained channel embeddings lie on a manifold resembling physical positions on the scalp.
- Introduced a training method by interpolating between channel embeddings for zero-shot inference with new EEG channels.

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.
- Optimized the code heavily to consider the movement of every landmark on the body and process the custom gestures.
- Designed gestures that sync with real movements - Walking on the spot, holding the steering wheel, striking and blocking.
- Developed a user-interface to map gestures to keys on the keyboard.

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