Nicholas Fasano

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EDUCATION

Princeton University, Princeton, NJ
Doctor of Philosophy in Applied Physics, GPA: 3.683/4.0 — May 2023
Master of Arts in Applied Physics, GPA: 3.683/4.0 — April 2019

Syracuse University, Syracuse, NY — May 2017
BS in Aerospace Engineering, BS in Physics, Minor in Mathematics
Graduated Summa Cum Laude, GPA: 3.932/4.0

TECHNICAL SKILLS

Programming: Python (Numpy, Pandas, Scikit-learn), SQL, Matlab, High performance computing, PowerPoint
Statistics/Machine Learning: *Regression* (Linear, Lasso/Ridge), *Classification* (SVM, Random forest, Decision trees, Logistic, Naïve Bayes, KNN), Unsupervised (SVD, PCA, k-means, LDA), data cleaning/preprocessing

RESEARCH EXPERIENCE

Postdoctoral Research Associate | Princeton University MAE — June 2023 – Present

- Using large simulation and experimental datasets to push the frontiers in plasma optics
- Mentored undergraduate and graduate students by guiding the advancement of their research projects

Graduate Researcher | Princeton University MAE — Sept. 2017 – May 2023

- Curated and analyzed terabyte-scale simulation data, utilizing linear regression and statistical methods to show that plasma-based optics are a practical choice for manipulating intense light sources
- Led an experimental campaign on Princeton's 20TW laser system to study waveform-controlled light-matter interactions, resulting in two conference presentations and a written manuscript
- Collaborated with teams from national labs and academia, where I co-designed and executed experiments

Undergraduate Researcher | Syracuse University MAE — June 2016 – Aug. 2016

- Researched and designed a 4-arc turbine blade. Used C++ to generate the blade in a 3D CAD software

SELECTED DATA SCIENCE PROJECTS (github.com/nfasano)

Content-based movie recommendation system — Jan. 2023 – Present

- Webscraped, cleaned, and preprocessed a dataset of 160,000+ film scripts using NLP techniques
- Built a topic model (latent Dirichlet allocation) to identify movies with similar content and then ranked the movie recommendations using cosine-similarity. Deployed recommender as a web app using gradio

Sentiment classifier for Black Lives Matter tweets — Jan. 2021 – May 2021

- Built a classifier to predict if a tweet was positive or negative toward the Black Lives Matter movement, utilizing pandas, scikit learn, hypothesis testing, and evaluation metrics (F1-score, precision, recall)

LEADERSHIP AND TEAMWORK EXPERIENCE

Assistant in Instruction | Princeton University — Jan. 2019 – Jan. 2023

- Led problem-solving precepts, aided in project development, and advised students via office hours

Physics Coach (Tutor) | Syracuse University — Sept. 2016 – May 2017

- Mentored students individually or in small groups, covering topics in physics, math, and engineering

WORK EXPERIENCE

Engineering Intern | Cameron Engineering & Associates, LLP — May 2015 – Aug. 2015

- Read and edited electrical and mechanical drawing plans using AutoCAD
- Performed on-site visits to survey and update electrical and mechanical engineering drawings

Maintenance | Piquet Lane Swim and Tennis Club — Summers 2013-2014

- Responsible for daily maintenance of tennis courts and other day to day operations of the club

CERTIFICATES AND AWARDS

Teaching Transcript Certificate | McGraw Center for Teaching, Princeton University Dec. 2022
Andrew Ng's Deep Learning Specialization | Coursera Sept. 2021
Fellowship | Awarded by Program in Plasma Science and Technology June 2020 – May 2023
Gelling Award | Awarded by Physics faculty of Syracuse University May 2017
Excellence by Aerospace Engineer | Awarded by MAE faculty of Syracuse University May 2014 - 2017

SELECTED PUBLICATIONS AND PRESENTATIONS

Google Scholar: scholar.google.com/citations?user=X9sdXuQAAAAJ&hl=en&oi=ao

- **N. M. Fasano**, M.R. Edwards, A. Giakas, et al., " Enhanced Relativistic Harmonic Generation using Plasma-Mirror-Shaped Laser Waveforms," To be submitted.
- **N. M. Fasano**, M. R. Edwards, and J. M. Mikhailova, "Electron bunch dynamics and emission in particle-in-cell simulations of relativistic laser-solid interactions: on density artifacts, collisions, and numerical dispersions," Physics of Plasmas 30, 063904 (2023).
- **N. M. Fasano**, M. R. Edwards, A. Giakas, et al., "Low-Order Harmonics Emitted from Relativistic Plasma Mirrors Driven by Two-Color and Elliptically Polarized Lasers," APS DPP meeting, Bulletin of the American Physical Society, (2021). Oral.
- **N. M. Fasano** and J. M. Mikhailova, "High-Power Ultraviolet Vortex Beams Generated from a Relativistic Laser Interacting with an Ultrathin Foil," CLEO: Conference on Lasers and Electro-Optics, (2021). Oral.
- M. R. Edwards, **N. M. Fasano**, T. Bennett, et al., "A multi-terawatt two-color beam for high-power field-controlled nonlinear optics", Optics Letters **45**, 6542 (2020).
- M. R. Edwards, **N. M. Fasano**, and J. M. Mikhailova, "Electron-nanobunch-width-dominated spectral power law for relativistic harmonic generation from ultrathin foils", Physical Review Letters **124**, 185004 (2020).