SHREYAS SUNDARA RAMAN

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COMPUTER SCIENCE (Artificial Intelligence & Data Science Specialization)

Interested in enabling autonomous agents to better use multimodal feedback by combining vision, NLP, RL

EDUCATION

Brown University, Rhode Island, U.S.A — *September 2019 - December 2023*
ScB. Computer Science; Senior
GPA: 4.0/4.0

Computer Science Courses	*My Average*	*Letter Grade*
CSCI0150 : Introduction to Object-Oriented Programming	94.8%	A
CSCI0160 : Introduction to Algorithms & Data Structures	94.2%	A
CSCI1870 : Cybersecurity & Ethics	N/A	A
CSCI0330 : Introduction to Computer Systems	95.5%	A
CSCI1470 : Deep Learning	99.6%	A
CSCI1420 : Machine Learning	99.1%	A
CSCI1951A : Data Science	96.6%	A
CSCI0220 : Introduction to Discrete Structures & Probability	106.5%	A
CSCI1970 : Independent Study [Prof. Thomas Serre]	N/A	A
CSCI1430: Computer Vision	102%	A
CSCI2951F: Learning & Sequential Decision Making [grad level]	100%	A
CSCI2951X: Reintegrating AI [grad level]	N/A	A
CSCI1460: Computational Linguistics	98.9%	A
CSCI1805: Computers, Privacy & Freedom	N/A	A
CSCI1970: Independent Study [Prof. Stefanie Tellex]	N/A	A
CSCI1951R: Introduction to Robotics	N/A	A
CSCI1600: Real-time & Embedded Software	N/A	A

Engineering & Mathematics Courses	*My Average* | *Class Average*	*Letter Grade*
ENGN0030 : Introduction to Engineering	99.9% | 89.7%	S_D [S/NC]
ENGN0040 : Dynamics & Vibrations	95.2% | 85.6%	A
MATH0200 : Multivariable Calculus	93.8% | 88.1%	A
MATH0520 : Linear Algebra	98.9% | N/A	A
APMA0350 : Applied Ordinary Differential Equations	97.7% | 93.3%	A
APMA1650 : Statistical Inference I	95.6% | N/A	A

Additional Courses	*My Average* | *Class Average*	*Letter Grade*
LITR0110B : Poetry I	-	S [S/NC]
EEPS0810 : Planetary Geology	94.5% | 82.2%	S_D [S/NC]

S_D = distinction in satisfactory/no-credit courses | N/A = *project-based* courses or where *class average* not calculated

Dubai International Academy, Dubai, U.A.E. — *September 2009 - May 2019*
International Baccalaureate Diploma Program
Subjects: Mathematics HL, Physics HL, Chemistry HL, English SL, Spanish B SL, Geography SL; Extended Essay in Physics
Final IB Score: 44/45

Academic Accomplishments

Valedictorian, Class of 2019: IB DP Examinations (44/45 across 6 subjects)	*June 2019*
Academic Achiever of the Year, 11th Grade	*June 2018*
Valedictorian, Class of 2017: IB MYP Examinations (56/56 across 8 subjects)	*June 2017*
GATEWAY (gifted student program): Student of the Year	*June* 2016

Additional Academic Background

ACT with writing (34/36)	*July 2018*
Subject SATs: Math II SAT (800/800) | Physics SAT (800/800)	*August 2018*
Breakthrough Junior Challenge *(Khan Academy):* Top 10% among 3000+ entries, 131 countries	*August 2016*

PUBLISHED WORK

CAPE: Corrective Actions from Precondition Errors using Large Language Models *Fall 2023*
First Author | Accepted, LangRob @ CoRL; Under Review, ICRA 2024 | *Python: PyTorch, GPT-3, VirtualHome, Robotics*

Plugging in The Safety Chip: Enforcing Constraints for LLM-driven Robot Agents *Fall 2023*
Co-Author | Under Review, ICRA 2024 | *Python: PyTorch, OpenAI GPT-3, Virtual Home, Robotics*

Tiered Reward Functions: Specifying and Fast Learning of Desired Behavior *Summer 2023*
Co-Author | Under Review, AAAI 2024 | *Python: OpenAI Gym, PPO, Gym-MiniGrid*

