

Jennifer Sarah Bigman, PhD

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APPOINTMENTS

2025 - present	Assistant Professor, School of Marine Science and Policy, University of Delaware
2024 - 2025	Fish Biologist, NOAA Fisheries Office of Science and Technology
2022 - 2024	National Science Foundation Postdoctoral Research Fellow in Biology NOAA Alaska Fisheries Science Center
2021 - 2022	National Research Council Postdoctoral Associate NOAA Alaska Fisheries Science Center
2014	California State Sea Grant Fellow, Delta Science Program

EDUCATION

2021	PhD Biology, Simon Fraser University; Advisor: Nick Dulvy
2013	MSc Marine Science, Moss Landing Marine Laboratories; Advisor: Dave Ebert
2009	BSc Marine Biology, University of North Carolina Wilmington, <i>summa cum laude</i>

PUBLICATIONS

Journal Articles

- in review* **Bigman JS**, Barnett, LAK, Thorson JT, Anderson SC, Oke K, Kearney K, Pilcher D, Cheng W, Goldstein E, Matta B, Holsman K, & Rogers LA. Changes in body size with age do not follow the temperature-size rule.
preprint: <https://www.biorxiv.org/content/10.1101/2025.09.02.673738v1>
- in review* **Bigman JS**, Kearney K, & Holsman K. Bias correction for integrated climate projection modeling.
- in review* Barrowclift E, **Bigman JS**, Digel ED, Berggren P, & Dulvy NK. Offspring size resolves a latitudinal population growth rate paradox in rays and skates. *Fish and Fisheries*
preprint: <https://www.biorxiv.org/content/10.1101/2024.01.02.573919v2>
- in review* Karp M, Bryan M, McGilliard C, **Bigman JS**, Barbeaux S, Curti K, Fields J, Haltuch M, Hulson P, Ianielli J, Miller T, Sagarese S, & Spies S. Case Studies in integrating environmental and climate impacts in the U.S. stock assessment process: Lessons learned and future directions.
- in review* Rogers LA, Axler KE, **Bigman JS**. Widespread phenological shifts with temperature in Alaska's marine fishes. *Global Change Biology*.
- 2025 Audzijonyte A, Anderson KH, Atkinson D, **Bigman JS**, Blanchard, JL, Coghlan AR, Heather F, Lindmark M, Morrongiello JR, & Pauly, D. Which Body Size Metrics Should Be Used for Assessing Temperature Impacts on Fish Growth and Size? *Global Change Biology*, 31(6), e70296.
- 2024 VanderWright WJ, **Bigman JS**, Iliou AS, & Dulvy NK. Ecological lifestyle and gill slit height across sharks. *Royal Society Open Science*, 11 (5), 231867.

