

Sadman Ahmed Shanto

shanto268.github.io | linkedin:sshanto | github:shanto268
sadman-ahmed.shanto@ttu.edu | 806.790.0156

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

(Teaching Asst. Fall 20)

Advanced Quantum Information and

Computation

Undergraduate

Object Oriented Programming

Theory and Design of Algorithms

Software Engineering I

Statistical Thermodynamics

Classical Mechanics

Mathematical Methods I & II

Linear Algebra

Proofs, Logic and Reasoning

Mathematical Statistics

Electromagnetism I & II

Quantum Mechanics I & II

Topology

SKILLS

Programming

Python, C++, C, JAVA, Mathematica, Matlab,

R, Julia, Bash, T_EX, 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

Database and Management

SQLite, MySQL, Git, Yarn/NPM, Apache

Web

HTML5, CSS, JS (React), nodeJS

CONFERENCES

Transportation Research Board Annual Meeting 2021

Annual American Physical Society (APS): Texas Section (2019 - 2020), Far West Section (2020)

Institute Of Physics (IoP) Quantum 2020
TTU Virtual Research Conference 2020

EXPERIENCE

ADVANCED PARTICLE DETECTOR LABORATORY | UNDERGRADUATE RESEARCH ASSISTANT

Nov 2018 - Present | Lubbock, TX

- 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
- Implemented Monte Carlo simulations to test experimental data integrity, assess theorized designs and measure telescope efficiency
- Created a real-time event dashboard for the telescope and automated analysis program using TTU's High Performance Computing Cluster (HPCC) as the backend
- 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

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

"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*

CENTER FOR MULTIDISCIPLINARY RESEARCH IN TRANSPORTATION | UNDERGRADUATE RESEARCH ASSISTANT

Jan 2019 - Jul 2020 | Lubbock, TX

- Developed an open-source Cellular Automaton based analysis and simulation software for studying various heterogeneous traffic flow scenarios
- Designed various Autonomous Vehicle Models to investigate regimes for most efficient shared lane mobility in multi-lane networks
- Incorporated Reinforcement Learning functionality to the software

AWARDS

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| 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.