Development of a CNN for GPD Classification in Cardiac Arrest Patients (with PhD Syphong Ha) *Summer 2022*
Acknowledgement: Code Development | Published to Brown University Archives | *Python: PyTorch, 1D CNN, Signal Processing*
- Helped develop 1D-CNN (L2 regularization) to classify EEG signals as *GPD* or *non-GPD*; >97% accuracy and F1 score

Planning Using Large Language Models via Corrective Re-Prompting *Spring 2022*
First Author | Accepted, FMDM @ NeurIPS | *Python: PyTorch, OpenAI GPT-3, VirtualHome*

Learning Disentangled Representations for RL by Constructing Factored MDPs *Spring 2022*
Co-Author | Manuscript in Preparation | Dreamer V2 (Google Brain) | *Python: Tensorflow, DreamerV2*

Categorizing the Visual Environment and Analyzing the Visual Attention of Dogs *Fall 2022*
Co-Author | Karen T. Romer Undergraduate Teaching and Research Award Recipient | Submitted to Animal Behaviour, Journal | Accepted to WACV 2024, CV4Smalls Workshop | *Python: Tensorflow, CV2, matterport*

WORK IN DEVELOPMENT

Visual-language embeddings with improved latent semantics for image editing *Summer 2023*
Co-Author | under Prof. Boris Katz & PhD student David Mayo @ MIT CSAIL | *Python: PyTorch, Stable Diffusion v1.5, CLIP*

Following Open Vocabulary Robot Instructions with Pre-Trained Vision language Models *Fall 2023*
Co-Author | under Prof. George Konidaris & PhD student Benedict Quartey | *Python: Robotics, GPT-4, CLIP*

Hierarchical Task Planning using LLMs *Summer 2023 - Fall 2023*
Co-Author | under Prof. Stefanie Tellex & PhD student Ifrah Idrees | *Python: PyTorch, OpenAI GPT-3.5, VirtualHome*

WORK & RESEARCH EXPERIENCE

Business Analyst Intern, McKinsey *December 2023 - February 2024*

Reviewer, ICRA 2024 *Fall 2023*

Head Teaching Assistant: Artificial Intelligence, CS1410 *Fall 2022*
Working with Prof. George Konidaris to design course assignments |Supporting 120+ students and managing 20+ TA staff
- Working to improve course content with the professor, automating systems for assignments and coordinating
- Mentoring 10+ students on developing novel heuristics towards a final project (adversarial zero-sum game)

Machine Learning Engineer, Wisdomise (www.wisdomise.io) *Summer 2022*
Optimizing Liquidity Provision on UniswapV3 using ML | *Python: GraphQL, scikitlearn, web3.py, TheGraph Protocol*
- Applied different regression models to optimize high and low tick prediction for liquidity provisioning in order to maximize active time and fees earned. Best approach achieved accuracy of >95% and utility of >98% with MSE ~10^{-4}
- Scraped UniswapV3 transaction data (80 features on the BTC/WETH pool) using graph protocol and smart contract data

Blockchain Developer, Rario (www.rario.com) *Summer 2022*
Worked with CTO to develop a P2P (web-3) Messaging Platform | *Solidity: Smart Contracts, HTML/CSS, Javascript, Hardhat*
- Worked with the CTO of this fast scaling venture (US$120m funded) on building a custom messaging platform leveraging blockchain for storage and transparency
- Built fully functional smart contracts to manage platform backend and deployed smart contracts on Polygon (Mumbai)

Teaching Assistant: Graduate-level Data Science Course, DATA1030 *Fall 2021*
Supporting 50+ students via virtual TA hours | Grading
- Holding weekly TA hours & mentoring 14 grad students on Machine Learning (ML) final projects

Serre Labs: Research Intern *Fall 2020*

Paleobotany AI | Taxonomic Classification & Generative Modeling | *Python: Selenium, sqlite3, Pandas, Tensorflow*

- Expanded leaf datasets 8× by adding 300,000+ images of mounted leaf specimens, with unique ids and taxonomical details. New data improved model accuracy to >80%
- Cycle-GAN Model | *Python (Tensorflow):* worked with grad students to enhance Cycle-GAN model between leaf and fossil image domains; used to generate training examples in the fossil domain