- 2024 Gravel S, **Bigman JS**, Pardo S, Wong S, & Dulvy NK. Metabolism, population growth, and the fast-slow life history continuum of marine fishes. *Fish and Fisheries*, 25(2):349-361.
- 2023 Prinzing TS, **Bigman JS**, Skelton ZR, Dulvy NK, & Wegner, NC. The allometric scaling of oxygen supply and demand in the California Horn Shark, *Heterodontus francisci*. *Journal of Experimental Biology*, 226(15).
- 2023 **Bigman JS**, Laurel B, Kearney K, Hermann A, Holsman K, Cheng W, & Rogers LA. Predicting Pacific cod spawning habitat in a changing climate. *ICES Journal of Marine Science*, 82(1), fsad096.
- 2023 **Bigman JS**, Wegner NC, & Dulvy NK. Gills, growth, and activity level across fishes. *Fish & Fisheries*. *Fish and Fisheries*, 24:730-743.
- 2023 Barrowclift E, Gravel SM, Pardo SA, **Bigman JS**, Berggren P, & Dulvy NK. Tropical rays are intrinsically more sensitive to overfishing than the temperate skates. *Biological Conservation*, 281, 110003.
- 2023 Thorson J, Maureaud A, Frelat R, M rigot B, **Bigman JS**, Friedman S, Palomares M, Pinsky M, Price S, Wainwright P. Identifying direct and indirect associations among traits by merging phylogenetic comparative methods and structural equation models. *Methods in Ecology and Evolution*, 14:1259–1275.
- 2023 **Bigman JS**, Wegner NC, & Dulvy NK. Revisiting a central prediction of the Gill Oxygen Limitation Theory: Gill area index and growth performance. *Fish and Fisheries*, 24(3):354-366
- 2022 Chen Z, **Bigman JS**, Xian W, Liang C, Chu E, and Pauly. D. The ratio of length at first maturity to maximum length in marine and freshwater fish. *Journal of Fish Biology*, 101(2), 400-407.
- 2021 **Bigman JS**, M'Gonigle LK, Wegner NC, & Dulvy NK. Respiratory capacity is twice as important as temperature in driving patterns of metabolic rate across the vertebrate tree of life. *Science Advances*, 7: eabe5163.
- 2021 Wong S*, **Bigman JS**, & Dulvy NK. The metabolic pace of life histories across fishes. *Proceedings of the Royal Society B*, 288 (1953), 20210910.
- 2021 Wong S*, **Bigman JS**, Yopak K, & Dulvy NK. The scaling of gill surface area and brain size in the blacktip shark (*Carcharhinus limbatus*). *Journal of Fish Biology*. 99(3):990-998.
- 2020 VanderWright WJ*, **Bigman JS**, Elcombe C*, & Dulvy NK. Gill slits provide a window into the respiratory physiology of sharks. *Conservation Physiology*, 8(1), coaa102.
- 2019 Lyons K, **Bigman JS**, Kacev D, Mull CG, Carlisle AB, Imhoff JL, Anderson JM, Weng KC, Galloway AS, Cave E, Gunn TR, Lowe CG, Brill RW, & Bedore CN. Bridging disciplines to advance elasmobranch conservation: applications of physiological ecology. *Conservation Physiology*, 7(1), cozo11.
- 2018 **Bigman JS**, Pardo SA, Prinzing TS*, Dando M, Wegner NC, & Dulvy NK. Ecological lifestyles and the scaling of shark gill surface area. *Journal of Morphology*, 279(12), 1716-1724.
- 2017 Carlisle AB, Litvin SY, Madigan DJ, Lyons K, **Bigman JS**, Ibarra M, & Bizzarro JJ. 2017. Interactive effects of urea and lipid content confound stable isotope analysis in elasmobranch fishes. *Canadian Journal of Fisheries and Aquatic Sciences* 74:419-428.
- 2016 **Bigman JS**, Knuckey JDS, & Ebert DA. 2016. Color aberrations in Chondrichthyan fishes: first records in the genus *Bathyraja*. *Marine Biodiversity*, 46:579-587.

- 2014 Carlisle AB, Goldman KJ, Litvin SY, Madigan DJ, **Bigman JS**, Swithenbank AM, Kline TC, & Block BA. Stable isotope analysis of vertebrae reveals ontogenetic changes in habitats in an endothermic pelagic shark. *Proceedings of the Royal Society Biology*, 282:20141446.

*undergraduate or graduate mentee

Other publications

Shotwell SK, **Bigman JS**, and Dame R, eds. Appendix 7A. Ecosystem and Socioeconomic Profile of the arrowtooth flounder stock in the Gulf of Alaska. In: Shotwell, S.K., G.D. Adams, D.H. Hanselman, J. Sullivan. 2025. Assessment of the arrowtooth flounder stock in the Gulf of Alaska. North Pacific Fishery Management Council, Anchorage, AK. Available from <https://www.npfmc.org/library/safe-reports/>.

Bigman JS. (2021). The respiratory basis of metabolic rate and life histories. PhD Dissertation. Simon Fraser University. 152 pgs. (<https://summit.sfu.ca/item/34556>)

Marshall A, Barreto R, **Bigman JS**, Carlson J, Fernando D, Fordham S, Francis MP, Herman K, Jabado RW, Liu KM, Pardo SA, Rigby CL, Romanov E., & Walls RHL. *Mobula tarapacana*. The IUCN Red List of Threatened Species 2019: e.T60199A124451161.

