Seth Joseph Theuerkauf

Marine Conservation Ecology • Geographic Information Systems (GIS) • Research • Leadership

Current Position: PhD Candidate & Dept. of Defense NDSEG Fellow
North Carolina State University, Center for Marine Science and Technology
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U.S. Citizen, Registered for the Selective Service

OVERVIEW

I am an effective and productive environmental scientist with a proven ability to lead high-impact, collaborative scientific research on marine and coastal systems, and to translate results into usable information for policymakers. I am able to successfully acquire grant funding from government and nongovernment sources ($168,900 received as PI), and to efficiently manage limited budgets and personnel. I have extensive collaborative scientific research experience (3 first-author, peer-reviewed written publications with collaborators from multiple institutions across the U.S., 4 in revision or review). I am also an effective public speaker and am able to clearly translate peer-reviewed findings to managers and policymakers (sole graduate student member of multi-agency working group related to coastal habitat restoration; 9 presentations at international, national and regional conferences).

EDUCATION

2013–Present. (Anticipated Graduation: August 31, 2017). Doctor of Philosophy in Biological Oceanography (Advisor: Dr. David Eggleston), Dept. of Marine, Earth and Atmospheric Sciences, *North Carolina State University*; Candidacy Achieved: March 2015; Cumulative GPA: 4.00/4.00.

2013–2016. Graduate Certificate in Geographic Information Systems (GIS), Dept. of Geospatial Information Science and Technology, *North Carolina State University*; Cumulative GPA: 4.00/4.00.

2009–2012. Bachelor of Science, *summa cum laude*, Majors: Biology and Environmental Science, *The College of William and Mary*; Cumulative GPA: 3.89/4.00; Earned Honors in Research in Biology (Advisors: Dr. Romuald Lipcius, Dr. Matthias Leu).

EMPLOYMENT EXPERIENCE

PhD Candidate, Department of Defense NDSEG Graduate Research Fellow. North Carolina State University, Center for Marine Sciences and Technology. Morehead City, NC. Supervisor: Dr. David Eggleston. August 2013–Present.

I lead field-, laboratory-, and spatial analysis-based marine conservation ecology research initiatives to empower state and federal coastal resource managers with information needed to better restore and manage coastal habitats to enhance their resiliency. To accomplish my scientific research duties, I have successfully solicited funding from government and nongovernment sources, requiring effective management of budgets and personnel. I have also: worked with peers to identify and resolve problems requisite to successfully conduct research initiatives, provided technical advice regarding research procedures and establishment of appropriate quality controls, and have co-authored technical and peer-reviewed scientific reports. In addition, I actively participate in multi-agency working groups to translate scientific findings to coastal resource managers, stakeholder groups, agency management, and policy makers.

Key Accomplishments:

- Successfully acquired competitive research funding from government and nongovernment sources ($168,900 received as PI; see 'Research Grants' section).
- Published written peer-reviewed publications from collaborative scientific research initiatives (3x 1st-author published, 3x in revision or in review; see 'Peer-Reviewed Publications' section).
- Participated in multi-agency working groups, including serving as the sole graduate student Steering Committee Member and Poster Session Coordinator for the 2016 Governor's South Atlantic Alliance Living Shorelines Summit.
- Led NC State Univ. Dept. of MEAS Grad. Student Assoc.: President ('14 –'15), Vice President ('13 –'14).
- Translated peer-reviewed scientific findings to state and federal resource managers, stakeholder groups, agency management, and policy makers (e.g., partnership with the NC Division of Marine Fisheries, NC Coastal Federation (NGO), and The Nature Conservancy to develop a GIS-based decision support tool to inform oyster restoration).
- Effectively led research teams to achieve research goals while maintaining quality control and data integrity standards, especially in harsh field conditions and under strict timelines.

Research Technician. North Carolina State University, Center for Marine Sciences and Technology. Morehead City, NC. Supervisor: Dr. David Eggleston. May 2013–August 2013.

