

Patrick J. Kearns, Ph.D.
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RESEARCH & ACADEMIC INTERESTS

Disease ecology; Bioinformatics; Microbial ecology; host-pathogen interactions; host-microbe interactions; mycology; science education

EDUCATION

- 2017 Ph.D. Ecology, Evolution, and Marine Biology; Northeastern University
- Dissertation: Factors that affect the composition and activity of salt marsh microbial communities: the effect of nutrient loading and diel cycles
 - Advisor: Jennifer Bowen, Ph.D.
- 2012 B.S. Biology and B.A. History; University of Massachusetts Boston, *cum laude*
- Biology Thesis: The Effect of Decreasing Temperature on Arthropod Diversity and Abundance in Horse Dung Decomposition Communities of Southeastern Massachusetts
 - Advisor: Robert Stevenson, Ph.D

ACADEMIC POSITIONS

- Jan. 2026 – Present Assistant Teaching Processor, Northeastern University, Boston, MA
- Sept 2022 – Aug 2025 Assistant Professor of Research, UMass Boston, Boston, MA
- Sept. 2020 – Sept. 2022 Program Director and assistant professor of biology, Fisher College, Boston, MA
- Jan 2019– May 2025. Adjunct Lecturer, Bentley University, Waltham, MA
- Jan. 2019- Dec. 2019. Adjunct lecturer, Roxbury Community College, Boston, MA
- May 2018– May 2021 Associate Lecturer, UMass Boston, Boston, MA
- Feb. 2017 – April 2018 Postdoctoral Researcher, Shade Lab, Department of Microbiology and Molecular Genetics, Michigan State University, East Lansing, MI.

PUBLICATIONS (*most recent, n= 37*), * indicates undergraduate author

Pincus K*, **Kearns PJ**, Williams K*, Woodhams DC. *Accepted*. Nutrient enrichment alters the microbiome and increases chytrid load in the American Bullfrog (*Rana catesbeianus*). *Diseases of Aquatic Organisms*.

Woodhams DC, Miniz-Torres A*, Hertz A, **Kearns PJ**, et al. *Accepted*. Novel skin defense peptides and microbiota contribute to disease resilience of the Ngabe-Bugle leopard frog. *Frontiers in Amphibian and Reptile Science*.

Barnhart L*, LaBumbard B, **Kearns PJ**, et al. *Accepted*. Micromanagement: Conditions influencing antipathogen function of the skin microbiome in spotted salamanders, *Ambystoma maculatum*. *Frontiers in Amphibian and Reptile Science*.

Weston, N. B., Troy, C., **Kearns, P. J.**, Bowen, J. L., Porubsky, W., Hyacinthe, C*, et al. (2024). Physicochemical Perturbation Increases Nitrous Oxide Production in Soils and Sediments. *EGUsphere*, 2024, 1-20.

Tokash-Peters AG, et al. (2024). Mosquito microbiomes of Rwanda: characterizing mosquito host and microbial communities in the land of a thousand hills. *Microbial Ecology* 87: 64.

Kearns, P.J., Winter AS, Woodhams DC, Northup DE. (2023). The mycobiome of bats in the American Southwest is structured by geography, bat species, and behavior. *Microbial Ecology*, 86: 1565-1574.

Bintarti AF, **Kearns PJ**, Sulesky A*, Shade A. (2022). Abiotic treatment to common bean plants results in an altered seed microbiome. *Microbiology Spectrum*, 10: e00210-2.

Madden AA, Oliverio AM*, **Kearns PJ**, Henley JB, Fierer N, Starks PTB, Wolfe BE, Romero LA, Lattin CR. (2022). Chronic stress and captivity alter the cloacal microbiome of a wild songbird. *Journal of Experimental Biology*, 225: jeb243176.

Hanley TC, Bowen JL, **Kearns PJ**, Hughes AR. (2021). Short-and long-term effects of nutrient enrichment on salt marsh plant production and microbial community structure. *Journal of Ecology*, 109: 3779-3793.

Peng X, Ji Q, Angell JH, **Kearns PJ**, Bowen JL, Ward BB. (2021). Long-Term Fertilization Alters Nitrous Oxide Cycling Dynamics in Salt Marsh Sediments. *Environmental Science & Technology*, 55:10832-42.

Woodhams, Douglas C., et al. (2020). Host-associated microbiomes are predicted by immune system complexity and climate. *Genome biology* 21: 1-20.

