

NATHANIEL T. STEMEN

natestemen.github.io | nathanielstemen@gmail.com | +1 203 815 4690

WORK & RESEARCH EXPERIENCE

- Software Development/Data Science Intern:** Overleaf *Jul–Nov 2017*
- Built framework using `pandas`, `sklearn`, and `scipy` to parse, mung, and analyze \TeX files to obtain data for new Overleaf autocomplete feature.
 - Using common patterns found in \TeX files, extended Overleaf's editor to support context-aware autocompletion by using a recommendation system.
- Undergraduate Researcher:** New York University *May 2016–May 2017*
- Studied nonlinear Schrödinger equations modeling transmission of short electromagnetic pulses in nonlinear media under Professor Luciano Medina.
 - Numerically computed solutions using `numpy` to nonlinear PDE's and analytically proved existence of solutions.
 - Built package to numerically solve functional minimization problems.
- Summer Researcher:** Yale University (PROSPECT Experiment) *Summer 2014–2015*
- Completed R&D for detector that will perform eV-scale sterile neutrino search and measure the antineutrino spectrum from the nuclear reactor at Oak Ridge National Laboratory under Professor Karsten Heeger.
 - Built optical simulation using SLitrani, and `C++` to model prototype detector to study light collection, detector uniformity, and optimize light guide shape.
 - Surveyed, and implemented pulse-shape discrimination methods in `Python` to determine optimal method for PROSPECT Experiment.

PUBLICATIONS

Current Papers

1. Stemen, N. and L. Medina (2018). Existence of Spinning Q -vortex Solitons. *to appear*.

Refereed Research Papers

1. Ashenfelter, J. et al. (2016). Background Radiation Measurements at High Power Research Reactors. *Nucl. Instrum. Meth.* A806, 401–419. arXiv: [1506.03547](https://arxiv.org/abs/1506.03547) [[physics.ins-det](#)].
2. Ashenfelter, J. et al. (2015). Light Collection and Pulse-Shape Discrimination in Elongated Scintillator Cells for the PROSPECT Reactor Antineutrino Experiment. *JINST* 10.(11), P11004. arXiv: [1508.06575](https://arxiv.org/abs/1508.06575) [[physics.ins-det](#)].

TEACHING EXPERIENCE

- Mathematics Teacher:** NYU Metro Center College Prep Academy *Jun–Aug 2016*
- Independently planned and taught Pre-Calculus class for high school students.
 - Created and graded in class worksheets, quizzes, and homework.
 - Used the Moore Method to guide students through advanced topics and introduce the idea of rigor in mathematics.
- Mathematics Tutor:** NYU Metro Center College Prep Academy *Oct 2015–May 2017*
- Facilitated numerous extra-curricular math courses of 30 students as a class assistant by providing additional guidance to students.
 - Specialized in tutoring Algebra II and Pre-Calculus, focusing on strong fundamentals.

EDUCATION

- New York University** 2013–2017
- B.S. in Physics and Mathematics
- Thesis in Mathematics: *An Investigation of Q -Balls*
 - Dean's List
 - University Honors Scholar

SKILLS

Languages *most→least*
Python, [Coffee | Java]Script, SQL, Ruby, Mathematica, MATLAB

Tools
git/Github, Bash, \LaTeX , Chebfun, HTML, CSS

AFFILIATIONS

- Sigma Pi Sigma** 2015–
Physics Honors Society
- American Physical Society** 2014–
NYU Society of Undergraduate Physicists 2014–17
President, Vice-President, and Secretary.

TALKS & PRESENTATIONS

Contributed Conference Presentations

1. Optical Vortex Solitons: Existence and Computation (October 2016). *Presentation, Gulf Coast Undergraduate Research Symposium, Rice University.*
2. Optical Simulations and Studies with the PROSPECT-20 Detector (October 2015). *Poster presentation, APS Division of Nuclear Physics Conference Experience for Undergraduates.* URL: <http://meetings.aps.org/link/BAPS.2015.DNP.EA.159>.