I assisted with all field and laboratory activities, including field population demographic sampling of natural and restored oyster reefs throughout Pamlico Sound, North Carolina. I developed and managed spatial databases (ArcGIS geodatabases) related to oyster reef footprints in North Carolina. I managed undergraduate personnel in their day-to-day activities, including communicating proper laboratory- and field-based methods, techniques, and safety considerations. I assisted with writing of technical and scientific reports, including final grant reports for various government and nongovernment funding sources.

Key Accomplishments:

- Successfully supervised and provided technical advice to two undergraduate intern students who conducted independent research initiatives.
- Assisted with integration of spatial analysis and GIS tools into field research planning.
- Established an online GIS database to host and manage spatial data on oyster reefs in North Carolina.
- Effectively communicated with and led field research teams to accomplish projects using standard methods and techniques (including ability to trailer and navigate small research vessels in shallow estuarine waters).
- Mentored and advised students to ensure they received necessary training to independently address scientific research questions (i.e., experimental design and data analysis).

Laboratory and Research Specialist I. College of William and Mary, Virginia Institute of Marine Science. Gloucester Point, VA. Supervisor: Dr. Romuald Lipcius. December 2012–May 2013.

As a 2012 College of William and Mary (W&M) Honors Fellow with funding support from the W&M Monroe Scholars program (reserved for top 7% of each graduating class) and the W&M Roy R. Charles Center, I began a Biology Dept. Undergraduate Honors Thesis that developed and validated a fine-scale GIS-based spatial habitat suitability index to guide oyster restoration in the Great Wicomico River, a tributary of Chesapeake Bay. I conducted this research in partnership with a federal government agency, the U.S. Army Corps of Engineers (USACE), requiring frequent meetings with, and presentations to, USACE coastal resource managers and researchers. I continued this work as a Laboratory and Research Specialist I at the Virginia Institute of Marine Science (VIMS) with funding from the USACE. In addition to this spatial analysis work, I also participated in

both the annual Chesapeake Bay-wide winter blue crab dredge survey led by VIMS and a blue crab dredge fishery mortality study. Participation in the blue crab dredge survey (ongoing for > 25 years) required careful attention to established, well precedented methods and proper data management despite adverse field conditions. I also assisted with integration of GIS and spatial analysis into field survey planning (i.e., use of spatial analysis to determine sampling stations for a stratified random sampling design).

Key Accomplishments:

- Collaboratively developed a GIS-based spatial analysis model to guide oyster restoration that was used by the USACE to inform rehabilitation of oyster reefs in a tributary of Chesapeake Bay and led to a first-author peer-reviewed publication.
- Made multiple presentations to federal government agencies (i.e., USACE) and stakeholder groups to translate scientific findings and results.
- Effectively translated peer-reviewed scientific findings via presentations to federal coastal resource managers and stakeholders.
- Utilized spatial analysis and GIS tools, R statistical package, Matlab, Latex, Microsoft Office products, and Adobe Illustrator to conduct analyses and to generate effective figures, reports, and presentations.

GIS Teaching Assistant. College of William and Mary, Center for Geospatial Analysis. Williamsburg, VA. Supervisor: Dr. Stuart Hamilton. June 2011–July 2011; August 2012–December 2012.

I developed course materials and ArcGIS-based laboratory activities for two courses, one for graduate students at the Virginia Institute of Marine Science during summer 2011, and another for undergraduate students at W&M during fall 2012. I assisted students with understanding the underlying purpose of various spatial analysis tools and to conceptualize efficient workflows to successfully achieve desired spatial analyses (e.g., designing ArcGIS ModelBuilder models). I also assisted multiple graduate and undergraduate students with completion of spatial analyses required for their own research.

Key Accomplishments:

- Assisted ~15 graduate and ~20 undergraduate students to understand and complete spatial analysis coursework.
- Collaboratively developed GIS course and laboratory materials.
- Effective teacher of spatial analysis and GIS techniques.
- Effective presentation skills, in the form of lectures and structured laboratory activities.

Laboratory Aide. College of William and Mary, Virginia Institute of Marine Science. Gloucester Point, VA. Supervisor: Dr. Romuald Lipcius. June 2007–December 2012.

