RYAN WEIGHTMAN

PhD Student in Computational Biology

CONTACT DETAILS

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DESCRIPTION

I am a PhD Student currently studying computational biology and applied mathematics at Rutgers University–Camden. I have experience both conducting research using various computational methods, and teaching mathematics and various levels.

EDUCATION

Rutgers University–Camden Graduate School of Arts & Sciences: Camden, NJ
PhD in the Center for Computational and Integrative Biology: Current

Rutgers University
New Jersey Wind Institute Fellowship through the New Jersey Department for Economic Development: Fall 2023-Fall 2024

Rutgers University–Camden Graduate School of Arts & Sciences: Camden, NJ
M.S in Pure Mathematics: May 2020

Rutgers University–Camden Institute for Effective Education: Camden, NJ
Teacher Preparation Program: Mathematics (P-12)
Teaching Certification: Awarded Jan. 2019, CEAS

Rutgers University–Camden College of Arts & Sciences: Camden, NJ
B.A in Mathematics: Awarded May 2018
Minor: Spanish

The University of Salamanca: Salamanca, Spain
Study Abroad: June 2016-Aug. 2016

HONORS AND AWARDS

American Control Conference Travel Grant (May 2023)

Rutgers Global Grant (January 2023)

Camden Graduate Scholarship recipient (Jan. 2018-May 2020)

Meritorious Achiever Award recipient (Sept. 2014- May 2018)

Academic Excellence Scholarship recipient (Sept. 2014-May 2018)

Mathematical Sciences Career Motivation Award recipient (May 2018)

Phi Beta Kappa Honor Society

International Mathematics Honor Society (Pi Mu Epsilon of New Jersey Gamma)

The National Leadership Honor Society (Omicron Delta Kappa)

Rutgers University–Camden Athenaeum Honor Society

Rutgers University–Camden Civic Scholar Scholarship recipient (Sept. 2014- May 2018)

Rutgers University–Camden Honors College (Sept. 2014-May 2018)

TEACHING EXPERIENCE

Rutgers University–Camden: Camden, New Jersey

Part Time Lecturer
Jan. 2019-present

- Assigned to teach courses covering topics in calculus, elementary/intermediate algebra, basic set theory and basic logic
- Plan and execute algebra lessons based on student need
- Develop materials to be used as assessment, homework, and supplementary materials for students

Teaching Assistant (TA)
Jan. 2020-2022

- Assigned to grade homework assignments, answer student questions, and assist in the administration of exams for courses such as Calculus II, Calculus III, and Differential Equations
- Assisted various professors in the development and implementation of their remote courses including but not limited to:assisting in development of lecture videos, attending virtual lectures for technical support, assisting in the development of virtual learning resources, assisting in communication between professor and students

Course Developer
Sept. 2020

- Assigned to develop the online section of an introductory algebra course for Rutgers University–Camden
- Involving but not limited to creating: lecture videos, syllabus, course schedule, exams and homework, grading scale, and course expectations for a partially asynchronous version of the course.

TEACHING EXPERIENCE CONTINUED

Collingswood High School: Collingswood, New Jersey

Long-Term Substitute Teacher
Sept. 2016-June 2019

- **Possess a State of New Jersey Substitute Teacher Certification**
- **Long-term substitute for AP Calculus and Honors Trigonometry (April 2018-June 2018)**
- **Instruct 80 sophomore, junior, and senior year students in the absence of the classroom teacher**
- **Help to prepare AP Calculus students for the College Board AP exam**
- **Create, implement and manage online resources for students participating in a Twilight program**
- **Substitute in the absence of cross-disciplinary teachers and student aids in grades 6-12**
- **Implement classroom management strategies in the absence of the regular classroom teacher**

Cinnaminson Middle School: Cinnaminson, New Jersey

Student Teacher
Sept. 2018-Dec. 2018

- Plan and execute Common Core-aligned pre-algebra lessons for 90 seventh grade students of varying skill-levels
- Participate in parent-teacher conferences, staff meetings, and department meetings
- Implement classroom management strategies

First Korean United Methodist Church (FKUMC): Cherry Hill, NJ

Pre-Calculus and AP Calculus Instructor
June 2018-Sept. 2018

- Teach 12 students in Pre-Calculus and 4 in AP Calculus during a summer enrichment program (totaling 45 hours per class)
- Prepare curriculum and materials
- Grade assignments
- Administer assessments

Self-Employed: Collingswood, NJ

Math Tutor
June 2013-present

- Tutor 15 students ranging from 4th grade math to college calculus including ESL and ELL students
- Prepare grade-level curriculum

RESEARCH EXPERIENCE

Rutgers University–Camden: Camden, New Jersey

Graduate Researcher for the Center for Computational and Integrative Biology
Fall 2021-Present

- Principal Investigator: Dr. Beneddetto Piccoli
- Topics of Study:
  - Apply systems of ordinary differential equations to various biological problems.
  - Develop models in order to quantify biological systems and provide a pipeline for future computational research.

