Caroline Rzucidlo

PhD Candidate in the MIT-WHOI Joint Program in Oceanography/Applied Ocean Science and Engineering

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Education

2020-present **Ph.D. – MIT-WHOI Joint Program in Oceanography, Biological Oceanography**
Advisor: Dr. Michelle Shero
Proposed thesis: Physiological correlates of reproductive success in high-output and low-output Weddell seals (*Leptonychotes wedellii*)
GPA: 4.8 / 5.0

2018-2020 **M.S. – Sonoma State University, Biology**
Advisor: Dr. Daniel Crocker
Thesis: Changes in serum adipokines during natural extended fasts in female northern elephant seals
GPA: 4.0 / 4.0

2014-2018 **B.S. – Fairfield University, Biology, minors in Neuroscience and Environmental Studies**
Advisor: Dr. Shannon Gerry
GPA: 3.72 / 4.0

2017 **School for Field Studies, Peru**
Biodiversity and Development of the Andes and Amazon

Honors & Awards

Research Grants

2022	$5,900	Wood Hole Oceanographic Institution Ocean Ventures Fund
2021	$6,000	Woods Hole Oceanographic Institution Ocean Ventures Fund
2018	$1,000	Sonoma State University Student Research Award
2018	$1,000	Sonoma State University Biology Department Student Research Grant
2017	$3,200	Fairfield University Lawrence Scholarship
2016	$3,000	Fairfield University Hardiman Scholarship

Travel Awards

2022	$360	MIT Graduate Student Council Conference Fund Grant
2021	$250	Society of Marine Mammalogy Travel Award
2017, 18		SICB Charlotte Mangum Student Support

Honors & Awards

2018 Fairfield University Research Distinction in Biology
2018 Fairfield University Biology Department Award for Excellence in Research
2018 Sigma Xi: The Scientific Research Honor Society
2014-2018 Fairfield University Dean's List

Publications

Rzucidlo, C.L., Curry, E., Shero, M.R. 2023. Non-invasive measurements of respiration and heart rate across wildlife species using Eulerian Video Magnification of infrared thermal imagery. BMC Biology.

Rzucidlo, C.L., Sperou, E.S., Holser, R.R., Khudyakov, J.I., Costa, D.P., Crocker, D.E. 2021. Changes in serum adipokines during natural extended fasts in female northern elephant seals. General and Comparative Endocrinology.

Debier, C., Pirard, L., Verhaegen, M., **Rzucidlo, C.**, Tinant, G., Larondelle, Y., Smith, D., Rees, J.F., Crocker, D.E. 2020. *In vitro* lipolysis and leptin production of elephant seal blubber precision-cut adipose tissue slices. Frontiers in Physiology.

Moran, C.J., **Rzucidlo, C.L.**, Ellerby, D.J., Gerry, S.P. 2019. Laboratory constraints on feeding behaviors in polymorphic bluegill sunfish (*Lepomis macrochirus*). Freshwater Ecology.

Moran, C.J., **Rzucidlo, C.L.**, Carlowicz, R.M., Gerry, S.P. 2018. Stereotyped feeding behaviors of polyphonic bluegill sunfish. Journal of Zoology.

Moran, C.J., Gerry S.P., O'Neill, M., **Rzucidlo, C.L.**, Gibb, A.C. 2018. Behavioral and physiological adaptations to high-flow velocities in Southwestern native chubs (*Gila* spp.) Journal of Experimental Biology.

Moran, C.J., Neubauer, D.L, **Rzucidlo, C.L.**, Gerry, S.P. 2018. Temperature constrains locomotion and muscle function in two temperate labrids. Comparative Biochemistry and Physiology.