I served as a Laboratory Aide within the Marine Conservation Biology and Community Ecology (MCBCE) lab at VIMS from summer 2007 (as a rising high school junior) through December of 2012 (5 years total), providing assistance with all field- and laboratory-based research activities. During summers, I was a full-time employee, and during the academic year, I was a part-time employee (~15 hours per week). I was intimately involved in the field sampling (and laboratory processing) of restored oyster reefs in tributaries of Chesapeake Bay to assess restoration success. I conducted independent research to assess the efficacy of alternative reef materials for use in oyster restoration efforts, and later published this work in a peer-reviewed journal. I worked collaboratively and adaptively with graduate students and staff within the MCBCE lab to complete lab-wide

research initiatives and offered technical GIS advice to aid with field experiment planning and subsequent spatial analysis. I frequently assisted with preparation of technical and scientific reports (e.g., final grant reports) and presentations to local nongovernment (e.g., Lynnhaven River Now) and government groups (e.g., USACE) to translate scientific findings regarding the status of restored oyster reefs in Chesapeake Bay tributaries. I also managed personnel within the lab, providing mentorship to undergraduate and high school interns that conducted independent research studies.

Key Accomplishments:

- Published a first-author peer-reviewed journal article based on independent research.
- Successfully supervised and mentored 3 high school interns and 2 undergraduate interns who conducted independent research projects.
- Received multiple awards, including the Virginia Sea Grant College Program Award and Virginia Museum of Natural History Research Award for independent research.
- Effective science communicator to public audiences, with communication of peer-reviewed scientific results to stakeholder groups in the form of presentations and published technical and scientific reports and targeted scientific outreach to local K-12 students.

HONORS AND AWARDS

- The Phi Beta Kappa Society; inducted Fall 2012.
- James Monroe Scholar at the College of William and Mary (W&M; member of top 7% of the Class of '13; selected Spring '10).
- W&M Environmental Science and Policy Department Award for "Academic Excellence in Science" (highest graduating GPA within department); selected Spring 2013.
- W&M Dean's List for Academic Excellence (6x).
- Earned Undergraduate Honors in Research in Biology for research conducted w/ Dr. Romuald Lipcius (VIMS) and Dr. Matthias Leu (W&M) that resulted in a 1st-author peer-reviewed publication ("Quantitative validation of a habitat suitability index for oyster restoration" in Frontiers in Marine Science 3(64)).

TOTAL GRANTS AND SCHOLARSHIPS RECEIVED: $195,900; financed 50% of college tuition & 75% of graduate education through the acquisition of competitive, merit-based scholarships and fellowships

RESEARCH GRANTS

Total Received: $168,900

- *North Carolina Space Grant / North Carolina Sea Grant Graduate Research Fellowship*; Spring 2016 (1 year): $10,000. Proposal titled: "Integrating Spatial Ecosystem Services Considerations into a GIS-based Decision Support Tool for Oyster Restoration: Application of Remotely-Sensed Chlorophyll *a*."
- *Coastal Research Fellowship* administered by North Carolina Coastal Reserve and North Carolina Sea Grant; Spring 2015 (1 year): $10,000. Proposal titled: "Quantifying the Impact of an Invasive Species on Ecosystem Service Provision: Applications for *Phragmites australis* Management in the NC Coastal Reserve System."
- *National Defense Science and Engineering Graduate Fellowship* administered by the American Society for Engineering Education (ASEE); Spring 2014 (3 years): $140,000. Proposal titled: "Hierarchical Habitat Suitability Modeling to Guide Shoreline Habitat Protection and Oyster Restoration."
- *College of William and Mary Honors Fellowship* administered through the Roy R. Charles Center; Spring 2012; $4,000.
- *College of William and Mary Honors Research Assistance Grant* administered through the Roy R. Charles Center; Spring 2012; $1,000.

- *College of William and Mary James Monroe Scholar Summer Research Grant* administered through the Roy R. Charles Center; Spring 2012; $3,000.
- *College of William and Mary Center for Geospatial Analysis Student Research Grant* administered through the Roy R. Charles Center; Spring 2012; $500.
- *College of William and Mary Student Activities Travel Grant*; Spring 2010, Fall 2010; $400.

MERIT SCHOLARSHIPS AND AWARDS

Total Received: $23,000.