Ebert DA, **Bigman JS**, & Lawson JM. (2017). Biodiversity, Life History, and Conservation of Northeastern Pacific Chondrichthyans. In *Advances in Marine Biology, Northeast Pacific Shark Biology, Research and Conservation Part A* (Vol. 77, pp. 9-78). Academic Press, 318 pgs.

Marshall A, Barreto R, **Bigman JS**, Carlson J, Fernando D, Fordham S, Francis MP, Herman K, Jabado RW, Liu KM, Pardo SA, Rigby CL, Romanov E, Smith WD, & Walls RHL. *Mobula thurstoni*. The IUCN Red List of Threatened Species 2019: e.T60200A124451622

Bigman JS, Ebert DA, & Goldman KJ. *Squalus suckleyi*. The IUCN Red List of Threatened Species 2016: e.T195488A2382480.

Bigman JS, Ebert DA, Robinson HJ, & Cailliet GM. *Raja stellulata*. The IUCN Red List of Threatened Species 2016: T161629A80677268.

Bigman JS, Ebert DA, Huveneers C, & Kyne PM. *Centrophorus westraliensis*. The IUCN Red List of Threatened Species 2015: e.T195485A68615179.

Bigman JS. (2013). Trophic ecology of the North Pacific Spiny Dogfish (*Squalus suckleyi*) off central California waters. Master's thesis. Moss Landing Marine Labs, California State University. 95 pgs. <https://scholarworks.calstate.edu/concern/theses/8g84mr831>

Bigman JS, Ebert DA, & Kyne PM. *Dipturus wengi*. The IUCN Red List of Threatened Species 2015: e.T195453A68621850.

Bigman JS & Ebert DA. *Squalus acutirostris*. The IUCN Red List of Threatened Species 2012: e.T195486A2382473.

AWARDS, GRANTS, AND HONORS

Totals: USD: 314,200; CAD: 52,350

2022 Genie Clark Special Recognition Award ([about award](#); \$2500 USD)

2021 NSF Postdoctoral Research Fellowship in Biology (138,000 USD)

2021 National Research Council (NRC) Postdoctoral Fellowship (90,000 USD)

2020 Graduate Fellowship, SFU (6500 CAD)

Travel and Minor Research Award, SFU (500 CAD)

Curriculum vitae – updated September 2025

- 2019 Graduate Fellowship, SFU (6500 CAD)
Travel and Minor Research Award, SFU (500 CAD)
- 2018 President's PhD Scholarship, SFU (6500 CAD)
Glen Geen Marine Biology Scholarship, SFU (1100 CAD)
Graduate Fellowship, SFU (6500 CAD)
Travel and Minor Research Award, SFU (500 CAD)
American Elasmobranch Member Travel Award (1000 USD)
- 2017 Graduate Fellowship, SFU (6500 CAD)
Graduate International Research Travel Award, SFU (4000 CAD)
- 2016 Graduate Fellowship, SFU (6500 CAD)
Travel and Minor Research Award, SFU (650 CAD)
J. Abbott and M. Fretwell Fisheries Scholarship (6100 CAD)
- 2014 Sea Grant Fellowship, State of California (41000 USD)
- 2013 CSU Council on Affairs, Science, and Technology (COAST) Award for Graduate Student in Marine Science (3000 USD)
COAST Travel Award for Graduate Student in Marine Science (750 USD)
- 2012 COAST Award for Graduate Student in Marine Science (3000 USD)
COAST Travel Award for Graduate Student in Marine Science (750 USD)
American Elasmobranch Society Student Travel Award (500 USD)
David and Lucile Packard Foundation Research and Travel Grant (1000 USD)
- 2011 Earl and Ethyl Myers Oceanographic Trust Grant (500 USD)
- 2010 Signe Lund Memorial Scholarship, MLML (1000 USD)
- 2009 Shishko Award for top five students in UNCW Marine Biology (7500 USD)
- 2008 Anderson Scholarship, Mote Marine Laboratory (700 USD)
SMART Grant (National Science and Mathematics Access to Retain Talent) (4000 USD)
Shishko Award for top five students in UNCW Marine Biology (7500 USD)
- 2007 SMART Grant (4000 USD)
Shishko Award for top five students in UNCW Marine Biology (7500 USD)

