Arun Ravishankar

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About me

I'm a Theoretical physicist and a Pharmacist by training and I have experience in Genomics, Mathematics & Data Science. I'm keen to leverage my diverse and strong mathematical background to tackle problems in the medical field using computational methods and AI - Organ-on-chips, Genomics, Medical Imaging, Diagnosis, Drug discovery, Toxicology, Clinical Trials.

Education

PhD in Physics — Expected Aug. 2020
MS. in Physics — May 2019
University of Arizona, Tucson, AZ, USA

MSc (hons.). in Physics
B.Pharmacy (hons.) — May 2014
Birla Institute of Technology & Science Pilani, India

Skills

Programming Languages

Python, R, Wolfram (Mathematica), LaTeX

Packages and Platforms

NumPy, Matplotlib, Scikit-Learn, Pandas, PyTorch*, TensorFlow*
Github, Jupyter

Data Analysis

Machine Learning & Deep Learning*,
High Performance Computing

*Tutorials/Workshop

Work Experience

Physics

Univ. of Arizona, USA
Fall 15 - Current

Graduate Research Associate with Dr. Samuel Gralla

- Discovered an instability of a maximally charged black hole (Gralla, S.E., Ravishankar, A. & Zimmerman, P. J. High Energ. Phys. (2018) 2018: 87)^.
- Identified the cause of the instability to be certain null geodesics (preprint: arXiv:1911.11164)
- Designed and ran simulations in Python on a supercomputer (El Gato) with job scheduling to investigate the instability.

^Authors in alphabetical order

Computational Genomics, Network Biology

Univ. of Arizona, USA
Current

Graduate Research Associate with Dr. Megha Padi

- Briefly worked on implementing a message passing/belief propagation algorithm to optimize the ALPACA code (in R) by maximizing differential modularity to find community structures within graph networks.
- The aim was to compare graph networks obtained from the genome sequences in diseased and control patients using this algorithm in order to find drivers of disease in different types of cancers.
- Building regression models to predict drug response in cancerous tissues based on genomic data from the Genomic Data Commons Data Portal of the NIH. Comparing different methods of feature selection on a high dimensional feature space to balance interpretability and accuracy of the supervised learning model in order to identify the biological pathway causing the cancer.

Mathematics

Ludwig Maximilians University,
Munich, Germany
Summer 13 - Summer 14

Master's Thesis with Dr. Detlef Duerr

- Analyzed the problem of describing arrival time distributions in quantum theory.
- Devised a way to circumvent Pauli's theorem to describe arrival time statistics.

Startup - Fascination Based Learning

Munich, Germany
Fall 13 - Summer 14

Content Producer

- Worked on the incubation stages of a startup for online-based education with the founder of Ideas Roadshow and The Founding Executive Director of the Perimeter Institute for Theoretical Physics, Waterloo, Canada, Dr. Howard Burton.
- Coordinated with an interdisciplinary team of entrepreneurs, educationalists, researchers and philosophers to come up with a working form of the online tool.
- Created appropriate content for the preliminary product based on lectures in cosmology by Prof. Roger Penrose which was then used to pitch the product to different universities including the National University of Singapore.

Workshops And Conferences

Organ-on-chip and Machine Learning

- Attended the 2nd European Organ-on-chip Conference 2019, Graz, Austria
- Attended the 4th Barcelona Summer School 2019 organized by the Virtual Physiological Human Institute on Machine Learning and Mechanistic Modelling - with a workshop on Computational anatomy, Deep Learning and Neural Networks to segment a time series of images with PyTorch

Physics

- Will be presenting at the Pacific Coast Gravity Meet, March 2020 in UC Santa Barbara, CA
- Invited as a guest speaker at Chennai Mathematical Institute, India in July 2019
- Presented at the American Physical Society, April Meeting 2019 in Denver, CO
- Presented at the Pacific Coast Gravity Meet, March 2018 in CalTech, Pasadena, CA