Sofya Zaytseva

Curriculum Vitae

Education

Aug 2014 – Aug 2019	**Ph.D., Applied Science**, *College of William and Mary.*
Advisor:	Leah Shaw
Thesis:	*"Investigation of Pattern Formation in Marine Environments Through Mathematical Modeling and Analysis of Remotely Sensed Data."*
Aug 2013 – July 2014	**MS, Applied Mathematics**, *University of North Carolina Wilmington.*
Advisor:	Xiaojie Hou
Thesis:	*"Periodic Solutions and Turing Patterns in a Cubic Autocatalator Model."*
Aug 2009 – May 2013	**BS, Applied Mathematics**, *University of North Carolina Wilmington.*
Advisor:	Xiaojie Hou
Thesis:	*"China's Economy: A Modified Predator Prey Model."*

Academic and Work Experience

Aug 2019 – present	**Limited Term Assistant Professor**, University of Georgia, Department of Mathematics.
Sep 2014 – Aug 2019	**Research Assistant**, College of William and Mary, Applied Science Department.
	Use mathematical modeling, statistical analysis, GIS and remotely sensed data to investigate pattern formation in marine environments, in particular tidal marshes and oyster reef habitats. Propose a system of partial differential equations to describe spatial patterning of the tidal marsh habitat through interactions between sedimentation and two keystone marsh species. Investigate the system numerically and analytically to understand spatial variation in marhses. Process, classify and analyze sonar and drone imagery of oyster reefs to understand their geometry and which reef configurations are best suited for restoration.
Jun 2016 – Aug 2016	**Intern**, Department of Homeland Security, ANSER.
	"Haitian Maritime Migration: An Agent-based Modeling Approach." Developed an agent-based model in NetLogo to simulate the movement of migrant vessels and United States Coast Guard assets in the Caribbean to find most efficient response strategies, patrolling patterns and resource allocation methods.
Aug 2013 – Jun 2014	**Intern**, Biostudy Solutions.
	Performed statistical analysis of pharmacokinetic data to establish bioequivalence of generic drugs; researched and developed study designs for clinical trials.
May 2012 – Dec 2012	**Intern**, PharPoint Research.
	Used SAS to prepare clinical trial reports for submission to the FDA.
Jan 2012 – May 2012	**Undergraduate research**, University of North Carolina at Wilmington.
	Analysis of a System of Differential Equations: Population and Harvesting Dynamics of the North Carolina Red Drum.

Research collaborations

June 2019 – present	*"Malaria in Botswana: In a connected world, how do neighbours influence elimination probability?"* Research collaboration as part of the IPAM Collaborative Workshop for Women in Mathematical Biology.

Aug 2018 – present	*"Devotion at Sub-national Level: Ramadan, Night-time Lights, and Religiosity in Egyptian Governorates."* Develop a VIIRS satellite night-time lights based measure of religiosity and validate it against survey-based religiosity measures. Joint work with Sabri Ciftci at Kansas State University and Michael Robbins at Arab Barometer.
Feb 2017 – May 2017	*"Modeling the Political Economy of the Middle East: Investigating the Regional Economic and Political Impact of Changing Energy Prices."* Diplomacy Lab project at the Institute for the Theory and Practice of International Relations at William and Mary under the direction of Sid Ghose. Investigated the impact of oil prices on military and defense spending, regional instability, labor migration and foreign aid using regression analysis and Granger causality.

Teaching Experience

October 2018 – May 2019	**Tutor**, *Williamsburg Community Chapel.* Provide weekly volunteer k-12 math tutoring.
Jan 2018 – May 2018	**Teaching Fellow**, College of William and Mary, Math Department. Taught an introductory course in Linear Algebra.
June 2017, 2018	**EXTREEMS QED summer research program**, *College of William and Mary.* Developed and taught two tutorials on using R and Matlab.
Aug 2013 – May 2013	**Teaching Assistant**, University of North Carolina at Wilmington. Led weekly recitations of College Algebra, graded tests and homework, tutored students in mathematics and statistics tutor at the university tutoring center.