SELECTED PRESENTATIONS

- 2025 Bridging fisheries science and ecological theory to understand fish in a changing climate. University of Delaware School of Marine Science and Policy Seminar.
- 2025 Bigman JS. Bridging macroecology and fisheries science to understand how fish will fare in a changing climate. NOAA Office of Science and Technology Seminar.
- 2025 Bigman JS. Climate-ready fisheries and my (small) role in this effort. DFO-NOAA Pacific Working group.
- 2025 Bigman JS, Barnett LK, Oke K, Laurel B, Kearney K, Holsman K, Pilcher D, Hermann A, Cheng W, Rogers L. Can the temperature-size rule explain changes in body size across ages? Walleye Pollock Workshop, NOAA AFSC.
- 2024 Bigman JS, Barnett LK, Oke K, Laurel B, Kearney K, Holsman K, Pilcher D, Hermann A, Cheng W, Rogers L. Can the temperature size rule help us predict fisheries productivity in a changing climate. PICES Annual Science Conference, Honolulu, HI.

- 2023 Bigman JS, Barnett LK, Oke K, Laurel B, Kearney K, Holsman K, Pilcher D, Hermann A, Cheng W, Rogers L. Can the temperature size rule help us predict fisheries productivity in a changing climate. PICES Annual Science Conference, Seattle, WA.
- 2023 Bigman JS, Kearney K, Aydin K, Cheng W, Goodman M, Hermann A, Ianelii J, McHuron E, Spencer P, Reum J, Szuwalski C, Kristiansen T, Whitehouse, A, Holsman K. Considerations and approaches for bias correction in integrated climate projection modeling. ACLIM GOACLIM Tag-up Meeting, Seattle, WA.
- 2022 Bigman JS, Laurel B, Kearney K, Hermann A, Holsman K, Cheng W, & Rogers LA. Predicting Pacific cod spawning habitat in a changing climate. ESSAS annual meeting, Seattle, WA.
- 2022 Bigman JS, Rogers, LA, and Laurel B. Using the Bering 10k ROMS to predict changes in fish distributions, life histories, and demography. Alaska Climate Integrated Modeling Retreat, Seattle, WA.
- 2022 Bigman JS, Rogers LA, Laurel B, Barnett B. Can the temperature-size rule help us predict fisheries productivity? ICES Annual Science Conference, Dublin, Ireland.
- 2022 Bigman JS, Rogers LA, and Laurel B. Predicting Pacific cod spawning habitat in a changing climate. Alaska Marine Science Symposium, Virtual.
- 2021 Bigman JS, Rogers LA, and Laurel B. Predicting Pacific cod spawning habitat in a changing climate. Coastal Cod Symposium, NOAA Fisheries, Virtual.
- 2020 VanderWright WJ*, Bigman JS, Elcombe C*, & Dulvy NK. Gill slits provide a window into the respiratory physiology of sharks. IDEAS Symposium, Simon Fraser University.
- 2019 Bigman JS, Pardo SA, Prinzing TS*, Wegner NC, & Dulvy NK. Ecological lifestyles and the scaling of shark gill surface area. Society for Integrative and Comparative Biology Annual Meeting.
- 2019 Prinzing TS*, Bigman JS, Wong S*, & Dulvy NK. The scaling of elasmobranch metabolic rate across life histories and ecological lifestyle traits. Society for Integrative and Comparative Biology Annual Meeting.
- 2019 Wong S*, Bigman JS, & Dulvy NK. The metabolic basis of life histories in fishes. Society for Integrative and Comparative Biology Annual Meeting.
- 2019 Hall BE*, Bigman JS, & Bedore CN. Scaling and ecological relationships in the visual ecology of sharks. Society for Integrative and Comparative Biology Annual Meeting.
- 2018 Bigman JS, Wegner NC, & Dulvy NK. The respiratory basis of metabolic rate in elasmobranchs and other vertebrates. Sharks International, João Pessoa, Brazil. Second place, best student talk
- 2018 Bigman JS, Wegner NC, & Dulvy NK. The respiratory basis of metabolic rate in elasmobranchs and other vertebrates. IDEAS Symposium, Simon Fraser University. First place, best 10-minute talk.
- 2017 Bigman JS & Dulvy NK. Vertebrate-wide scaling of metabolic rate and respiratory surface area. Canadian Society for Ecology and Evolution Annual Meeting .
- 2016 Bigman JS & Dulvy NK. Body size and the speed of life. Joint Meeting of Ichthyologists and Herpetologists and the American Elasmobranch Society.
- 2015 Bigman JS, Liles GC, Brand MR, & Bergamaschi B. Fishy food webs of the Sacramento San Joaquin Bay-Delta. Joint Meeting of Ichthyologists and Herpetologists and the American Elasmobranch Society.

