Nashad Rahman

Contact Information

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RESEARCH EXPERIENCE

High Energy Density Physics group at Ohio State

Computational Research Assistant / Columbus, Ohio / Mar 2020 – Present

- Used the Ohio Supercomputer Center (OSC) to model Laser-Plasma interactions to find more efficient means of Ion Acceleration
- Modeled Laser interactions with solid density targets at intensities which cause surface modifications
- Used Particle-In-Cell programs such as LSP and EPOCH, analyzed data using MATLAB and Python

Experimental Research Assistant / Columbus, Ohio / Jan 2019 – Mar 2020

- Created a server system to integrate various experimental diagnostics built on Linux, Python, MySQL.
- Developed scripts for signal processing and live readouts during experiments
- Worked with laser optics, beam alignment, target alignment, and liquid crystal targets
- Analyzed data using MATLAB

University of Glasgow Internship via CERN

Summer Research Intern with the University of Glasgow / Glasgow, Scotland / May 2019 – July 2019

- Contributed to the Allpix-Squared source code, an open sourced project used to model silicon detectors used in cameras, medical imaging, and at the Large Hadron Collider.
- Used Geant4 with Allpix-Squared to conduct model-based Monte Carlo simulations for silicon detectors used at the Large Hadron Collider
- Developed user-friendly GUI applications (Python) to analyze and visualize data from simulations and experiments

Wexner Medical Center

Body Kinematics Data Analyst / Columbus, Ohio / Jan 2018 – Mar 2018

- Developed scripts to preprocess signal data from EEG readers and Body Kinematic Sensors
- Analyzed 3D vector data from Xbox Kinect using MATLAB to interpret body functions of recovering stroke patients.

EDUCATION

The Ohio State University

Bachelor of Science in Applied Physics, Graduating May 2021, Columbus, Ohio,

SOFTWARE PRODUCTS

Koalati

- A user-friendly productivity app to help promote reflection, build habits, and manage time
- Coded in Swift, available for free on the App Store for iPhones and iPad
- Rated 5 stars from 13 reviews, downloaded on over 100 devices in 5 different countries.

Doggelganger (In Development)

- A twitter bot to find your doppelganger in dog form!
- Uses a ResNet50 convolutional neural network in Keras to find visually similar images
- Interacts with users using the Twitter REST API

SKILLS

Simulation Skills: Particle-in-cell method (LSP, EPOCH), Monte Carlo Technique, GEANT4, Allpix-squared

Programming Languages: Python, MATLAB, Swift, Java, C / C++, HTML / CSS / JavaScript

Laboratory Skills: Microcontrollers (Arduino), CAD (Solidworks), EDA (EasyEDA), Oscilloscopes, Laser Alignment, Liquid Crystal films, Power Tools/Machining, Soldering

Data Analytics, Visualization, and Artificial Intelligence: Scikit / SKLearn, Keras, Tensorflow, Pandas, Numpy, Matplotlib, Jupyter

Software Development Skills: Git / Github, REST API, QT, HTTP Requests

LEADERSHIP EXPERIENCE

Residence Life at OSU

Resident Advisor / Columbus Ohio / August 2018 – May 2020

- Had one-on-one meetings with over 100 students to ensure their success at OSU
- Promoted diversity and inclusion through programming and outreach

BT A Cappella

President / Columbus, Ohio / May 2019 – May 2020

- Utilized transformational leadership to foster growth, promote teamwork, and lead my team to win first place at our regional competition.

PUBLICATIONS (Under Review)

1. "Particle-in-Cell modeling of a potential demonstration experiment for double pulse enhanced target normal sheath acceleration" **N. Rahman**. J. R. Smith, G. Ngirmang, C. Orban. https://arxiv.org/abs/2101.04650 (2021 under review)

2. "A Particle-In-Cell Code Comparison for Ion Acceleration: EPOCH, LSP, and WarpX" J. R. Smith, C. Orban, **N. Rahman**, B. McHugh, R. Oropeza, E. A. Chowdhury. https://arxiv.org/abs/2103.17248 (2021 under review)

PRESENTATIONS

3. "Particle-in-Cell modeling of a potential demonstration experiment for double pulse enhanced target normal sheath acceleration" **N. Rahman**. J. R. Smith, G. Ngirmang, C. Orban. Ohio State University Denman Research Forum (2021)

4. “Particle-in-Cell modeling of a potential demonstration experiment for double pulse enhanced target normal sheath acceleration” **N. Rahman**, J. R. Smith, G. Ngirmang, C. Orban. National Ignition Facility Annual User Meeting (2021).

5. “Are Two Laser Pulses (With Half Energy) Better Than One for Ion Acceleration?” **N. Rahman**, B. McHugh, C. Orban. APS Division of Plasma Physics Conference (2020).

6. “Particle-in-Cell Simulation Code Comparison for 2D Laser Propagation,” B. McHugh, **N. Rahman**, C. Orban. APS Division of Plasma Physics Conference (2020).

7. “The Ohio State University Scarlet Laser Facility – Open To External Users Via LaserNetUS,” G. Tiscoreno, N. Czapla. R. Daskalova, D. M. Nasir, **N. Rahman**, L. Smith, A. Zingale, E. A. Chowdhury, D. W. Schumacher. APS Division of Plasma Physics Conference (2020).

8. “Pump-Probe Study of Relativistic Transparency,” A. Zingale, D. Nasir, N. Czapla, P. Pozderac, G. Tiscareno, R. L. Daskalova**, N. Rahman**, D. W. Schumacher. APS Division of Plasma Physics Conference (2020).

9. “Are Two Laser Pulses (With Half Energy) Better Than One for Ion Acceleration?” **N. Rahman**, B. McHugh, C. Orban. OSAPS (2020).

10. "Particle-in-Cell Simulation Code Comparison for 2D Laser Propagation," B. McHugh, **N. Rahman**, C. Orban. OSAPS (2020).

SEMINARS

11. “Double Pulse Laser Simulations for Increased Ion Acceleration,” **N. Rahman**, B. McHugh, C. Orban. LSP Users Group Virtual Meeting at Lawrence Livermore National Lab (2020).

12. "Particle-in-Cell Simulation Code Comparison for 2D Laser Propagation," B. McHugh, **N. Rahman**, C. Orban. LSP Users Group Virtual Meeting at Lawrence Livermore National Lab (2020).

13. “Client-Side Data Visualization Python Tool for Sensor Data,” **N. Rahman**, A. Blue, ATLAS Internal Tracker Production Database Developers Meeting (2019)

14. “GUI-Based Application for Uploading Sensor Data,” **N. Rahman**, A. Blue, ATLAS Internal Tracker Production Database Developers Meeting (2019)