ANURADHA BATABYAL, PhD
Assistant Professor
Department of Physical and Natural Sciences
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FLAME University
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PERSONAL DETAILS

Preferred pronoun: she/her

Research: Area of expertise: Neuroethology, Behavioural Ecology, Evolution

EDUCATION

2012-2017 **Ph.D.**
Adviser: Dr. Maria Thaker
Centre for Ecological Sciences, Indian Institute of Science, Bengaluru, India
Thesis: *Urbanisation and shifting phenotypes: behavioural, physiological and cognitive strategies in the Indian rock agama Psammophilus dorsalis.*

2010-2012 **M.Sc**. in Zoology
University of Pune, Pune, India
Thesis*: Determining sensitive stages for learning to detect predators in larval bronzed frogs: Importance of alarm cues in learning*

2007-2010 **B.Sc**. Hons. (Zoology)
University of Calcutta, Kolkata, India

POSITIONS HELD

2022-ongoing **Assistant Professor**
FLAME University, Pune, India

2020-2022 **Postdoctoral Fellow**
Adviser: Dr. Ken Lukowiak
University of Calgary

2021-2022 **Content creator and marketing lead**
8 Bit Cortex (mental wellness startup: www.8bitcortex.com)

2018-2020 **Postdoctoral Fellow**
Azim Premji University, Bengaluru, India

2019 **Guest Faculty**
Azim Premji University, Bengaluru, India

2017-2018 **Research Associate**
Indian Institute of Science, Bengaluru, India

FELLOWSHIPS AND HONORS

2023 Srikumar Chattopadhyay Memorial Young Scientist Award
Naturemates India (http://www.naturematesindia.org/)

2019-2021 Postdoctoral Grant by Government of India. INR 1.9M ($33,196)
Title: *Intra and inter-specific variation in multimodal signalling across an environmental gradient in the genus Micrixalus*

2012-2017 National Research Fellowship for PhD by Government of India. INR 1.6M ($27,802)
(All India rank: 65)

2011 Debasish Kar Memorial Award for highest marks in Zoology Honours, Vivekananda College, University of Calcutta, India.

RESEARCH AND TRAVEL GRANTS

2017 Travel grant for presenting in "Congress of European Society of Evolutionary Biology", Groningen, The Netherlands.

2013 Research grant for "A study on the effects of invasive *Prosopis juliflora* on *Saara hardwickii*" by RAMBLE Foundation (INR 0.5M or $1,729)

PUBLICATIONS

Manuscripts in review

30. **Batabyal A*,** Zambre A*, Mclaren T, Rankin K, Somaweera R, Stuart-Fox D, Thaker M 2023. It's not just chameleons: rapid colour change varies among sexes, body regions and species in agamid lizards. Ecology and Evolution. *In review* **(*contributed equally to this study)**
29. Rivi V*, **Batabyal A*,** Benatti C, Blom JMC, Tascedda F, Lukowiak K 2023. Behavioral and transcriptional effects induced by exposure to predator scent in innate and wild pond snails. Neurobiology of Learning and Memory. *In review* **(*contributed equally to this study)**
28. Rivi V*, **Batabyal A*,** Benatti C, Blom JMC, Tascedda F, Lukowiak K 2023. Change is evident when you're wild: contrasting behavioral and transcriptional responses in freshly collected and laboratory-reared snails in response to heat stress.Canadian Journal of Zoology. *In review* **(*contributed equally to this study)**
27. Holding J, Kagan D, **Batabyal A**, Lukowiak K. 2022. Aspirin blocks stress-induced memory enhancement in L. stagnalis. Naunyn-Schmiedeberg's Archives of Pharmacology. *In review*
26. Kowall C, **Batabyal A**, Lukowiak K Phillips I. 2022. Agricultural use of insecticides alters important *Lymnaea stagnalis* behaviours. PlosWater *in review*

Manuscripts published

25. Rivi V, **Batabyal A,** Benatti C, Blom JMC, Tascedda F, Lukowiak K 2022. Novel taste, sickness, and memory: Lipopolysaccharide to induce a Garcia-like effect in inbred and outbred strains of *Lymnaea stagnalis*. Physiology and Behaviour 263: 114137
24. Kagan D, **Batabyal A**, Lukowiak K 2023. Remember the Poke: MicroRNAs are Required for Long-Term Memory Formation Following Operant Conditioning in Lymnaea. *Journal of Comparative Physiology A.* https://doi.org/10.1007/s00359-022-01604-8

