VANESSA RIVERA–QUIÑONES, PH.D.

Data Scientist · Mathematical Biologist · Educator

Webpage· GitHub· LinkedIn

SUMMARY

- Applied Mathematician with 5 years of experience managing interdisciplinary and computational projects using R, Python and MATLAB.
- Effective writer and public speaker with the ability to present complex ideas in a clear manner.
- Highly adaptable professional who enjoys learning new skills, embraces teamwork, and is able to work independently.

SKILLS

Programming Languages	Python, MATLAB (proficient), R , SQL (intermediate)
Python Packages	Pandas, Matplotlib, Numpy, Jupyter, Scikit-Learn, TensorFlow, Apache Spark
Software & Tools	HTML, LaTeX, Microsoft Office (Word,Excel,PowerPoint), Mathematica
Languages	Spanish (native), English (fluent)

RELEVANT COURSE WORK

Stochastic Processes, Machine Learning, Numerical Methods for Partial Differential Equations, **DataCamp:** Data Scientist in Python Track, Natural Language Processing Fundamentals with Python.

EDUCATION

University of Illinois at Urbana – Champaign, Illinois

Ph.D., Mathematics (August 2019), Thesis: "Mathematical Models of *Daphnia* Epidemics."
M.S., Applied Mathematics (August 2016)

University of Puerto Rico – Río Piedras, Puerto Rico

B.S., Mathematics, Minor: Finance, *Magna Cum Laude* (May 2013)

PROFESSIONAL EXPERIENCE

Freelance, Data Scientist: Developed independent projects to expand my data science skills.

- Built an automatic credit card approval predictor using a logistic regression model and performed cross-validation to find optimal hyperparameter values.
- Using fuzzy (sound) name matching to find the gender distribution of children's picture books authors over time.
- Built and measured the accuracy of a support vector machine (SVM) model that can automatically detect honey bees and bumble bees from image data.

Co-editor, Blog on Math Blogs (2019 – Present)

- Write two monthly posts covering the mathematical blogosphere for the Blog on Math Blogs by the American Mathematical Society (AMS). Topics include mathematics research, applied mathematics, data science and machine learning, mathematicians, math in the news, mathematics education, math and the arts and more.

Project Manager at the Illinois Geometry Lab (2018, 2019)

- Managed a team of students on evaluating models for social group competition and modeling prevalence of JUUL and other E-Cigarrete use (Spring 2019) and genetic algorithms to model molecular clocks in Python (Spring 2018).

- Coordinated and guided students to meet objectives and goals in a timely manner.
- Provided critical feedback on verbal and written reports.

To dine or not to dine? A visual exploration of Chicago's food inspections: As part of Hack Culture 2019 (3rd place), our team gained the skills of data literacy, data cleaning, data analysis, and data visualization and communication using the Agile framework over the course of four weeks.

- Analyzed health inspection data for the city of Chicago during 2018–2019 and visualized key trends using an info-graphic.
- Provided ideas for analysis and an app that could be performed by the agencies themselves.

United Nations Inter-operability Tool for Efficient Data utilization (UNITED) :

- Created a prototype of a database that can be shared through organizations to facilitate refugee aid while granting ownership and protection of data to user during their journey as part of the Belgian Humanitarian Hackaton 2019 team project.

RESEARCH EXPERIENCE (2013–2019)

Role of Recovery in Disease Spread

- Implemented the Gillespie algorithm in MATLAB to simulate a stochastic model of recurrent epidemics. • Developed a partial differential equation model where recovery is a function of age-since-infection. • Computed relevant epidemiological quantities such as the basic reproduction number and prevalence to evaluate the model.

Phototactic Behavior in *Daphnia*: Studied how the zooplankton *Daphnia* adapts its phototactic behavior (i.e. moves away or towards light) as a response to infection pressures.

- Converted video data into image data and applied image recognition techniques using MATLAB and ImageJ to visualize the movement trajectory for individual *Daphnia*. • Prepared training manual and trained undergraduate students in performing the data analysis using ImageJ.

Modeling Disease Spread in *Daphnia* Epidemics: Analyzed conditions which lead to an epidemic through a variety of predictive models and numerical simulations.

