Sadman Ahmed Shanto

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EDUCATION

TEXAS TECH UNIVERSITY (TTU)
BS in Applied Physics
May 2021 | Lubbock, TX
Minors: *Math & Computer Science*
CGPA: 3.703 / 4.0

COURSEWORK

Graduate
Introduction to Quantum Computing
Advanced Quantum Information and Computation

Undergraduate
Quantum Mechanics I & II
Electromagnetism I & II
Modern and Intermediate Physics Lab
Optics
Theory and Design of Algorithms
Software Engineering I
Statistical Thermodynamics
Mathematical Methods I & II
Linear Algebra
Mathematical Statistics
Topology

SKILLS

Programming
Python, C++, C, JAVA, Mathematica, Matlab, R, Julia, Bash, TEX, Swift
Operating System
MAC OS, Linux, Raspbian, Windows 10
Data Analysis
Numpy, Scipy, SymPy, Matplotlib, Ray, Modin, Pandas, StatsModels, BeautifulSoup
Machine Learning
Tensorflow, Keras, SciKit Learn, Pytorch, Open AI Gym
Quantum Computing
Qiskit, PyQuil, PennyLane, Microsoft QDK, Forest SDK
Digital Electronics
LTspice, Vivado Design Suite, KiCad
Microcontrollers
Arduino, Raspberry Pi, FPGA

CONFERENCES

Transportation Research Board Annual Meeting 2021
Annual American Physical Society (APS): Texas Section (2019 - 2020), Far West Section (2020)
Instiute Of Physics (IoP) Quantum 2020
TTU Virtual Research Conference 2020
TTU Physics Department (2019-2020)

EXPERIENCE

ADVANCED PARTICLE DETECTOR LABORATORY | Undergraduate Research Assistant
Nov 2018 - Present | Lubbock, TX

- Engineered the calibration and installation of 40 SiPM's and 44 PMTs on the telescope
- Designed custom Winston Cone light collectors for increased optical transmission
- Designed the Data Acquisition System for a prototype Muon Telescope that makes use of 40 Arduino's, 2 FPGA's and CAMAC Crate Modules to record data at 0.5 ns fidelity
- Facilitated the design of custom PCB's (KiCad) and soldered specialized circuits
- Refactored all of the lab's software (multithreaded) to work on HPCC
- Currently incorporating concepts of image segmentation and ML techniques (RNN's and LSTM's) to enhance final image and improve muon track reconstruction efficiency

"INTRODUCTION TO QUANTUM COMPUTING" COURSE, TEXAS TECH UNIVERSITY | Teaching Assistant
Aug 2020 - Dec 2020 | Lubbock, TX

- Delivered supplemental lecture notes and interactive jupyter notebooks to teach quantum computing through the use of IBM's qiskit
- Materials covered: *qiskit API*, *single and multi qubit systems*, *statevector evolution*, *superposition and entanglement*, *quantum circuit model*, *quantum teleportation*, *Deutsch's algorithm*, *Deutsch-Jozsa Algorithm*, *Grover's Algorithm*, *Bernstein-Vazirani algorithm*, *VQE*, *and Jordan?s Algorithm*

SENIOR CAPSTONE PROJECT Supervisors: Dr. Ismael Regis de-Farias & National Laboratory of Scientific Computing (LNCC)
May 2020 - Present | Lubbock, TX

- Implemented methods to calculate Hilbert-Schmidt-Product and decompose any given square matrix into sum of Pauli matrices
- Created a computational framework for testing Variational Quantum Eigensolver (VQE) Algorithms and presently working on applying it to solve instrumentation optimization problems in High Energy Physics
- Initiated a study to explore the dynamics of changing each component used in the VQE routine by conducting sensitivity analyses on two key performance metrics

VANDERBILT UNIVERSITY | Summer Research Intern
May 2020 – Aug 2020 | Nashville, TN

- Contributed to developing a computational framework (*Flow*) for deep RL and control experiments for traffic microsimulations
- Established an object oriented system for calibrating results from stochastic simulations under multi-objective methods using gradient free algorithms
- Implemented an optimization framework to fit simulation data to macroscopic RDS data sets

AWARDS

2017-21 TTU Presidential Scholarship & Deans' List
2020 C.C. Schmidt and Alma K. Schmidt Award in Physics, TTU
2020 Certification of Quantum Excellence, IBM Qiskit
2019 Outstanding Student Presenter at Texas Section of APS Conference
2018-19 Bucy Undergraduate Scholarship Physics Award, TTU
2018 Silver Medal, University Physics Competition (UPhysC)

PUBLICATIONS

[1] D. W. R. R. B. S. G Gunter, **SA Shanto**. Challenges of microsimulation calibration with traffic waves using aggregate measurements. *2021 Transportation Research Board Annual Meeting*, in press.

[2] M. M. . S. C. **SA Shanto**, R Perez. High-resolution muography using a prototype portable muon telescope. *Journal of Undergraduate Reports in Physics*, 2020.