23. **Batabyal A**, Lukowiak K 2022. From predator naïve to predator experienced: tracking the path from learning to innate predator recognition in *Lymnaea stagnalis*. Behavioral ecology 34 (1): 125-135. https://doi.org/10.1093/beheco/arac107
22. Rivi V, **Batabyal A,** Benatti C, Blom JMC, Tascedda F, Lukowiak K 2022. Aspirin reverts lipopolysaccharide-induced learning and memory impairment: first evidence from an invertebrate model system Naunyn-Schmiedeberg's Archives of Pharmacology. 395:1573–1585
21. Rivi V*, **Batabyal A*,** Wiley B, Benatti C, Blom JMC, Tascedda F, Lukowiak K 2022. Fluoride affects memory by altering the transcriptional activity in the central nervous system of *Lymnaea stagnalis*. Neurotoxicology 92: 61-66 **(*contributed equally to this study)**
20. Wiley B*, **Batabyal A***, Lukowiak K 2022. Fluoride alters feeding in lab-bred pond snails but not in wild snails or their progeny. Journal of Comparative Physiology A. https://doi.org/10.1007/s00359-022-01563-0 **(*contributed equally to this study)**
19. Rivi V*, **Batabyal A***, Benatti C, Blom JMC, Tascedda F, Lukowiak K 2022. Too hot to eat. Wild and lab-bred *L. stagnalis* differ in feeding response following repeated heat exposure. Biological Bulletin. 243 (1) https://doi.org/10.1086/720948 **(*contributed equally to this study)**
18. **Batabyal A**, Chau D, Rivi V, Lukowiak K 2021. Risk in one is not risk in all. Snails show differential decision making under high and low risk environments. Animal Behaviour. 190: 53-60
17. Wiley B, **Batabyal A,** Lukowiak K 2021. Fluoride affects learning and memory in *Lymnaea stagnalis*. Journal of Comparative Physiology A. 1-11
16. Rivi V*, **Batabyal A***, Benatti C, Blom JMC, Lukowiak K 2021. Nature versus nurture in heat stress induced learning between inbred and outbred populations of *Lymnaea stagnalis*. Journal of Thermal Biology**. (*contributed equally to this study)** 103170
15. Kagan D, **Batabyal A**, Rivi V, Lukowiak K. 2021. A change in taste: The role of MicroRNAs in altering hedonic value. Journal of Experimental Biology. https://doi.org/10.1242/jeb.243840
14. Rivi V, **Batabyal A**, Benatti C, Blom JMC, Tascedda F, Lukowiak K 2021.A flavonoid, quercetin, is capable of enhancing LTM formation if encountered at different times in the learning, memory formation, and memory recall *continuum*. Journal of Comparative Physiology A. 1-13
13. **Batabyal A***, Rivi V*, Benatti C, Blom JMC, Lukowiak K 2021. Long term memory of configural learning is enhanced via CREB upregulation by the flavonoid Quercetin in *Lymnaea stagnalis*. Journal of Experimental Biology. 242761 https://doi.org/10.1242/jeb.242761 **(*contributed equally to this study)**
12. **Batabyal A,** Lukowiak K. 2021. Configural learning memory can be transformed from intermediate-term to long-term in pond snail *Lymnaea stagnalis.* Physiology and Behavior. 239, 113509.
11. Fernell M, Rivi V, **Batabyal A**, and Lukowiak K 2021 The temperature-sensitivity of memory formation and persistence is altered by cold acclimation in a pond snail. Journal of Experimental Biology. 224 (11): jeb242513 https://doi.org/10.1242/jeb.242513
10. Rivi V*, **Batabyal A***, Juego K, Kakadiya M, Benatti C, Blom JMC, Lukowiak K 2021. To eat or not to eat: A Garcia effect in pond snails (*Lymnaea stagnalis*) Journal of Comparative Physiology A. **(*contributed equally to this study)** https://doi.org/10.1007/s00359-021-01491-5
9. Soudavari R, **Batabyal A** and Lukowiak K. 2021. In *Lymnaea* two stressors that individually enhance memory in combination block memory formation. Canadian Journal of Zoology. https://doi.org/10.1139/cjz-2020-0207
8. **Batabyal A**, Bhattacharya A, Thaker M. and Mukherjee S. A longitudinal study of perceived stress and cortisol responses in an undergraduate student population from India. PlosOne https://doi.org/10.1371/journal.pone.0252579
7. **Batabyal A,** Thaker M. 2019. Lizards learn faster to stay safe in urban areas. Biology Letters. 15: 20190009. *(Article featured in Science, The Wire 2021: https://science.thewire.in/environment/raghavendra-gadagkar-lizard-stories/)*
6. **Batabyal A,** Thaker M. 2018. Social coping styles of lizards are shifting from proactive to reactive in urban areas. General and Comparative Endocrinology. 270, 67-74. *(Article featured in Mongabay 2019: https://india.mongabay.com/2019/02/how-lizards-in-bengaluru-are-faring-when-compared-to-their-country-cousins/)*