- 2013 Bigman JS, Bizzarro JJ, & Ebert DA. Trophic ecology of the North Pacific Spiny Dogfish, *Squalus suckleyi*, off central California waters. Joint Meeting of Ichthyologists and Herpetologists and the American Elasmobranch Society.
- 2012 Bigman JS, Ebert DA, Bizzarro JJ, Dewar H, Kohin S, & Vetter R. Spot a Basking Shark: Using Citizen Science to Uncover an Enigmatic Shark. Joint Meeting of Ichthyologists and Herpetologists and the American Elasmobranch Society.
- 2012 Carlisle AB, Goldman KJ, Bigman JS, Madigan SJ, Litvin SY, Kline TC, & Block BA. Investigating Ontogenetic Changes in Habitat Use in Salmon Sharks (*Lamna ditropis*) Using Stable Isotope Analysis. Joint Meeting of Ichthyologists and Herpetologists and the American Elasmobranch Society.
- 2011 Bigman JS, Ebert DA, Bizzarro JJ, Dewar H, Kohin S, & Vetter R. Spot a Basking Shark. Joint Meeting of Ichthyologists and Herpetologists and the American Elasmobranch Society.

*graduate mentee

Invited talks and seminars

- 2025 Climate-ready fisheries and my (small) role in this. Presentation to the Department of Fisheries and Oceans and NOAA Fisheries Pacific Climate and Fisheries Working Group.
- 2024 Bridging macroecology and fisheries science to understand how fish will fare in a changing climate. NOAA Fisheries Alaska Science Center, Groundfish Seminar Series.
- 2022 The connection among physiology, ecology, and life histories from a macroecological perspective in sharks and other vertebrates. University of Alaska Fairbanks, Fisheries and Ocean Sciences Seminar.
- 2021 A macroecological perspective on the relationships among ecology, physiology, and life histories. EcoFOCI seminar, Alaska Fisheries Science Center, NOAA Fisheries.
- 2020 Using theory to advance fisheries science. Invited Speaker at Applied, theoretical, and technological advances in elasmobranch ecology symposium at Joint Meeting of Ichthyologists and Herpetologists and the American Elasmobranch Society. *cancelled due to Covid-19*
- 2018 The respiratory basis of metabolic rate in elasmobranchs and other vertebrates. Invited Speaker at The Physiology of Elasmobranch Fishes Symposium at the 13th International Congress on the Biology of Fish, American Fisheries Society.
- 2017 The respiratory basis of metabolic rate in elasmobranchs and other vertebrates. Invited Speaker at the Physiological Ecology Symposium at Joint Meeting of Ichthyologists and Herpetologists and the American Elasmobranch Society.
- 2017 The respiratory basis of metabolism, life histories, and population dynamics. Crawford Lab Meeting at Simon Fraser University.
- 2017 Urbanization and sustainability of the Sacramento-San Joaquin Delta. *Les Ecologistes*, Simon Fraser University.