- *Southern Association of Marine Laboratories (SAML) Student Support Award*; selected Fall 2015; $150.
- *North Carolina Coastal Conservation Association Scholar*; selected Summer 2014; $750.
- *Beneath the Sea Foundation "Jordan Viders Spirit of the Sea" Scholar*; selected Spring 2014; $1,000.
- *National Science Foundation Graduate Research Fellowship Program "Honorable Mention" Fellow*; selected Spring 2013.
- *James Monroe Scholar at the College of William and Mary* (member of the top 7% of the Class of 2013); selected Fall 2010.
- *The Morris K. Udall and Stewart L. Udall National Foundation "Honorable Mention" Scholar*; selected Spring 2011; $350.
- *Robert C. and Muriel M. Jennings Scholarship*, administered by the Alpha Chapter of Phi Beta Kappa; selected Fall 2012: $2,000.
- *Virginia Federation of Garden Clubs, Inc. Thelma W. Utt Environmental Scholarship*; selected Spring 2012; $2,000.
- *Beneath the Sea Foundation "Discovery" Scholar*; selected Spring 2011; $1,500.
- *Marine Technology Society Student Scholar*; selected Spring 2009 and Spring 2010; $4,000.
- *Henry W. Mackenzie, Jr. Environmental Research Scholar*; selected Spring 2009 at the Virginia Junior Academy of Science; $5,000.
- *Virginia Soil and Water Conservation District Educational Foundation Scholar*; selected Spring 2009; $1,000.
- *Virginia Cable Telecommunications Association "Virginia Future Leaders" Scholar*; selected Spring 2009; $2,500.
- *Gloucester High School Coca Cola Foundation Scholar*; selected Spring 2009; $1,000.
- *Gloucester High School D.A.R.E. (Drug Abuse Resistance Education) Scholar*; selected Spring 2009, $1,000.
- *David Jewel Memorial Scholar*; selected Spring 2009, $750.

LEADERSHIP GRANTS

Total Received: $4,000

- *Graduate Student Association (GSA) Grant* to support Fall 2015 NC State University Dept. of Marine, Earth, and Atmospheric Sciences "Graduate Research Symposium" event; received $1,000 as GSA President from the NC State University Student Government.
- *Graduate Student Association (GSA) Grant* to support Spring 2015 NC State University Dept. of Marine, Earth, and Atmospheric Sciences "Departmental Unity" event; received $250 as GSA President from the NC State University Student Government.
- *SciREN (Scientific Research and Education Network) Grant* to support November 2014 SciREN Triangle Researcher-Educator Networking Event; received $500 as a SciREN Leadership Team officer from NC State University Dept. of Marine, Earth, and Atmospheric Sciences.
- *Marine Technology Society "Student Leader" Travel Grant* to support travel to the 2014 Marine Technology Society "Student Leadership" Meeting in St. Johns, Newfoundland, Canada; received $750 as Invited Student Representative.

- *Marine Technology Society "Student Leader" Travel Grant* to support travel to the 2011 MarineTechnology Society "Student Leadership" Meeting in Kona, Hawaii; received $1500 as Invited Student Representative.

PEER-REVIEWED WRITTEN PUBLICATIONS AND TECHNICAL REPORTS

***Published* (3)**

1. **Theuerkauf, S. J.**, D. B. Eggleston, B. J. Puckett, K. W. Theuerkauf. (2016). Wave exposure structures oyster distribution on natural intertidal reefs, but not on hardened shorelines. ***Estuaries and Coasts***. DOI 10.1007/s12237-016-0153-6
2. **Theuerkauf, S. J.**, R. N. Lipcius (2016). Quantitative validation of a habitat suitability index for oyster restoration. ***Frontiers in Marine Science***. 3(64).
3. **Theuerkauf, S. J.**, R. P. Burke, R. N. Lipcius. (2015). Settlement, growth, and survival of Eastern oysters on alternative reef substrates. ***Journal of Shellfish Research***. 34(2): 241-250.