TEACHING AND COURSE DEVELOPMENT

Courses

- Environmental Science and Sustainability
- Biology for non-Majors
- Cell and Molecular Biology
- Genetics
- General Chemistry 1 and 2
- General Biology 1 and 2
- Microbiology
- Genomics and the Human Microbiome
- Public Health and Epidemiology
- Climate Change
- Marine Ecology
- Biogeochemistry
- Coastal Ecology

Workshops

- Institute for Maximizing Student Development (IMSD) Research Immersion Lab (Winter 2022, Summer 2023)
 - Self-designed research-based course to expose underrepresented minorities in the UMass Boston IMSD program to hands-on research experiences
- Institute for Maximizing Student Development (IMSD) Research Immersion Project (Winter 2015, Winter 2016) in collaboration with the New England Aquarium

- Self-designed research-based course to expose underrepresented minorities in the UMass Boston IMSD program to hands-on research experiences
 - Students learned bioinformatic tools using QIIME and R
 - Students investigated the microbial communities associated with poison arrow frogs using cutting-edge molecular techniques
- Bridges to Baccalaureate Skills Workshop (Summer 2015)
 - Workshop to introduce community college students to undergraduate research
 - Instituted a new curriculum to include updated including microbiological and molecular techniques

PUBLISHED ABSTRACTS

- 10) **Kearns PJ**, Woodhams DC. Multicontinental analysis of amphibian-associated *Janthinobacterium lividium* genomes reveals strong host selection on gene content. Invited talk at the International Society of Microbial Ecology Conference (ISME). Cape Town, South Africa. August 21-26, 2024.
- 9) Wigginton SK, Brannon EQ, **Kearns PJ**, Lancellotti B, Loomis GW, Amador JA. Big pipe vs. small pipe: a comparison of nitrogen cycling microbial communities in a nitrogen removing wastewater treatment plant and in nitrogen removing septic systems. Poster at 2018 New England Estuarine Research Society (NEERS) Conference in Portsmouth, NH. April 26-28, 2018.
- 8) Bowen JL, Bulseco-McKim AN, Murphy AE, Vines JH, **Kearns PJ**, Giblin AE, Deegan LA. Nitrate in coastal waters: shifting the balance from carbon sink to carbon source. Talk at the International Society of Microbial Ecology (ISME) in Leipzig, Germany. August 12-17, 2018.
- 7) Weston NB, Troy C, **Kearns PJ**, Bowen JL, Porubsky W, Hyacinthe C, Meile C, Van Cappellen P, Joye S. The role of physiochemical perturbation on denitrification and nitrous oxide production. Talk at the Society of Wetland Scientists (SWS).
- 6) **Kearns PJ**, Stopnisek N, Shade A. Phytohormones can resuscitate dormant environmental bacteria. Poster at The Global Change and Agroecosystems: Challenges and Opportunities symposium in East Lansing, MI. January 11, 2018.
- 5) Damashek J, **Kearns PJ**, Bowen JL, Casciotti KL, Francis CA. Relating ammonia oxidizer diversity to nitrification throughout the northern San Francisco Bay water column. Talk at the meeting for the Coastal and Estuarine Research Federation (CERF) in Providence, RI. November 2017.
- 4) **Kearns PJ**, Sorensen JW, Shade A. Genome reconstruction from metagenomes to investigate microbial traits and strategies over secondary succession. Talk at the meeting for the Ecological Society of America (ESA) in Portland, OR. August 9, 2017.
- 3) **Kearns PJ**, Sorensen JW, Shade A. Quantifying stability in microbial communities by accounting for dormancy. Talk at the meeting for the Ecological Society of America (ESA) in Portland, OR. August 9, 2017.
- 2) **Kearns PJ**, Bowen JL. Testing controls on microbial dormancy in microbial diverse salt marsh systems Presentation at the meeting for the International Society for Microbial Ecology (ISME). August 2016.

1) **Kearns PJ**, Angell JA, Bowen JL. High rates of dormancy mask the effect of fertilization on microbial activity in salt marshes. Talk at the meeting for the Coastal and Estuarine Research Federation (CERF). November 2015.

SYNERGISTIC ACTIVITIES

Professional Affiliations

- New England Estuarine Research Society (2013-)
- Coastal and Estuarine Research Federation (2013-)
- New England Aquarium Research Volunteer (2015-)
- Society of Wetland Scientists (2015-)
- Ecological Society of America (2017-)

Reviewer for:

- *The ISME Journal*
- *Nature Communications*
- *FEMS Microbiology*
- *Wetlands*
- *BMC Microbiology*
- *Environmental Science and Technology*
- *Fungal Ecology*
- *Ecology and Evolution*
- *Microbiome*