OTHER PROFESSIONAL EXPERIENCE

- 2024 - 2025 Fish Biologist, NOAA Fisheries, Office of Science and Technology
- 2020 - Certified Carpentries Instructor (<https://carpentries.org/>)
- 2013 - 2021 Member, International Union for the Conservation of Nature (IUCN) Shark Specialist Group, Northeast Pacific

Curriculum vitae – updated September 2025

- 2013 - 2014 Research Assistant, Alaskan skate trophic ecology study, University of Washington
- 2012 - 2013 Scientific Revisor, Sharks of the World Catalogue, Vol 1. Food and Agriculture Organization of the United Nations (FAO)
- 2012 Research Assistant, Monterey Bay Food Web Study, Idaho State University
- 2011 - 2013 Research Technician, Basking Shark sightings network, Moss Landing Marine Laboratories (MLML) and NOAA Fisheries
- 2011 - 2012 Research Assistant, Salmon Shark, *Lamna ditropis*, movement study, MLML and Hopkins Marine Station
- 2011 - 2012 Research Technician, Geological Oceanography Laboratory, MLML
- 2011 Research Volunteer, Fishery Resource Analysis and Monitoring Division, NOAA Northwest Fisheries Science Center, Newport, OR
- 2010 - 2012 Editor, Pacific Shark Research Center (PSRC) “Featured Elasmobranch” blog, MLML
- 2009 - 2012 Research Assistant, Life history of sharks and rays, PSRC, MLML
- 2009 Volunteer fisheries biologist, California Collaborative Fisheries and Research, MLML
- 2008 Research Volunteer, Dolphin Research Program, Mote Marine Laboratory (MML)
- 2008 Research Intern, Sea Turtle Conservation and Research Program, MML
- 2006 - 2009 Research technician, Benthic Ecology Laboratory, University of North Carolina Wilmington

TEACHING

- 2022 Introduction to Data Wrangling, Visualization, and Analysis in R, Workshop, Georgia Southern University
- 2015 TA, BISC 309 Conservation Biology, SFU
- 2015 Lecturer, Reform of Education in Sustainability in Urban Environments (RESCUE) Workshop. Lecce, Italy
- 2015 – 2020 Guest Lecture, Urbanization and sustainability of the Sacramento-San Joaquin. BISC 309, Conservation Biology
- 2016 Guest Lecture, How physiology can save species. Lecturer, Environmental Physiology of Animals BISC 445, SFU
- 2017 Guest Lecture, Macroecology and macrophysiology. Department of Biology, University of North Florida. Jacksonville, FL USA

MENTORING

Informal Mentoring

Cayley Elcombe (undergraduate student, SFU); Sarah Gravel (graduate student, SFU); Brianna Hall (graduate student, Georgia Southern University); Emily Merlo (undergraduate student, SFU); Maddie Millward (undergraduate student, SFU); Tanya Prinzing (undergraduate and graduate student, SFU); Serena Wong (graduate student, SFU); Wade VanderWright (undergraduate and subsequently laboratory technician, SFU)

Committee Membership

- 2023 - Rachel Aitchinson, SFU PhD Student

- 2023 - Claudia Vázquez, Instituto de Investigaciones Oceanológicas PhD Student
- 2021 - Wade VanderWright, SFU PhD Student
- 2021 - Caroline Wiernicki, University of Delaware PhD Student

SERVICE AND PROFESSIONAL AFFILIATIONS

- 2025 - Member, Graduate Curriculum Committee, School of Marine Science and Policy, University of Delaware
- 2025 - Co-chair ICES Working Group ‘Impacts of Warming on Growth and Fisheries Yields’
- 2008 - member, American Elasmobranch Society (AES)
 - elected member, Equity and Diversity Committee (2019 - 2021)
 - member, Student Affairs Committee
- 2015 - member, American Fisheries Society (AFS)
 - elected Treasurer, Regional Executive Committee (2015-2017)
- 2015 - member, American Society of Ichthyologists and Herpetologists (ASIH)
- 2015 - 2017 elected member, SFU Biological Students’ Caucus, Departmental Scholarship Committee
- 2017 - member, Society for Integrative and Comparative Biology (SICB)
- 2018 elected member, SFU Biological Students’ Caucus, ‘Faculty Mole’

JOURNAL REVIEWS

African Journal of Marine Science; Canadian Journal of Fisheries and Aquatic Sciences; Communications Biology, Ecography, Ecology, Ecosphere, Fish and Fisheries, Global Change Biology, ICES Journal of Marine Science, Journal of Biogeography, Journal of Fish Biology, Marine Biodiversity Records, Marine and Freshwater Research, Marine Ecology Progress Series, Progress in Oceanography, Science, SFU Undergraduate Journal