



BIANCA S. RANGEL

Ecophysiologicalist

Biologist working with energy metabolism, reproduction and trophic ecology of sharks and rays. Special interest in how elasmobranchs use their energy for reproduction, and how they deal with anthropogenic threats upon their ecosystems such as urbanization, tourism, fishing and habitat loss. I am also interested in spatial and trophic ecology of elasmobranchs.

✉ biarangel.sharks@gmail.com
☎ +55 11 98383-6056
📍 178 Camilo Street, Suzano, SP, Brazil
🌐 www.biancarangel.weebly.com
[Google Scholar](#)
[ResearchGate](#) | [CV Lattes](#)

FELLOWSHIPS

- PhD Scholarship – State of São Paulo Research Foundation (FAPESP ~US\$46,000; 2018–2022)
- Master's Scholarship – State of São Paulo Research Foundation (FAPESP ~US\$10,450; 2016–2018)
- Master's Scholarship (CNPq ~US\$1,500; 2016)

RESEARCH FUNDING

- Instituto Linha D'Água (BRL 19,000). Linked to the Sea Shepherd Brasil. Volunteer technical coordinator, 2021–2023.
- Brazilian Fund for Biodiversity FUNBIO 98/2019 (BRL 38,000). Coordinator, linked to the PhD project, 2019–2022.



EDUCATION

UNIVERSITY OF SÃO PAULO, BRAZIL

Postdoc researcher, Department of Physiology
2023–present

Doctorate in Physiology, Department of Physiology
2018–2023

Masters of Science, Department of Physiology
2016–2018

NOVE DE JULHO UNIVERSITY, BRAZIL

Bachelor of Science
2012–2015

STATE TECHNICAL SCHOOLS, BRAZIL

Technician, Honors in Environmental Technician
2009–2010



ONGOING RESEARCH PROJECTS

Ocean science in the formation of citizens engaged in the conservation of Brazilian oceanic islands – Collaborator
2023 – present

Consumption of shark and ray meat in Brazil: Traded species and implications for human health – Coordinator
2022 – present

Ecophysiology of sharks in a Brazilian oceanic oasis, the Fernando de Noronha Archipelago – Coordinator
2019 – present



Noronha Sharks and Rays Project: research, education and conservation – Coordinator
2020 – present



40+ media comments/interviews



41 peer reviewed publications

5 book chapters

32 abstracts published in conference proceedings

PEER REVIEWED PUBLICATIONS

Rodrigues A, Shkola W, Rangel BS. 2023. Extending records of albinism and skin disorders in American cownose rays to southeastern Brazil. in press. *corresponding author

Rangel BS, Moreira RG, Hammerschlag N (2023). Urban living affects the nutrition of sharks. *Frontiers for Young Minds*. V. 11, 911054.

Rangel BS, Afonso AS, Bettcher VB, Bucair N, Andres N, Veras, L, Hazin FH, Garla R (2023). Evidence of mating scars in female tiger sharks (*Galeocerdo cuvier*) at the Fernando de Noronha Archipelago, Brazilian Equatorial Atlantic. *Environmental Biology of Fishes*, 106: 107–115.

Bettcher VB, Bucair N, Mendes LF, Di-Dario F, Moura RL, Garla RC, Rangel BS (2023). First record of mating behavior and induced parturition of the Brazilian endemic Lutz's stingray *Hypanus berthallutzae*. *Journal of Fish Biology*, 102(1): 172–177.

Rangel BS, Afonso AS, Garla R. (2022). Female wound records suggest mating periods for the Caribbean reef shark at an insular marine protected area from the Equatorial Atlantic Ocean. *Journal of Fish Biology*, 101(6): 1591–1594.

Rangel BS, Moreira RG, Rider MJ, Sulikowski JA, Gallagher AJ, Heithaus MR, Cooke SJ, Kaufman L, Hammerschlag N. (2022). Physiological state predicts space use of sharks at a tourism provisioning site. *Animal Behaviour*, 191, 149–163.

Bucair N, Mendonça S, Araújo C, Rangel BS, Gadig OBF. 2022. Records of bentfin devil ray, *Mobula thurstoni*, in a marine protected area in Brazilian Equatorial Atlantic: implications for the species? distribution and local conservation strategies. *Environmental Biology of Fishes*, 105, 653–661

Becerril-García, et al. 2022. Research priorities for the conservation of chondrichthyans in Latin America . *Biological Conservation*, 269, 109535.

