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Research Interests

I am interested in understanding the evolutionary implications of human-induced environmental change. Currently, I am using zebrafish as a model to study how size-selective mortality results in evolutionary changes in personality traits and cognitive behaviour, and what are its consequences on survival and reproduction.

Key words

anthropogenic change, behaviour, cognition, experimental evolution, fish

Education

08/2011 – 10/2017: PhD; Indian Institute of Science Education and Research Kolkata, India

07/2006 – 06/2011: Integrated M.Sc.; St. Xavier's College (Autonomous), University of Calcutta, India

Academic Employment

06/2023 – present: **Research Associate**, Humboldt University of Berlin, Germany

06/2023 – present: **Postdoctoral Researcher**, Leibniz Institute of Freshwater Ecology and Inland Fisheries Berlin, Germany

04/2022 – 09/2022: **Postdoctoral Research Associate**, Leibniz Institute of Freshwater Ecology and Inland Fisheries Berlin, Germany

01/2020 – 03/2022: **Alexander von Humboldt Postdoctoral Fellow**, Leibniz Institute of Freshwater Ecology and Inland Fisheries Berlin, Germany

01/2018 – 05/2019: **Postdoctoral Research Associate**, Arizona State University, USA

Professional Research Experience

01/2020 – 09/2022: **Postdoctoral Research Fellow**; Leibniz Institute of Freshwater Ecology and Inland Fisheries Berlin, Germany; investigating the impact of size-selective

harvesting on the evolution of personality and cognition using zebrafish as a model
01/2018 – 05/2019: **Postdoctoral Research Associate**; Arizona State University, USA;
investigated the role of visual preferences and physical and social environments on
learning abilities in zebrafish

08/2011 – 10/2017: **Doctoral Student**; Indian Institute of Science Education and
Research Kolkata, India; studied behavioural variations and their ecological correlates
among wild zebrafish, *Danio rerio*

Publications

Manuscripts published

1. **Roy, T.**, Rohr, T., Arlinghaus, R. Size-selective harvesting impacts learning and decision-making in zebrafish, *Danio rerio*. Behavioral Ecology: arad037
2. Sbragaglia, V., **Roy, T.**, Thörnqvist, P.-O., López-Olmeda, J. F., Winberg, S., Arlinghaus, R. Evolutionary implications of size-selective mortality on the ontogenetic development of shoaling: a neurochemical approach using a zebrafish, *Danio rerio*, harvest selection experiment. Behavioral Ecology and Sociobiology 76: 154
3. **Roy, T.**, Arlinghaus, R. Size-selective harvesting foster changes in collective risk-taking behaviour through ontogenetic changes in zebrafish, *Danio rerio*. Oecologia 200: 89-106
4. **Roy, T.**, Fromm, K., Sbragaglia, V., Bierbach, D., Arlinghaus, R. 2021 Size selective harvesting does not result in reproductive isolation among experimental lines of zebrafish, *Danio rerio*: implications for managing harvest-induced evolution. Biology 10: 113
5. **Roy, T.**, Suriyampola, P. S., Flores J., Lopez M., Hickey C., Bhat, A., Martins, E. P. 2019 Color preferences affect learning in zebrafish, *Danio rerio*. Scientific Reports 9: 14531
6. **Roy, T.**, Bhat, A. 2018 Repeatability in boldness and aggression among wild zebrafish *Danio rerio* from two differing predation and flow regimes. Journal of Comparative Psychology 132: 349-360
7. **Roy, T.**, Bhat, A. 2018. Divergences in learning and memory among wild zebrafish: Do sex and body-size play a role? Learning & Behavior 46: 124–133
8. **Roy, T.**, Bhat, A. 2018. Population, sex and body-size: Determinants of behavioural variations and behavioural correlations among wild zebrafish *Danio rerio*? Royal Society Open Science 5: 170978
9. **Roy, T.**, Bhat, A. 2017. Social learning in maze? Contrasting individual performance among wild zebrafish when associated with trained and naïve conspecific. Behavioural Processes 144: 51-57

10. **Roy, T.**, Shukla, R., Bhat, A. 2017. Risk-taking during feeding: Between and within-population variation, and repeatability across contexts among wild zebrafish. *Zebrafish* 14: 393-403
11. Suriyampola, P. S., Shelton, D. S., Shukla, R., **Roy, T.**, Bhat, A., Martins, E. P. 2016. Zebrafish social behavior in the wild. *Zebrafish* 13: 1-8
12. **Roy, T.** Bhat, A. 2016. Learning and memory in juvenile zebrafish: What makes the difference - population or rearing environment? *Ethology* 122: 308-318
13. **Roy T.**, Bhat A. 2015. Can outcomes of dyadic interactions be consistent across contexts among wild zebrafish? *Royal Society Open Science* 2: 150282

Communications in conferences

Roy, T., Rohr, T., Arlinghaus, R. 28/07/2022–02/08/2022. Size-selective mortality fosters ontogenetic changes in collective learning, and decision-making in zebrafish, *Danio rerio*. International Society for Behavioural Ecology Congress (ISBE) 2022, Stockholm, Sweden.