Conference Presentations

Oral Presentations

Rzucidlo, C., Beltran, R., Robinson, P., Curry, E., Klink, A., Hindle, A., Shero, M. 2024. Novel Application of Infrared Thermography Coupled with Eulerian Video Magnification to Monitor Health and Vital Signs in Wild Pinnipeds. Ocean Sciences Meeting, New Orleans, LA

Rzucidlo, C., Kirkham, A., Burns, J., Shero, M. 2022. Balancing lipid and lean store use during reproduction in Weddell seals: Implications for investments in current versus future offspring. Society for Marine Mammalogy, Palm Beach, FL

Rzucidlo, C.L., Moran, C.J., Gerry, S.P. 2017. Locomotor Performance and Muscle Physiology of Tautog (*Tautoga onitis*). Division of Vertebrate Morphology regional meeting, Lowell, MA

Moran, C.J., **Rzucidlo, C.L.,** Gerry, S.P. 2017. Locomotor physiology of a hibernating fish in the family Labridae. Society for Integrative and Comparative Biology. New Orleans, LA

Moran, C.J., Neubauer, D., **Rzucidlo, C.,** Gerry, S.P. 2016. Feeding behavior variation in polyphonic bluegill sunfish. International Congress of Vertebrate Morphology. Washington, DC

Poster Presentations

Klink, A.C., **Rzucidlo, C.L.**, Shero, M.R., Burns, J.M., Briggs, B.R., Hindle, A.G. 2023. Genetic impacts on reproductive output in Antarctic Weddell Seals (*Leptonychotes weddellii*) in the Erebus Bay population. American Society of Mammalogy, Anchorage, AK

Shipway, G., **Rzucidlo, C.**, Costa, D., Khudyakov, J., Crocker, D. 2022. Adipose-derived hormones vary across natural fasts and show strong associations with immune markers and metabolites in adult male northern elephant seals (*Mirounga angustirostris*). Society for Marine Mammalogy, Palm Beach, FL

Rzucidlo, C.L., Curry, E., Shero, M.R. 2022. Validation of infrared thermography for non-invasive assessment of animal vital rates across wildlife species. ICES PICES Early Career Scientist Conference. St. John's, Newfoundland, Canada

Rzucidlo, C.L., Moran, C.J., Gerry, S.P. 2018. Locomotor Performance and Muscle Physiology of Tautog.

Society for Integrative and Comparative Biology. San Francisco, CA

Rzucidlo, C.L., Moran, C.J., Gerry, S.P. 2017. Taking functional morphology to the field: do bluegill feed differently in the wild versus the lab? Society for Integrative and Comparative Biology. New Orleans, LA

Moran, C.J., **Rzucidlo, C.L.,** Gerry, S.P. 2017. Locomotor muscle kinematics and enzyme activity of polyphenic bluegill sunfish. Society for Integrative and Comparative Biology. New Orleans, LA

Professional Experience

Laboratory Experience

2020-present **Graduate Student Researcher** in the laboratory of Dr. Michelle Shero
Woods Hole Oceanographic Institution, Biology Department

- Assisted in developing methodology to prepare pinniped tissue for iron isotope analysis
- Analyzed Weddell seal serum for metabolic, reproductive, and iron transfer hormones and markers using colorimetric assays, RIAs, and ELISA assays
- Validated RIAs and ELISA assays for use in Weddell seals
- Managed radioisotope lab hygiene and records

2021 **Research Assistant** at Lindner Center for Conservation and Research of Endangered Wildlife
Cincinnati Zoo & Botanical Gardens

- Validated use of infrared thermography (IRT) to obtain metrics of health from zoo animals
- Imaged 60+ animals across taxa and analyzed infrared videos
- Communicated project updates and results to zoo staff, veterinarians, and general public

2018-2020 **Graduate Student Researcher** in the laboratory of Dr. Daniel Crocker
Sonoma State University, Biology Department

- Analyzed hormone levels in serum samples using RIAs and ELISAs
- Validated RIAs and ELISAs for use in elephant seals
- Used qPCR to identify expression of metabolic genes in elephant seal blubber

2015-2018 **Undergraduate Researcher** in the laboratory of Dr. Shannon Gerry
Fairfield University, Biology Department

- Completed muscle dissections of bluegill sunfish (*Lepomis macrochirus*) and tautog (*Tautoga onitis*)
- Used muscle ergometer to test function of locomotor muscles in cunner (*Tautogolabrus adspersus*) and tautog (*Tautoga onitis*)
- Analyzed data using IGOR and videos using ImageJ, and 3D behavioral data using Argus (Hedrick lab, UNC Chapel Hill)
- Responsible for tank and captive fish maintenance

2017 **Research Assistant** in the laboratory of Dr. William Helenbrook
School for Field Studies, Pilcopata, Peru

- Analyzed fecal samples for macroparasite identification

2017 **Undergraduate Intern** in the laboratory of Dr. John Landers
UMass Medical School, Neurology Department