Yahsat Space Lab: Research Intern *June 2017 - March 2019*

The only high school student accepted into a selective program for graduate students; explored satellite design, energy-budget calculations and orbit efficiencies of CubeSats. Supported Professor in developing models/resources for incoming students

McKinsey & Company, Dubai, U.A.E: Job Shadowing *May 2017*

Job Shadowing a Research Analyst. Worked on short research pieces: country trade-profiles, efficiency of car rentals

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PROFICIENCY & PROJECTS

Python: *Highly Proficient* | sqlite3, Pandas, matplotlib, sklearn, Kivy, pytorch, tensorflow, functional programming

- Zebra-horse CycleGAN, Faster-RCNN for traffic sign detection, Pose-Estimation models for ASL hand-sign classification, LSTM/GRU for (french-english) translation, semantic parsing: natural language to SQL, DQN on CartPole
- Regression and hypothesis testing (sklearn) correlating AirBnB and local housing prices in NYC

Java: *Proficient* | multi-threading, JavaFX (applets and AWT)

- Classical games e.g. Tetris, Doodle Jump, Fruit Ninja; genetic algorithm based neural network for learning Flappy Bird
- Graph and decision-tree algorithms [Dijgstka, Prim-Jarnik, PageRank] and SeamCarve implementation

C: *Moderately Proficient* | multithreading, signals, signal safety, I/O registers [stdin, stdout], read-write locks

- Shell: a Bash Unix shell that parses input commands [pwd, ls, chdir etc.] and executes with appropriate error-handling
- Malloc + Database: interactive program allowing clients to add, query, sort, remove and print a database (handled/hosted by a server socket) using multi-threaded processes; implemented with signal handling, thread safety and read-write locks

HTML, CSS & Python-Django: *Highly Proficient* **|** CSS stylesheet; slider, gallery, image effects

- Back-end web server and storage: SQL database connection (with Django) and standard queries (editing, conditionals, join-operation) for SQL data display in HTML, loading and saving files with Django

SQL & SQLite: *Proficient* | SQL syntax, table JOINS and merges, searching, filtering and sorting

Javascript: *Moderately Proficient* | d3 + SVG elements: transformation, tool tips; importing csv data

- Data Dashboard: stylized graphs, pie-charts and scatter plots (with summary tooltips) hosted on a HTML page with interactive text/button inputs to filter displayed data or perform scatter point regression in real-time [with animation]

MATLAB + SolidWorks (CAD): *Proficient* **|** MATLAB: systems of equations, excel output, graphical outputs | SolidWorks: image imports, part assembly and engineering-drawings

- Intelligent kinematically accurate predator-prey simulation; COVID-19 infection spread (SIR model) simulation
- Generated 3D printed models of designs; constructed bridge/truss structures and a bottle-opener design

Solidity & Smart Contracts: *Proficient* | contract creation, mappings, keccack256, contract deployment, integration with hardhat

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AWARDS & INTERESTS

Meiklejohn Mentor	Selected to advise incoming freshmen (Class of 2024) on courses, research, student life etc…
Brown Space Engineering	Member of the avionics and manufacturing divisions. Learned to use circuitry softwares (EAGLE) and develop logic gate design for satellite payloads
Chess	Founder of high school chess club; Coached 25+ members and led team to win 3 consecutive inter-schools; FIDE member; 2nd place in Ivy League Spring Tournament, Fall 2022; 4-vs-4 Chess Collegiate League Tournament, Fall 2023
STEMS Tutoring Program	Tutored physics and SAT preparation at Hope High School (Providence) weekly, after school
Math Acceleration Group	Initiated a mentorship program for high-potential juniors to help meet their HL aspirations. Many of the 20+ students have now been able to meet their goal.
Poetry	Published a collection of 25 poems influenced by events that impacted my childhood
Duke of Edinburgh Award	DoE Silver Award
Founder, Inspire Science	Founded a science website and blog (https://inspirescienceclub.com) during senior year with extensive followership and active publications on science in real life
Languages	English (native), Spanish (professional working), Hindi (limited working), Tamil (native)