Roy, T., Arlinghaus, R. 03/08/2021–06/08/2021. Size-selective mortality affects collective risk-taking under predation threat in zebrafish, *Danio rerio*: implications for fisheries-induced evolution. The 58th Annual Conference of the Animal Behavior Society (ABS) 2021, USA.

Roy, T., Arlinghaus, R. 05/07/2021–08/07/2021. Size-selective mortality affects collective risk-taking under predation threat in zebrafish, *Danio rerio*: implications for fisheries-induced evolution. Fisheries Society of the British Isles (FSBI) symposium 2021, KU Leuven, Belgium.

Roy, T., Suriyampola, P. S., Flores J., Lopez M., Hickey C., Bhat, A., Martins, E. P. 03/01/2019-07/01/2019. Color preferences affect learning ability in zebrafish *Danio rerio*. Society for the Integrative and Comparative Biology (SICB) Annual Meeting 2019, Tampa, Florida, USA.

Roy, T., Bhat, A. 19/06/2017-23/06/2017. Can outcomes of dyadic interactions be consistent across contexts among wild zebrafish? 13th Meeting Ecology and Behaviour (EB 2017), Chize Center for Biological Studies, Chize, France.

Roy, T., Bhat, A. 03/01/2017-07/01/2017. Social learning in maze? Performance across social and asocial context among wild zebrafish, *Danio rerio*. Young Ecologists Talk and Interact (YETI) 2017, Tezpur University, India.

Roy, T., Bhat, A. 12/07/2016-15/07/2016. Variations in spatial learning and memory across natural populations of zebrafish, *Danio rerio*. 8th European Conference on Behavioural Biology (ECBB 2016), Vienna, Austria.

Roy, T., Bhat, A. 30/10/2015-01/11/2015. The bold zebrafish: Effect of evolutionary history and environment. National Conference on Ethology and Evolution (NCEE) 2015, 39th Ethological Society of India meet, IISER Mohali, India.

Roy, T., Bhat, A. 08/09/2015-11/09/2015. Effect of habitat degradation on behavioural patterns of a freshwater species, zebrafish (*Danio rerio*). Student Conference on Conservation Science (SCCS) 2015 Bengaluru, India.

Roy, T., Bhat, A. 16/12/2013-19/12/2013. Dominant subordinate relationship with respect to resource monopolization in zebrafish, *Danio rerio*. Young Ecologists Talk and Interact (YETI) 2013, Nagaland University, Lumami campus, India.

Roy, T., Bhat, A. 05/12/2012—07/12/2012. Testing the spatial cognitive ability among juvenile zebrafish, *Danio rerio*. Young Ecologists Talk and Interact (YETI) 2012, Wildlife Institute of India, India.

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Professional Memberships

2022 – 2024: International Society of Behavioral Ecology

2020 – 2022: Animal Behavior Society

2018 – 2019: Society for the Integrative and Comparative Biology

2017 – 2018: Association for the Study of Animal Behaviour

Mentoring and Teaching Experience

Thesis supervision

- Master thesis (ongoing) of Elvis Wong titled 'Impact of size-selective harvesting on cognitive behaviour in zebrafish (*Danio rerio*)' in Leibniz Institute of Freshwater Ecology and Inland Fisheries Berlin (04/2022 – present)
- Master thesis (ongoing) of Daniel Faria titled 'Impact of size-selective harvesting on collective behaviour and its adaptive consequences in zebrafish (*Danio rerio*)' in Leibniz Institute of Freshwater Ecology and Inland Fisheries Berlin (05/2021 – 03/2023)
- Master thesis (jointly) of Kim Fromm titled 'Size-selective harvesting and reproductive isolation in zebrafish (*Danio rerio*)' in Leibniz Institute of Freshwater Ecology and Inland Fisheries Berlin (03/2020 – 08/2020)