Masters Thesis in Pure Mathematics
Fall 2020

- Supervisor: Dr. Siqi Fu
- Topic of study: Properties of bounded domains and minimizing the first Dirichlet Laplacian Eigenvalue.

Research Assistant for the Center for Computational and Integrative Biology
Fall 2020

- Supervisors: Dr. Beneddetto Piccoli and Dr. Sean McQuade
- Topic of Study: Developing extended SIR model coupled with Optimal Control Scheme in order to shed light on COVID-19 impact on the state of New Jersey

Participate in the word's largest live traffic experiment in the world
Fall 2022

- Attend planning meetings for the development of a 100 autonomous vehicle traffic experiment
- Develop plan for car deployment and collection for experiment days
- Assist hardware team in installation and removal of key hardware for data collection
- Direct car deployment live for 5 days of testing during the actual experiment

Rutgers University

Fellow of the Wind Institute
Fall 2023-Fall 2024

- Receive grant funding for work on projects relating to offshore wind energy development
- Develop research questions surrounding optimal turbine placement in the state of New Jersey
- Present progress at wind energy conference
- Attend various networking and informational events surrounding the New Jersey Wind energy landscape

Yale University: New Haven Connecticut

Student Facilitator
Spring 2021-Fall 2021

- Receive grant funding for work on projects relating to high performance computing
- Present goals of the proposed project
- Give weekly project updates to project facilitators.
- Present the progress made on the proposed project over the lifetime of the grant (6 months)

Research Products

1. Weightman, R. (2021). Steiner symmetrization and the eigenvalues of the Laplace operator on polygons (Masters dissertation, Rutgers University-Camden Graduate School).

2. McQuade, S. T., Weightman, R., Merrill, N. J., Yadav, A., Trélat, E., Allred, S. R., & Piccoli, B. (2021). Control of COVID-19 outbreak using an extended SEIR model. Mathematical Models and Methods in Applied Sciences, 1-26.

3. Luo, Q., Weightman, R., McQuade, S. T., Díaz, M., Trélat, E., Barbour, W., ... & Piccoli, B. (2022). Optimization of vaccination for COVID-19 in the midst of a pandemic. arXiv preprint arXiv:2203.09502.

4. Weightman, Ryan, Anthony Sbarra, and Benedetto Piccoli. "Coupling compartmental models with Markov chains and measure evolution equations to capture virus mutability." Mathematical Models and Methods in Applied Sciences(2022).

5.R. Weightman. “Epidemiological Modeling of Covid-19 Over Time.” Presentation at Rutgers Camden Center for Computational and Integrative Biology Seminar 2022

6. Weightman, Ryan, and Benedetto Piccoli. "Optimization of non-pharmaceutical interventions for a mutating virus." 2023 American Control Conference (ACC). IEEE, 2023.

7. Hayat, A., Alanqary, A., Bhadani, R., Denaro, C., Weightman, R., Xiang, S., ... & Piccoli, B. (2023). Traffic smoothing using explicit local controllers.

8. R. Weightman. “Incorperating Viral Mutation Into Epidemiological Models.” Presentation at Rutgers Camden Center for Computational and Integrative Biology Seminar 2023

9. Weightman, R., Moroney, S., Sbarra, A., & Piccoli, B. (2021, September). Advanced Models for COVID-19 Variant Dynamics and Pandemic Waves. In Virtual Workshop of Mathematical Modelling and Control for Healthcare and Biomedical Systems (pp. 217-243). Cham: Springer Nature Switzerland.

10. Morand, V., Müller, N., Weightman, R., Keimer, A., Piccoli, B., & Bayen, A. Deep Learning of First-Order Nonlinear Hyperbolic Conservation Law Solvers. Available at SSRN 4614193.

11. R. Weightman. “ Optimization of non-pharmaceutical interventions for a mutating virus.” Presentation at 2023 American Control Conference (ACC).

Competency in the Following Programs:

MATLAB

C++

Python

HTML

Canvas

Youtube (for creating educational content)