***In Revision* (3)**

4. **Theuerkauf, S. J**., B. J. Puckett, K. W. Theuerkauf, E. J. Theuerkauf, D. B. Eggleston. (*in revision*). Density-dependent role of an invasive marsh grass on ecosystem service provision. PloS ONE.
5. **Theuerkauf, S. J.**, K. W. Theuerkauf, B. J. Puckett, D. B. Eggleston. (*in revision*). Oyster density and demographic rates on natural intertidal reefs and hardened shoreline structures. ***Journal of Shellfish Research.***
6. Duke, R. M., A. Schnetzer, **S. J. Theuerkauf**, D. B. Eggleston. (*in revision*). Clearance of phytoplankton and microzooplankton by the Eastern oyster (*Crassostrea virginica*). ***Estuaries and Coasts.***

***In Review* (1)**

7. K. W. Theuerkauf, D. B. Eggleston, **S. J. Theuerkauf.** *(in review).* An exotic species alters patterns of marine community development.

PROFESSIONAL ORAL PRESENTATIONS

- *2016 International Conference on Shellfish Restoration in Charleston, South Carolina*; Accepted Oral and Poster Presentation; November 2016. Presented (oral presentation): "Wave exposure structures oyster distribution on natural intertidal reefs, but not on hardened shorelines," and (poster presentation): "A GIS-based Decision Support tool for Oyster Reef Habitat Restoration."
- *2016 National Estuarine Research Reserve System Annual Meeting in Williamsburg, Virginia*; Accepted Poster Presentation; November 2016. Presented by co-author: "Does an invasive marsh grass, *Phragmites australis*, affect the provision of ecosystem services in oligohaline marshes?."
- *2016 ESRI Oceans GIS Forum in Redlands, California*; Accepted Oral Presentation; November 2016. Presented: "A GIS-based Decision Support tool for Oyster Reef Habitat Restoration."
- *2016 National Conference on Ecosystem Restoration in Coral Springs, Florida*; Accepted Poster Presentation; April 2016. Presented: "A GIS-based Decision Support Tool for Oyster Restoration." Awarded: Southern Association of Marine Labs Travel Grant.
- *2016 Governor's South Atlantic Alliance Living Shorelines Summit in Jacksonville, Florida*; Accepted Poster Presentation; April 2016. Presented: "A GIS-based Decision Support Tool for Oyster Restoration."
- *2015 Benthic Ecology Meeting in Quebec City, Quebec, Canada*; Accepted Oral Presentation; March 2015. Presented: "Interacting Effects of Geomorphological and Ecological Processes Guide Conservation and Restoration of Intertidal Oyster Reefs."
- *2010 College of William and Mary International Mercury Expo in Williamsburg, Virginia*; Invited Poster Presentation; April 2010. Presented: "Terrestrial-Aquatic Cycling of Mercury at Erosion Hotspots Along the South River in Virginia"
- *2010 American Geophysical Union "Ocean Sciences Meeting" in Portland, Oregon*; Accepted Poster Presentation; February 2010. Presented: "Settlement, Growth, and Survival of Eastern Oysters (*Crassostrea virginica*) Set Upon 'Oyster Castles' and other Reef Substrates in the York River, Virginia." Awarded: William and Mary Student Activities Travel Grant.

- *2009 Virginia Academy of Science in Richmond, Virginia*; Invited Presenter; May 2009. Presented: "Settlement, Growth, and Survival of Eastern Oysters (*Crassostrea virginica*) Set Upon 'Oyster Castles' and other Reef Substrates in the York River, Virginia"

TEACHING EXPERIENCE

- Teaching Assistant, Earth System Science (MEA100) at North Carolina State University, Spring 2014.
- Teaching Assistant, GIS for Biologists (BIOL445) at the College of William and Mary, Fall 2012.
- Teaching Assistant, Spatial Analysis (MSCI698; graduate course) at Virginia Institute of Marine Science, College of William and Mary; Summer 2011.