Internship supervision

- Undergraduate student Tabea Rohr on a project testing the impact of size-selective harvesting on collective decision making in zebrafish in Leibniz Institute of Freshwater Ecology and Inland Fisheries Berlin (04/2021 – 05/2021)
- Preuniversity students Alina Heide, Jelena Lewin and Florian Riedel in separate projects testing the impact of size-selective harvesting on boldness, learning, collective behaviour and mortality in zebrafish in Leibniz Institute of Freshwater Ecology and Inland Fisheries Berlin (08/2020 – 02/2022)
- Undergraduate student Collin Hickey in projects testing how change in group

composition affect consensus decision making in zebrafish and how colour preferences affect learning ability in zebrafish in Arizona State University (09/2018 – 04/2019)

- Undergraduate students Brontë Ellsworth and Laura Mirtich in a project testing the effect of change in light regime on cue use patterns in zebrafish in Arizona State University (01/2019 – 04/2019)
- Undergraduate students Jennifer Flores and Melissa Lopez in a project testing the impact of colour preferences on learning in zebrafish in Arizona State University (05/2018 – 10/2018)
- Postgraduate student Kavitha Anand in projects studying courtship, mating and aggressive behaviour in wild-caught zebrafish in Indian Institute of Science Education and Research Kolkata (05/2013 – 06/2013)

Teaching

- Interactive course on ANOVA and Linear Models in the doctoral program of Leibniz Institute of Freshwater Ecology and Inland Fisheries Berlin (12/05/2021)
- Teaching assistantship in Animal Behaviour practical course at Indian Institute of Science Education and Research Kolkata (01/2014 – 04/2014)

Service

Peer Review

- Reviewed manuscripts for journals Progress in Neuropsychopharmacology & Biological Psychiatry, Nature Scientific Reports, Animal Behavior, Behavioural Processes, Journal of Fish Biology, Zebrafish, Behavioral Ecology, PeerJ, Hormones & Behavior, Journal of Zoology and Science of the Total Environment
- Reviewer board member for the journal Fishes
- Reviewed student research grant applications for the Animal Behaviour Society (02/2022)
- Reviewed undergraduate research presentation and travel scholarship applications submitted in spring and summer for The National Diversity in STEM conference of SACNAS in 2019 and 2020

Judging

- Acted as a Grand Award Judge in the category of Animal Sciences for Regeneron International Science and Engineering Fair (ISEF) 2022, Atlanta, Georgia, USA
- Acted as a Grand Award Judge in the category of Animal Sciences for Regeneron International Science and Engineering Virtual Fair (ISEF) 2021
- Acted as a Grand Award Judge in the category of Animal Sciences for Intel

International Science and Engineering Fair (ISEF) 2019 held at Phoenix Convention Center, Phoenix, Arizona

- Acted as a judge in the senior category in Animal Sciences division at 2019 Arizona Science and Engineering Fair (AzSEF) held at Phoenix Convention Center, Phoenix, Arizona

Outreach

- Roy T., Hickey C. 2019. The Language of Colors. Activity conducted for the community people at ASU Open Door 2019 in the Tempe campus on 23rd February 2019
- Roy T., Hickey C. 2018. The Language of Colors - How animals perceive and communicate through colors? Presentation and activities conducted as a part of the Museum House Project for the Home-school explorers in collaboration with ASU Natural History Museum on 16th November 2018
- Roy T. *et al.* 2013. How to study fish behaviour? Demonstration of methods for studying fish behaviour among local school children using live zebrafish at S.N. Bose Memorial Science Fair, Nadia, West Bengal
- Roy T. *et al.* 2012. Studying behaviour. Demonstrating methods and concepts for studying animal behaviour among local school children using zebrafish as a model at S.N. Bose Memorial Science Fair, Nadia, West Bengal

Hobbies, interests and achievements

Art

- Pursue clay sculpting as a hobby since childhood

Languages

- Bengali (mother tongue), Hindi (fluent), Assamese (fluent) and English (fluent)
- Limited working proficiency in German

Leadership role

- Class representative for the 2006 batch in the Department of Biotechnology (2006-2011)
- Representative of research scholars in the Department of Biological Sciences in IISER Kolkata (2013-2015)

Fellowships and awards

- Alexander von Humboldt postdoctoral research fellowship from Alexander von Humboldt foundation, Germany (10/2019-03/2022)

- Certificate of excellence from the European Commission for high-quality research proposal submitted under Horizon 2020's Marie Skłodowska-Curie actions (04/2019)
- Junior research fellowship and eligibility for lectureship award from the Council of Scientific and Industrial Research & University Grants Commission, Government of India (07/2011-12/2016)

References:

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