Anvita Bhagavathula

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Education

Brown University, *Sc.B. Physics, A.B. Applied Mathematics 3.95/4.0 GPA* **Providence • May 2023**

Relevant Courses: Deep Learning, Data Structures and Program Organization, Computational Probability and Statistics, Machine Learning for Earth and Environment, Intro to Computational Chemistry, Solid State Physics, Quantum Mechanics I and II, Thermodynamics and Statistical Mechanics, Partial Differential Equations, Ordinary Differential Equations, Complex Analysis, Honors Statistics, Linear Algebra, Multivariable Calculus

United World College of Southeast Asia **Singapore • June 2019**

International Baccalaureate (IBDP): 45/45 Points

Physics, Mathematics, and Chemistry at a Higher Level. Spanish, Literature, and History at a Standard Level.

Research and Work Experience

Brown University Crunch Group, *Research Assistant* **Providence, RI • Oct 2022 - Present**

- Designed and implemented a self-adaptive physics-informed neural network (PINN) to solve a one-dimensional differential equation in a team of three students. Built using Jax.
- Developing an algorithm which will adaptively optimize the number of collocation points our model uses to generate well-defined solutions in data-poor regimes. Supervised by Dr. Somdatta Goswami.

Microsoft Research, *Research Intern* **Seattle, WA • June 2022 – Aug 2022**

- Created an interpretable machine-learning based method using a QSAR (quantitative structure-activity relationship) approach to predict food protein digestibility. Filed a provisional patent for this research. Built using Python.
- Produced two ground-truth protein property datasets by combining amino acid indices and structural protein sequence embeddings, extracted from a pretrained transformer model.
- The downstream impact of this research could minimize invasive experimentation on animals when measuring food protein digestibility. Supervised by Dr. Sara Malvar and Dr. Ranveer Chandra.

Li Lab and Rubenstein Lab, *Research Assistant* **Providence, RI • June 2021 – Present**

- Developing simulations of twisted tri-layer graphene using density functional theory and geometry optimization. Implemented using Quantum Espresso, Bash scripting, and Python.
- Built a nano-electronic device made from twisted tri-layer graphene to measure its unique superconducting and magnetic properties at cryogenic temperatures.
- Received Undergraduate Teaching and Research Award to pursue this research. Supervised by Professor Jia Li and Professor Brenda Rubenstein.

Transcelestial Technologies, *Software Engineer Intern* **Singapore • Jan 2021 – Apr 2021**

- Created Streamlit based client facing web-tool that halved time taken to qualify equipment installations for a laser communications startup. Built using Python.
- Designed and implemented a processing algorithm using Fourier analysis, Euler angle integration, and signal processing to analyze time-series vibration data and evaluate installation structures.
- Web-tool led to faster deployment of devices that facilitated internet connectivity in Southeast Asia during the COVID-19 pandemic. Supervised by Dr. Jan Smisek.

Leadership, Mentoring, and Teaching Experience

Brown University Women in Physics, *Lead Coordinator* **Providence, RI • Jan 2021 – Present**

- Organizing numerous community-building initiatives such as group study sessions, lunches, and peer mentoring.

Physics Department Diversity Action Plan Committee, *Member* **Providence, RI • Jan 2020 – Present**

- Addressing diversity and inclusion issues within the Physics department in a committee of undergraduates, doctoral students, and faculty. Designed climate survey to collect data regarding the state of diversity in the department which received over 100 responses.

International Mentoring Program, *Mentor* **Providence, RI • Jan 2021 – Aug 2021**

- Mentored a group of 12 international students and provided support for their transition to university. Facilitated virtual orientation events.

Brown University Department of Physics, *Teaching Assistant* **Providence, RI • Jan 2020 – Dec 2020**

- Facilitated labs for students enrolled in Introduction to Astronomy. Experiments included solar imaging and image processing. Conducted weekly remote problem-session workshops for students amidst COVID-19.

Publications (Preprint)

- Malvar, S., **Bhagavathula, A.**, Balaguer, M., Sharma, S., and Chandra, R. (2022). *Machine learning can guide experimental approaches for protein digestibility estimations.* arXiv:2211.00625 [cs, q-bio]. [online] Available at: https://arxiv.org/abs/2211.00625

Computational Projects

- 2D Ising Model: Modeled magnetic dipole lattice at different temperatures using MCMC algorithm in MATLAB.
- Satellite Imagery Classifier: Classification using Keras to predict drivers of deforestation in satellite imagery.

Programming Languages: Proficient in Python, MATLAB, TensorFlow, Jax, Pandas, NumPy, and Scikit-learn. Experience with Bash, SciPy, RDKit, Quantum ESPRESSO, LaTeX, and Git.