- Extended a predictive mathematical model for analyzing an invasion of a competing species and performed numerical simulations to validate our findings. • Visualized competition outcomes in MATLAB and communicated results through written reports and oral presentations.

SELECTED TEACHING EXPERIENCE AT UNIVERSITY OF ILLINOIS

Illinois Geometry Lab/ Uni High Summer Camp (June 2019)

- Lead a research project for a team of three high school from the University of Illinois Laboratory High School students in exploring mathematical models.
- Collaborate with other project leaders in organizing the camp activities.
- Design one-week crash course on the biological applications of game theory, prepare homework, and assign project exploration tasks.

Teaching Assistant (2013–2019)
Courses: Theory of Arithmetic, Pre-Calculus (*), Calculus for Business I (*), Calculus I and, Calculus II for Engineers, Ordinary Differential Equations. (*) Denotes Head Teaching Assistant position.

- Led discussion sessions of about 32 students each in small groups active learning activities.
- Developed course curriculum, facilitated classroom lessons, created solution.
- Provided feedback to instructors on course content materials, homework, and exams.
- Tutored students, graded homework and exams to ensure students understood course concepts.

SELECTED INVITED AND CONFERENCE TALKS

- "Applied Machine Learning: Where my girls at?"
  AWM Mini-Symposium, Department of Mathematics, University of Illinois, (2018).
- "The Role of Recovery in Disease Spread."
  Intl.Symp. of Biomathematics,Research,Ecology & Education, Illinois State University, (2017).
- "Survival of the fittest: Adaptation and its role in disease spread."
  Invited Talk, MATRIX Undergraduate Math Club, April (2018), Rose–Hulman Institute of Technology, Undergraduate Seminar (2017), Great Talks for a General Audience, MAA MathFest, Chicago, IL (2017).
- "A Mathematical View of Adaptation and Diversification."
  Graduate Student Colloquium, Department of Mathematics, University of Illinois (2017).
- "Host polymorphism in *Daphnia* epidemics."
  Intl.Symp. of Biomathematics,Research,Ecology & Education, Illinois State University, (2015).

LEADERSHIP EXPERIENCE

Lathisms Junior Associate (2019)

- Lathisms.org was founded to showcase the contributions of Latinx and Hispanic mathematicians. In charge of sending out calls for nominations to past Lathisms mathematicians and via social media and academic listserves.

STEM–Female Alliance Vice-President (2014–2018)

- Raised awareness of gender issues occurring within the STEM community.
- Organized community engagement and professional development events for graduate students.

Association for Women in Mathematics (AWM), U. of Illinois Student Chapter

- Co-founded the Teaching & Diversity Seminar, organized the Graduate Student Colloquium, professional development activities, and informal chats with visiting professors.
- Coordinated the Women in Mathematics seminar to support women discussing mathematics.

SERVICE AND MENTORING

- Helped new graduate and undergraduate students become familiar with departmental culture, strategies for success and resources at the University and in Champaign–Urbana through the **Sloan UCEM Peer Mentor** and **Merit Scholar Graduate Mentor** programs.
- Held a workshop for girls in 2nd-5th grade to explore mathematical models through a game based simulation of frog extinction (Fall 2017) and 2-D and 3-D polyhedron models (Spring 2013) as part of **Girls Do Science** program.
- Collaborated in workshops for female high school and middle school students regarding topics in mathematics as part of the **Sonia Kovalevsky Day** program.
- Explained to the general public the functions of the Illinois Geometry Lab and showcased the properties of polyhedrons using paper models as part the **Science at the Market program**.

AWARDS

Teaching Awards: Brahana TA Instructional Award, Department of Mathematics (Fall 2017) — List of Teachers ranked as excellent by their students: Fall: 2014, 2015, Spring: 2015, 2017. **Fellowships**: Ford Foundation Predoctoral Fellowship Award (2015–2019) — State Farm Mathematics Doctoral Fellowship (2014, 2016). **Graduate College Student Awards:** Service to Educational Equity Programs Certificate (2017) — Academic Excellence & Good Citizenship Award (2016)