- Used microscopy to photograph and analyze neurons
- Assisted with cell culture

Fieldwork Experience

2023-2024 **Graduate Student Researcher** with Dr. Jennifer Burns, Dr. Michelle Shero & Dr. Greg Breed
- Spent four weeks on Sable Island, Nova Scotia studying iron physiology in female grey seals

2022-2023 **Graduate Student Researcher** with Dr. Michelle Shero, Dr. Allyson Hindle, Dr. Jennifer Burns & Dr. Brandon Briggs
- Completed a four-month deployment to McMurdo Station, with two more planned for 2024 and 2025 to study the reproductive physiology of female Weddell seals
- Collected blood samples, muscle and blubber biopsies, morphometric measurements, attached time-depth recording tags, assisted with reproductive ultrasounds, and took thermal videos and photogrammetry
- Tested, prepared, and deployed VHF and time-depth recorder tags
- Responsible for sample processing, data management, radioisotope use and records, and gear and procedure preparations

2022 **Field Assistant** with Dr. Roxanne Beltran
- Took infrared images and videos during juvenile elephant seal procedures
- Assisted with taking morphometric measurements and attaching tags during juvenile elephant seal procedures at Ano Nuevo State Reserve

2018-2020 **Graduate Student Researcher** with Dr. Daniel Crocker
- Collected blood samples, blubber biopsies, and body morphometric measurements from male, female, and juvenile northern elephant seals at Ano Nuevo State Reserve
- Responsible for sample processing

2017 **Undergraduate Assistant** with Dr. William Helenbrook
- Tracked black-headed night monkey locations, collected fecal samples, and conducted habitat analysis in Manu Biosphere Reserve, Peru

Teaching Experience & Outreach

Teaching

2019-2020 Teaching Associate- Molecular Biology, Cellular Biology, and Physiology, *Sonoma State University*

2018-2019 Teaching Associate- Introduction to Cell Biology and Genetics, *Sonoma State University*

2019 Marine Biology Teacher for EXCEL (Middle School Summer Program), *Rohnert Park, CA*

2016-2018 Peer Learning Group leader- General Biology I & II, *Fairfield University*

2017 Teaching Assistant- Human Physiology, *Fairfield University*

Teaching Training

2023 MIT Teaching + Learning Lab, Lesson Planning Course

2023 MIT Teaching + Learning Lab, Microteaching Course

Guest Lectures

2023 UC Berkeley, Marine Mammals

2022 UC Berkeley, Marine Mammals- From cells to behavior of marine mammal life history: Finding 'tipping points' in a changing world

Outreach

2023 WHOI Summer Student Fellow (SSF) mentor
- Met with undergraduate students in the SSF program throughout the summer to provide career and graduate school advice

2022-present WHOI Broader Impacts Group (BIG) member
- WHOI BIG aims to humanize science, primarily through outreach and involvement in local schools, both K-12 and at the undergraduate level
- Includes judging local science fairs, volunteering with school field trips and creating activities for K-12 STEM fairs

2021-present MIT-WHOI Joint Program ASK Mentor
- Provided guidance to students applying to the MIT-WHOI Joint Program by helping with application materials, connecting them with faculty, and answering questions

2020-present Skype a Scientist
- Talked to students, classes, and summer camps ranging in ages 5 through 18 about marine biology, getting involved in science, and graduate school
- Connected with > 5 classrooms/year

2019 Summer High School STEM Internship Program (SHIP) Mentor at Sonoma State University
- Worked with a high school student as she designed a summer research project and taught her endocrinology lab techniques

Service

2023-2024 MIT-WHOI Joint Program at-large student representative and president of student representatives

2023-present Organizer of WHOI Polar Ecology seminar

Press

2023 Thermal imaging can help monitor animal health in the wild

2023 Exploring new ways to study heart rate in wild animal populations

2023 Woods Hole Oceanographic Institution partners with zoological facilities to find new ways to study heart rate, respiration in wild animal populations

2021 WVXU- Why is the Cincinnati Zoo taking thermal pictures of its animals?

2021 Cincinnati Zoo tests new technology to assess animal health from a distance

2021 WLKY- Infrared technology being used at Louisville Zoo to track health of wild animals