5. **Batabyal A,** Thaker M. 2018. Lizards assess complex social signals by lateralizing colour but not motion detection. Journal of Experimental Biology. 221: jeb173252

4. **Batabyal A.**, Thaker M. 2017. Signaling with physiological colours: high contrast for courtship but speed for competition. Animal Behaviour (129) 229–236. (*Article featured in Livemint 2017: https://www.livemint.com/Sundayapp/Eq5cf272TL5828gYnZKPNK/How-urban-lizards-are-changing-their-lifestyles-to-make-citi.html)*
3. **Batabyal A.**, Balakrishna S., and Thaker M. 2017. A multivariate approach to understanding shifts in escape strategies of urban lizards. Behavioral Ecology and Sociobiology 71(5), 83. (*Article featured in The Hindu 2017: https://www.thehindu.com/sci-tech/science/lizards-adapt-to-city-life/article24955827.ece)*
2. Balakrishna S., **Batabyal A.,** and Thaker M. 2016. Dining in the city: Dietary shifts in Indian Rock Agamas across an urban – rural landscape. Journal of Herpetology. 50(3), 423–428.
1. **Batabyal A.**, Gosavi SM., and Gramapurohit NP. 2014. Determining sensitive stages for learning to detect predators in larval bronzed frogs: Importance of alarm cues in learning. Journal of Biosciences (39), 701–710.

Book chapter

Batabyal A, Thaker M. 2018. "Compounding climate change with urbanisation: challenges and responses for species". *Biodiversity and climate change: an Indian perspective*, (eds.) Bhatt JR, Das AA, Shanker K. New Delhi, India: Ministry of Environment, Forest and Climate Change, Government of India.

INVITED TALKS AND POSTERS

2021 Risk in one is not risk in all. *Contributed talk at Animal Behaviour Live Conference (virtual).*
2021 From colour changing lizards to tea drinking snails. *Invited talk at University of Kansas, US.*
2017 Urbanisation and Shifting phenotypes. *Contributed poster at European Society for Evolutionary Biology. Groningen, The Netherlands.*
2016 Sex, survival and colour. *Invited talk at School in Herpetology. Indian Institute of Science. India*
2016 Urbanisation degrades social signaling in the rock agama *Psammophilus dorsalis*. *Contributed talk at India-Behaviour, Ecology, Evolution (I-BEE), India.*
2015 Urbanisation is causing stress and degrading social interaction in lizards too! *Contributed talk at International Ethological Conference, Australia.*
2015 Urban lizards run faster and have bolder escape strategies. *Contributed poster at International Ethological Conference, Australia.*
2015 Urban lizards run faster and have bolder escape strategies. *Contributed poster at Students' Conference on Conservation Science, India.*

TEACHING EXPERIENCE

2022-23 Introduction to Environmental Studies (Course instructor for undergraduate course), FLAME University
2022-23 Fundamentals of Ecology (Course instructor for undergraduate course), FLAME University
2022 Pharmacology of organ systems (Teaching Assistant and Guest Lecturer for undergraduate course), University of Calgary, Canada.
2021 Science and Society (Guest Lecturer for undergraduate course), University of Calgary, Canada.
2019 Colours in Nature (Course Instructor for post graduate students), Azim Premji University, India.
2018 Animal Perception Workshop (Instructor for high school students), Art-Science lab, Srishti Institute of Art, Design and Technology, India.
2018 Learning and cognition, (Guest Lecturer for graduate course "Animal Behaviour"), Indian Institute of Science, India.
2014 Experiments in Ecology, (Teaching Assistant for Undergraduate laboratory course), Indian Institute of Science, India.