ADVISING AND PERSONNEL MANAGEMENT EXPERIENCE

- *CMAST High School Summer Research Aide*; served as the primary supervisor and acquired an independent grant (via 2015 NCCR/NCSG Coastal Research Fellowship program) to provide funding to support hiring a local high school summer research aide within the Marine Ecology and Conservation lab group.
- *NCSU CMAST Summer Fellows Internship Program*; served as the mentor for undergraduate students and assisted with the design and implementation of research projects. Students: Amber Perk (2013), Olivia Philips (2014), Brent Griffin (2015).
- *NCSU / Wake Tech Community College Internship Program*; served as the mentor for community college students and assisted with their integration into the Marine Ecology and Conservation lab group. Student: Rachel Willis (2014 & 2015).
- *NCSU Dept. of Marine, Earth and Atmospheric Sciences Peer Student Advisor* (founded mentorship program for incoming graduate students); Summer 2014.
- *William and Mary Peer Student Advisor*; Summer 2011, Winter 2011, and Summer 2012.
- *Virginia Institute of Marine Science Summer Mentorship Program*; assisted high school students with the design and implementation of research projects during the summers of 2010, 2011, and 2012.

LEADERSHIP EXPERIENCE

- Governor's South Atlantic Alliance Living Shorelines Summit Steering Committee and Poster Session Coordinator; designated coordinator for poster session, marketing, and day-of logistics for targeted summit on living shorelines that brought together ~150 researchers, pracitioners, policymakers (Fall 2015 – Spring 2016, event April 2016).
- Scientific Research and Education Network (SciREN) Leadership Team; NC State University Leader for the SciREN Triangle Event (Spring – Fall 2014).
- North Carolina State University Dept. of Marine, Earth and Atmospheric Sciences Graduate Student Association (GSA); president (Fall 2014 – Spring 2015), vice president (Fall 2013 – Spring 2014).
- William and Mary Marine Science Society; president (Spring 2012 – Fall 2012), vice president (Fall 2011 – Spring 2012), treasurer (Fall 2010 – Spring 2011), co-founder (Fall 2010).
    - Marine Technology Society "Student Section;" founder (Fall 2011).
    - Awarded the 2012 Marine Technology Society "Outstanding Student Section" Award

PROFESSIONAL WORKSHOPS

- "Introduction to Marxan" systematic conservation planning software course held at the Stony Brook University, NY; April 2011.
- ESRI Oceans "Scientific Tools for Marine and MetOcean Analysis" – training course on spatial statistical, Python, and emerging ArcGIS-based tools with marine science spatial analysis applications, held at ESRI Headquarters in Redlands, CA; November 2016.

SOFTWARE KNOWLEDGE

- Highly computer literate, and familiar with basic IT skills (e.g., network set-up, hardware and component installation, troubleshooting)
- Mac OS, Windows, Linux, Microsoft Office Suite (10+ years experience)
- ArcGIS (5 years experience)
- R Statistical Software (5 years experience)
- Matlab (3 years experience)
- Adobe Illustrator and Photoshop (3 years experience)
- Python Programming Language (2 years experience)
- Marxan Conservation Planning Software, Fragstats (1 year experience)

PROFESSIONAL AFFILIATIONS

- American Association for the Advancement of Science (AAAS): 2016-present.
- Society for Ecological Restoration (SER): 2016-present.
- National Shellfisheries Association; 2013-present.
- American Geophysical Union; 2009-present.
- American Fisheries Society (AFS); 2013-present.
    - North Carolina Chapter of AFS; 2013-present.
- Marine Technology Society; 2009-present.
- Virginia Academy of Science; 2009-present.

PROFESSIONAL CERTIFICATIONS

- NC Department of Wildlife Boater's Safety Certificate, Summer 2013.
- CPR/First Aid, Summer 2011.

REFERENCES (available upon request)

- Dr. David Eggleston, Professor of Marine Science and Director of NCSU CMAST, 252-222-6301, dbeggles@ncsu.edu
- Dr. Romuald Lipcius, Professor of Marine Science at VIMS, 757-869-2717, rom@vims.edu
- Dr. Brandon Puckett, Research Coordinator for the NC Coastal Reserve and National Estuarine Research Reserve, 252-838-0851, Brandon.Puckett@ncdenr.gov
- Dr. Russell Burke, Lecturer of Organismal and Environmental Biology at CNU, 757-594-7970, Russell.Burke@cnu.edu