Rangel BS, Hammerschlag N, Martinelli, A., Moreira RG. 2021. Effects of urbanization on the nutritional ecology of a highly active coastal shark: Preliminary insights from trophic markers and body condition. *Science of the Total Environment*. 826, 154082.

Diniz-Reis, TRA, et al. (2022). SIA-BRA: A database of animal stable carbon and nitrogen isotope ratios of Brazil. *Global Ecology and Biogeography*, v. 31 (4), 611–620.

Soares, KD, Lana, F, Lopes, C, Martins, MF, Petean, F, Rangel, BS, Rego, M, Rolim, F, Roque, P, Wosnick, N. (2021). Mulheres que pesquisam Elasmobrânquios e formam redes: as experiências do simpósio online ELASMulheres. *Boletim - Sociedade Brasileira de Ictiologia*, v. 138, p. 5–16.

Rangel, BS, Viegas, R, Bettcher, VB, Garla, R. 2021. Eye healing in a free-ranging whitespotted eagle ray (*Aetobatus narinari*) following shark-inflicted bite injuries. *Journal of Fish Biology*. v. 100: 590–593.

Rangel, BS, Vignoli, R, Xavier, N., Bettcher, VB. 2021. New records on intestinal eversion in a free-ranging nurse shark (*Ginglymostoma cirratum*) and a free-ranging, breaching-spotted eagle ray (*Aetobatus narinari*). *Environmental Biology of Fishes* 104(10): 1353–1357.

Rangel, BS, Barreto, R; Gil, N; Del-Mar, A; Castro, C. Brazil can protect sharks worldwide. *Science* 373(6555):633.

Rangel BS, Hammerschlag N, Sulikowski J, Moreira RG. 2021. Physiological markers suggest energetic and nutritional adjustments in male sharks linked to reproduction. *Oecologia*. 196, 989–1004.

Rangel BS, Moreira RG, Neilla, Y, Sulikowski J, Hammerschlag N. 2021 Metabolic and nutritional condition of juvenile tiger sharks exposed to regional differences in coastal urbanization. *Science of the Total Environment*. 780: 146548.

Rangel BS, Hammerschlag N; Moreira RG. 2021. Urban living influences the nutritional quality of a juvenile shark species. *Science of the Total Environment*. 776:146025.

Rangel BS, Hammerschlag N; Sulikowski J; Moreira RG. 2021. Dietary and reproductive biomarkers in a generalist apex predator reveal differences in nutritional ecology across life stages. *Marine Ecology Progress Series*. 664:149–163.

Viliod MCL, Rangel BS, Rocha LC, Domingos JF, Malavasi-Bruno CE, Amorim AF, Watanabe I, Ciena AP. Ecomorphological, space and mineral relations of dermal denticles in angular angel shark (*Squatina guggenheim*). *Microscopy Research Technique*. 84(9):2017–2023.