Pedagogical material: https://prezi.com/view/TB4KVO49EOW2SOKDBoRQ/

MENTORING

Graduate students mentored

2020-2021 Veronica Rivi, University of Modena, Italy and University of Calgary, Canada.
2014-2017 Madhura Amdekar, Indian Institute of Science, India.
2014-2017 Shakilur Kabir, Indian Institute of Science, India.
2018-2021 Avik Banerjee, Indian Institute of Science, India.

Undergraduate students mentored

2022 Jasper Hollings, University of Calgary, Canada
2021-2022 David Chau, University of Calgary, Canada.
2020-2021 Bevin Wiley, University of Calgary, Canada.
2020-2021 Diana Kagan, University of Calgary, Canada.
2012-2014 Shashank Balakrishna, St. Josephs College, India.
2015-2016 Abhijit Kumar, Indian Institute of Science, India.
2014-2015 Arka Pal, Indian Institute of Science, India.
2016-2017 Caleb Daniel, Indian Institute of Science, India.
2019-2020 Ninad Gosavi, Shivaji University, India.

PROFESSIONAL DEVELOPMENT COURSES AND CERTIFICATES

2022 Video for science communication, University of Calgary, Canada.
2021 Science communication: writing, speaking and visual, University of Calgary, Canada.
2020-2021 Postdoctoral Scholar Certificate in University Teaching and Learning, Taylor Institute of Teaching and Learning, University of Calgary, Canada.
2020 Career Development at University of Calgary, Canada.

WORKSHOPS AND MINI COURSES

2019 Experiments in Neuroscience at Indian Institute of Science, India organized by Monsoon WEN.
2018 Google Earth engine workshop at National Centre for Biological Sciences, India.
2018 Designing and Teaching Science Courses and Curriculum Development, Indian Institute of Science, India
2016 Molecular Phylogenetic workshop at Centre for Ecological Sciences, Indian Institute of Science, India.
2015 Field and Genome Science course at Kyoto University, Kyoto, Japan.
2011 Dealing with Evolution in the Classroom: Evolutionary Perspectives in Modern Biological Teaching and Research at Homi Bhabha Centre for Science and Education, Mumbai, India.
2008 Collection and Preservation Techniques of Zoological Specimens at Zoological Survey of India, Kolkata, India

SERVICE AND OUTREACH

2022-23 Reviewer for Branch Out Neurological Foundation, Canada
2021-present Editorial board member, Hamadryad.
2020-2022 Outreach team member for HBITO (Hotchkiss Brain Institute Trainee Organization), University of Calgary.
2021 Winner of Sustainability: Zero Waste Challenge organized by Hunter Hub for Entrepreneurial Thinking at University of Calgary
2021 Reviewer for Journal of Animal Ecology
2019-2021 Reviewer for Behavioural Ecology Sociobiology

2020-2021	Reviewer for Copeia
2020-2021	Reviewer for Graduate Science Education Committee (University of Calgary)
2020-2021	Invited Guest Advisor for SEEDS (ESA: Ecological Society of America) at University of Kansas
2020-2021	VP-PR for Toastmasters
2018	Judge for "Ecosystem and Ecosystem services" theme at National Children's Science Congress, held at Kendriya Vidyalaya, IISc, India
2013-2014	Student representative for Ecology Student Society, Indian Institute of Science, India
2017-2020	Member of European society for Evolutionary Biology

TECHNIQUES

Hormone and behaviour analysis, R programming, PRISM, Bonsai, Raven, MEGA, Adobe photoshop and illustrator, Da Vinci resolve, magicavoxel 3D art

INTER-PERSONAL SKILLS

Clifton Strengths Signature themes: *Empathy, Communication, Positivity, Maximizer, Adaptability*