Indranil Ghosh
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ACADEMIC QUALIFICATION
- Bachelor of Science, Jadavpur University, Kolkata, India. Physics. July 2018. Secured a first class with distinction.
- Presently Master of Science, Jadavpur University, Kolkata, India. Physics (Condensed Matter Physics and Non – Linear Dynamics). July 2020

ACADEMIC PROJECTS
Title: Computational Methods for Physics (Python)   **November 2018 – Present**
Team size: 2
- This is a book project aimed towards introducing computational physics and numerical computations in Python, in the undergraduate physics curriculum in Indian Universities set by CBCS. This project is supervised by Dr. Debasish Lohar.

CONFERENCE PRESENTATIONS
Title: A Python implementation of Quantum Evolutionarily Stable Strategy Game, an interdisciplinary study of quantum computation and Game theory in population biology   **February 2019**
Place: Society of Laboratory Automation and Screening, Washington D. C., USA
- The presentation aims towards building a python simulator that experiments and analyses the consequence when a small group of mutants using quantum strategies try to invade a classical ESS in a population of N members who are randomly matched in pairs to play a symmetric and asymmetric bi matrix game. These games are played every day about us in protein folding or evolution of competitive interactions among viruses in an RNA phage.

Title: Analysis of Quantum Game Theoretic Models with a Python simulator   **December 2018**
Place: SciPy India, 2018, Indian Institute of Technology, Bombay, Mumbai, India
- This talk aims towards building a quantum computing simulator in Python which can be used to simulate and carry out real time experiments in various Quantum Game Theoretic Models.

Title: Analysis of Chaos Game Simulator in Pygame   **October 2018**
Place: International Conference on Complex Dynamical Networks, 2018, Indian Statistical Institute, Kolkata, India
- The work is based on the dynamic simulations of various Chaos Game algorithms to produce fractal patters, with the help of Pygame, a cross-platform set of python modules to create interactive video games. These simulators can be used to analyze the mathematical structures of the self similar sets on a plane.

SUMMER SCHOOLS
Title: Research Topic of Statistical Physics to young Physicists, 2018   **June 2018**
Place: Satyendra Nath Bose National Centre for Basic Sciences, Kolkata
- National and International Speakers of repute delivered talks and hand on workshops on Non-equilibrium Systems, Statistical Physics of Fracture and Breakdown, Dynamics of Glass Transition, Self-organized Criticality, Statistical Biology Physics, Hydrodynamics of Turbulence, Granular Systems, Percolation, Phase Transitions in Polymers, Computational Studies with Fortran and Quantum Entanglement.
- Presented a poster on computation of analytic structure factor of macromolecules.
- Delivered a Talk on applications of Pygame in simulations of scientific systems.

Title: Dynamics of Complex Systems, 2018   **June 2018**
Place: International Centre for Theoretical Sciences, Bangalore, India
- The theme for the program was non-smooth dynamical systems and complex networks with speakers of national and international reputes.
- Hands on introduction to theoretical and computational aspects of complex networks.
- Introduction to Anaconda and NetworkX.
- I was the youngest participant to get selected and was awarded travel, food and lodging

Title: TEQIP Short Term Course on Basic Physics   **June 2016**
Place: Indian Institute of Technology, Kanpur, India
- This workshop was designed for 2nd year undergraduate students to motivate them to pick up different research topics of physics and interdisciplinary studies.

➢ Speakers of national reputes delivered talks and workshops.

RESEARCH INTERNSHIPS

Place: Indian Institute of Space Science and Technology, Thiruvananthapuram, Kolkata   **May 2019 – June 2019**
➢ Project Title: Complexity Analysis of Road Networks and Quantum Machine Learning.
➢ Supervisor: Dr. B S Manoj.
➢ Research: We analysed complex road networks from the perspective of road types in order to find out optimal locations for deploying buffer nodes for software defined vehicular networks. In addition, a real world mobility model involving pedestrians and vehicles is designed which can be used to measure performance of vehicular networks. A simple protocol for message transfer between vehicles and buffer nodes was also designed.
➢ Skills learned: OOP concepts in Python, OSMNX, Networkx, Parallel Processing, Urban Delay Tolerant Network Simulator (UDTNSim), Continuous Variable Quantum Computing with Pennylane.
➢ Grade : 9.4/10

Company: Quantica Computacao, IIT Madras, Chennai   **November 2019 – April 2020**
➢ A startup founded by Bhagvan Kommadi which aims towards researches on Quantum Computing. I have been involved as an intern, with the theoretical research on Quantum computations and algorithms.

PUBLICATIONS

Accepted:

➢ "Study on Quantum Genetic Algorithms: A theoretical introduction", accepted for publication in "Resonance – Journal of Science Education", from Indian Academy of Sciences, co-published by Springer.

Under Review:

➢ "Quantum Game Theory: A comprehensive study" submitted to "Resonance – Journal of Science Education", from Indian Academy of Sciences, co-published by Springer.
➢ "Effort: A New Metric for Roadside Unit Placement in 5G Enabled Vehicular Networks" submitted to "2020 IEEE 3rd 5G World Forum (5GWF)
➢ "From Lattice Theory to Quantum Logic: Part I, An Introduction to Lattice Theory" submitted to "Resonance – Journal of Science Education", from Indian Academy of Sciences, co-published by Springer.

Software:
➢ "QGameTheory: An R package for simulating quantum versions of game theoretic models" available at CRAN. [https://cran.r-project.org/web/packages/QGameTheory/index.html]

TECHNICAL SKILLS
➢ Programming Language: FORTRAN, Python, C, R
➢ Operating System: LINUX and Windows
➢ Softwares: LATEX, Microsoft Word, Git,

ONLINE PROFILES
➢ Github: https://github.com/indrag49
➢ LinkedIn: https://www.linkedin.com/in/indranil-ghosh-b999b2135/