- Rangel BS, Rodrigues A, Moreira RG. 2021. Capture and handling stress in incidentally captured rays from small-scale fishing: a physiological approach. *Oecologia Australis*. 25(1):190–196.
- Salmon T, Rangel BS*, Malavasi CE, Kfoury-Jr JR. 2021. New records and preliminary reproductive aspects of elasmobranchs of the Trindade–Martin Vaz insular complex. *Oecologia Australis*. 25(1):159–165. *corresponding author
- Rangel BS, Ribeiro DC; Chagas JMC; Spada L, Moreira RG; Ribeiro, CS. Effects of biological traits on capture-induced parturition in a freshwater stingray and perspectives for species management. *Journal of Fish Biology*. 97: 546–551.
- Rangel BS, Hussey NE, Niella Y, Martinelli LA, Gomes AD, Moreira RG. 2020. Neonatal nutritional strategy of a viviparous elasmobranch with extremely low reproductive output. *Marine Ecology Progress Series*. 638: 107–121.
- Rangel BS, Hussey NE, Gomes AD, Rodrigues A, Martinelli LA, Moreira RG. 2019. Resource partitioning between two young-of-year cownose rays *Rhinoptera bonasus* and *R. brasiliensis* within a communal nursery inferred by trophic biomarkers. *Journal of Fish Biology*, v. 94, p. 781–788.
- Rangel et al. 2019. Microstructural morphology of dermal and oral denticles of the sharpnose sevengill shark *Heptanchias perlo* (Elasmobranchii: Hexanchidae), a deep-water species. *Microscopy Research and Technique*, v. 82:1243–1248.
- Wosnick N, Rangel BS, Afonso A, Bornatowski H, Moreira RG, Freire CA. 2018. Hormones and migration in tiger sharks (*Galeocerdo cuvier*): can they be related? *Aqua (Neu-Isenburg)*, v. 24, p. 9–14.
- Rodrigues A, Rangel BS, Wosnick N, Bornatowski H, Santos JL, Moreira RG, Amorim AF. 2019. Report of injuries in batoids caught in small-scale fisheries: implications for management plans. *Oecologia Australis*, 23(1): 78–89.
- Rangel BS, Rodrigues A, Moreira RG. 2018. Use of a nursery area by cownose rays (Rhinopteridae) in southeastern Brazil. *Neotropical Ichthyology*, v. 16, p. e170089[1]–e170089[7].
- Rangel BS, Salmon T, Poscai AN, Kfoury Jr JR, Rici REG. 2018. Comparative investigation into the morphology of oral papillae and denticles of four species of lamnid and sphyrnid sharks. *Zoomorphology*, v. 138, p. 127–136.
- Rangel BS, Cruz VP, Rodrigues A, Araujo MLG, Oliveira C, Foresti F, Moreira RG. 2017. Sympatric and syntopic occurrence of cownose rays: Neonatal strategies for survival? *Journal of Applied Ichthyology*, 33, 542–545.
- Palacios-Barreto P, Cruz VP, Foresti F, Rangel BS, Uribe-Alcocer M, Díaz-Jaimes P. 2017. Molecular evidence supporting the expansion of the geographical distribution of the Brazilian cownose ray *Rhinoptera brasiliensis* (Myliobatiformes: Rhinopteridae) in the western Atlantic. *Zootaxa*, v. 4341, p. 593.
- Wosnick N, Rangel BS, Moreira RA, Freire CA. 2017. Clasper flaring in a guitarfish (*Zapteryx brevirostris* – Elasmobranch, Rinobathidae) under anaesthesia. *Veterinary Anaesthesia and Analgesia*. v.4, 976–978 .
- Poscai AN, Rangel BS, Casas A, Wosnick N, Rodrigues A, Rici REG, Kfoury Jr JR. 2017. Microscopic aspects of the nictitating membrane in Carcharhinidae and Sphyrnidae sharks: a preliminary study. *Zoomorphology*. 136, 359–364.
- Rangel et al. 2017. A preliminary investigation into the morphology of oral papillae and denticles of blue sharks (*Prionace glauca*) with inferences about its functional significance across life stages. *Journal of Anatomy*, 230: 389–397.
- Wosnick N, Bornatowski H, Ferraz C, Afonso A, Rangel BS, Hazin FHV, Freire CA. 2017. Talking to the dead: using Post-mortem data in the assessment of stress in tiger sharks (*Galeocerdo cuvier*) (Péron and Lesueur, 1822). *Fish Physiology and Biochemistry*, v. 43, 165–178.
- Rangel BS, Wosnick N, Magdanelo-Leandro R, Amorim AF, Kfoury Jr JR, Rici REG. 2016. Thorns and dermal denticles of skates *Atlantoraja cyclophora* and *A. castelnaui*: Microscopic features and functional implications. *Microscopy Research and Technique*, v. 79, p. 1133–1138, 2016.
- Rangel BS, Wosnick N, Amorim AF, Kfoury Jr JR, Rici REG. Microscopic aspects of electrosensory system on the partially euryhaline lesser guitarfish. *Anais da Academia Brasileira de Ciências*, 2016.
- Rangel BS, Santander Neto J, Rici REG, Lessa R. 2016. Dental sexual dimorphism and morphology of *Urotrygon microphthalmum*. *Zoomorphology*. 135, (3): 367–374.
- Rangel BS, Ciena AP, Wosnick N, Amorim AF, Kfoury Jr JR, Rici REG. 2016. Ecomorphology of oral papillae and denticles of *Zapteryx brevirostris* (Chondrichthyes, Rhinobatidae). *Zoomorphology*, 135(2): 1–7.
- Ciena AP, Rangel BS, Malavasi-Bruno CE, Miglino MA, Amorim AF, Rici REG. 2015. Morphological aspects of oral denticles in the sharpnose shark *Rhizoprionodon landii* (Müller and Henle, 1839) (Elasmobranchii, Carcharhinidae). *Anatomia, Histologia, Embryologia*, 45(2): 109–114.
- Rangel BS et al. 2015. Morphological analysis of the oviduct, oviducal gland and isthmus of the blue shark *Prionace glauca* (Elasmobranchii – Carcharhiniformes). *Neotropical Ichthyology*, 13(4): 663–672.