Publications

- Zaytseva, S., Shaw L.B., Lipcius R., Junping S., Kirwan, M.L., *Pattern formation in marsh ecosystems modeled through the interaction of marsh vegetation, mussels and sediment*,(submitted)
- Zaytseva, S., Shaw L.B., Junping S., *Model of pattern formation in marsh ecosystems with nonlocal interactions*,(submitted)
- Zaytseva, S., Lipcius R., Shaw L.B., *Analysis of oyster reef patterns in remotely sensed data*,(in preparation)

Invited Presentations

Janury 2019	**Joint Mathematics Meeting**, *Baltimore, Maryland.* "Model of pattern formation in marsh ecosystems with nonlocal interactions." Invited speaker in the AMS Special Session on Mathematical Investigations of Spatial Ecology and Epidemiology.
March 2018	**Department of Mathematics, Virginia Commonwealth University**, *Richmond, Virginia.* "Pattern formation in Marine Ecology". Invited speaker in the weekly mathematics colloquium.
July 2016	**11th American Institute of Mathematical Sciences (AIMS) Conference**, *Orlando, Florida.* "Using a System of Reaction Diffusion Equations with Nonlocal Interactions to Model Pattern Formation in the York River Tidal Marshes." Invited speaker in the special session on Pattern Formation and Recognition in Structured Information and Biological Systems with External Forcing.

Selected Contributed Presentations

July 2018	**2018 Society for Industrial and Applied Mathematics (SIAM) Annual Meeting**, *Portland, Oregon.* "Imagery Analysis to Investigate Oyster Reef Pattern Formation"
May 2017	**2017 SIAM Conference on Applications of Dynamical Systems**, *Snowbird, Utah.* Poster "Pattern formation in marsh ecosystems."

March 2017	**16th Annual Graduate Research Symposium**, *College of William and Mary*.
	"Pattern formation in marsh ecosystems modeled through the interaction of marsh vegetation, mussels and sediment."
May 2016	**BAMM! Biology and Medicine through Mathematics Conference**, *Richmond, Virginia*.
	"Spatial patterning in the York River tidal marshes through the interaction of cordgrass, mussels and sediment."

Features and Awards

- Received the 2019 William and Mary Graduate Studies Advisory Board Award for Excellence in Scholarship in the Natural and Computational Sciences for paper titled *"Analysis of oyster reef patterns in remotely sensed data."*
- Featured in a July 2018 SIAM news article titled *"Imagery Analysis Improves Oyster Reef Restoration Efforts in the Chesapeake Bay."* Link to article
- Received the 2017 William and Mary Award for Excellence in the Natural Computational Sciences for paper titled *"Pattern formation in marsh ecosystems modeled through the interactions of marsh vegetation, mussels and sediment."*

Professional Development

October 2018	**Mapping with Drones**, *Virginia Tech Richmond Center*, Richmond, Virginia.
	Three-day workshop on federal sUAS regulations, sUAS platforms, sensors, image processing software techniques an sUAS project workflows.
June 2016	**2016 Seminaire de Mathematiques Superieures: Dynamics of Biological Systems**, *University of Alberta*, Edmonton, Canada.
	Two-week seminar on various topics in dynamical and biological systems.
July 2015	**AARMS Summer School on Differential Equations and Numerical Analysis**, *Dalhousie University*, Halifax, Canada.
	Four week long course on "Waves and Patterns in Nonlinear Systems."
March 2015	**"Dynamic Energy Budget Models: Theory and Application"**, *Virginia Institute of Marine Science*, Gloucester, Virginia.
	Week long workshop on dynamic energy budget models with Jaap van der Meer.

Skills & Abilities

Programming	Matlab, R, Python, SAS, NetLogo
Software	ArcGIS, QGIS, Inkscape
Linguistic	Russian, English
Misc	Geospatial Analysis, Image Processing, Remote Sensing