Sindhu Ramachandra

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Data Science and AI Research Associate at Codio, working on Product Research and Design for Ed-tech. Building AI skills to move into computational biochemistry, with protein folding as my main focus.

EXPERIENCE

Data Science and AI Research Associate Jan 2025 – Present
Codio

- Work on product research and design for Codio's ed-tech learning platform.
- Work with LLMs and LLM evaluations (evals) for AI-assisted learning tools.
- Build with MCP servers and JavaScript-based extensions and plugins.

Data Science Research Intern Sep 2024 – Dec 2024
Codio

- Built extensions that use LLMs to assist Computer Science teachers.
- Collected and analysed a custom dataset of bot usage.
- Designed learning analytics for the Codio user interface.

Data Science Intern Sep 2023 – Dec 2023
Unified Mentor

- Built a YOLOv8 lane detection model (91.6% precision, tested on COCO) with real-time traffic density estimation.
- Built a custom search engine on the Google Search API that ranks results by content quality and filters sponsored pages with Beautiful Soup.

Project Trainee, Materials Engineering Jan 2020 – Aug 2020
IISc Bangalore

- Built microbial biosensors to detect heavy metals in water.

Research Trainee, Molecular Biophysics Unit Oct 2017 – Dec 2019
IISc Bangalore

- Purified proteins by SEC chromatography, HPLC, Ion-exchange chromatography and MALDI-TOF, and determined protein structures by NMR spectroscopy.

PUBLICATIONS

[1] **One Workflow to Grade Them All: LLM-Enabled Auto-grading for Comprehensive, Personalized Feedback.** 2026 ASEE Annual Conference & Exposition, Charlotte, NC. peer.asee.org/60347
An LLM workflow that derives rubric-like criteria from existing auto-graders and uses them to grade code. Across 70 Python exercises and thousands of submissions it agreed closely with the existing auto-graders and added test-case-level feedback.

[2] **Investigating the Impact of Codio Coach: A Specialized AI Learning Assistant on Computing Student Engagement and Performance.** 2025 ASEE Annual Conference & Exposition, Montreal, Canada. doi:10.18260/1-2–56896
A study of Codio Coach (assignment summaries, error explanations and hints) in MOOC-style computer science courses. Assignments with Coach enabled showed a 12% increase in mean grade and a 15% increase in median grade.

SKILLS

- **LLMs and AI:** LLM evaluations, prompt engineering, MCP servers, generative AI (GANs, attention mechanisms, transformers)
- **Software:** Python (OOP, data structures and algorithms, web scraping), JavaScript extensions and plugins
- **Machine learning:** supervised and unsupervised learning, feature engineering, SVM, decision trees, random forests; deep learning (ANN, CNN, RNN, computer vision)
- **Data and NLP:** statistical modelling, probability, tokenization, TF-IDF, sentiment analysis
- **Product:** product research and design for ed-tech
- **Lab:** protein purification, chromatography, MALDI-TOF, NMR spectroscopy, microbiology

PROJECTS

Covid-19 mRNA Analysis
Python, Biopython, EDA

Analysed NIH data on coronavirus variants to trace global spread, then aligned Delta and Omicron mRNA sequences with Biopython to find the mutation site in Delta that led to Omicron.

CNN Classifier
Python, TensorFlow, Keras

Built a Sequential convolutional network with Conv2D, max-pooling and dense layers, using ImageDataGenerator augmentation to improve generalisation.

ACADEMIC RESEARCH PROJECTS

Recombinant Expression and Purification of Cytochrome b5–Mo3964
Project guide: Siddhartha P. Sarma, Molecular Biophysics Unit, IISc Bangalore

Recombinantly expressed Mo3964, an M-superfamily conotoxin peptide from the cone snail *Conus monile*, as a fusion with cytochrome b5 and purified the fusion protein.

Papain Ameliorates Imiquimod-Induced Psoriatic-Like Skin Inflammation in Mice
Project guide: Dr. R. Rajesh, Department of Studies in Molecular Biology, University of Mysore

Showed anti-psoriatic activity of papaya peel extract and purified papain using MMP activity assays, western blotting for MAPK activation and skin histopathology.

Dissertation: Psychoneuroimmunology – Stress, Microglial Activation and Alzheimer's
Supervisor: Dr. B. S. Vishwanath, Department of Studies in Biochemistry, University of Mysore

Reviewed how chronic stress raises glucocorticoids, which can remodel microglia and drive pro-inflammatory cytokine release, worsening neurodegenerative diseases such as Alzheimer's.

EDUCATION AND CERTIFICATIONS

M.Sc. in Biochemistry 2015 – 2017
University of Mysore *Cumulative GPA: 8 (on a 10-point scale)*

B.Sc. in Biochemistry, Microbiology, Biotechnology 2012 – 2015
JSS College for Women *Graduation percentage: 79%*

Learnbay certifications: Generative AI course (2023); Python programming (2022); Statistics and Machine Learning (2022).

Apprentice, Data Science July 2022 – Aug 2023
Learnbay

- Forecast daily sales for 1,115 drug stores with linear regression (R-squared of 0.9) after data cleaning, EDA and statistical analysis.
- Built a Hotstar review sentiment classifier (TF-IDF and Naive Bayes, 79% accuracy) on data scraped with Beautiful Soup.