

Souvik Mandal, Ph.D.

Post-doctoral fellow, Department of Molecular and Cellular Biology / Center for Brain Science

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I'm trained as a behavioral ecologist and broadly interested in behavior of social animals. As research tools, I use classical techniques like studying natural history, manual behavioral observation, and training animals, as well as modern computational tools like data science, machine vision and artificial intelligence. Additionally, I have over 10 years of experience in public outreach and management, and several years of teaching. I am a strong believer of "education for all for a better world".

Research experience

2018 - Postdoctoral Fellow

Department of Molecular and Cellular Biology / Center for Brain Science,
Harvard University, Cambridge, MA

Faculty Advisor: [Venkatesh N. Murthy](#), Professor, Department of Molecular and Cellular Biology

Project: Cooperation, decision-making, resource searching and retrieval mechanisms in the Carpenter ant
Camponotus pennsylvanicus

2016 Visiting researcher

Centre de Recherches sur la Cognition Animale (Research Center on Animal Cognition)
Université Toulouse III - Paul Sabatier, Toulouse, France

Faculty Advisor: [Martin Giurfa](#), Professor and Chair, Centre de Recherches sur la Cognition Animale

Project: Neural and behavioral basis of cooperative defense in honeybees

Education

2017	Ph.D. Thesis title	Finding the way back home: A study of orientation, navigation and homing behaviour in the social wasp <i>Ropalidia marginata</i>
	Faculty advisor	Raghavendra Gadagkar
	Affiliation	Centre for Ecological Sciences , Indian Institute of Science , India
2009	Master of Science	in Zoology, special paper – Ecology
	Affiliation	Presidency College , University of Calcutta , India
2007	Bachelor of Science	in Zoology (honors), Chemistry & Botany (minor), 2007
	Affiliation	Presidency College , University of Calcutta , India

Research interest

Foraging | Searching | Decision making | Cognition | Learning & memory | Sociobiology | Entomology | Ethology | Computational ethology | Behavioral ecology | Neuroethology | Evolution | Natural History | Ecology

Research skills

Behavioral experiment | Field work | Handling ant, bee & wasp colonies | Canine training | Programming – Python, MATLAB, R, html5 | Statistical modelling & analysis | Machine vision | Science communication | Mentoring

Other skills & interests

Media production & Documentary movie making (Adobe Premiere Pro) | Graphic design (Adobe Photoshop, Adobe Illustrator) | Painting | Photography | Music | Education & Science policy | Public outreach | Insect-inspired technology | Bird watching | Agriculture | Gardening | Skiing

Professional certifications

- 2021 [Undergraduate Science Mentoring - Harvard University](#)
- 2020 [Project Management Strategies For The Researcher – Harvard University](#)

Publications

1. Ganga Prasath S*, **Mandal S***, Giardina F*, Kennedy J, Murthy VN, Mahadevan L (2021) [Cooperative escape in ants and robots](#). bioRxiv
2. Brahma A, **Mandal S**, & Gadagkar R. (2019) [To leave or to stay: direct fitness through natural nest foundation in a primitively eusocial wasp](#). *Insectes Sociaux*
3. **Mandal S**, Brahma A. (2019) [Getting older, getting smarter: Ontogeny of foraging abilities in a tropical social wasp](#). *Journal of Experimental Biology*
4. **Mandal S**. (2018) How do animals find their way back home? A brief overview of homing behavior with special reference to social Hymenoptera. *Insectes Sociaux*
5. Brahma A, **Mandal S**, & Gadagkar R. (2018) Current indirect fitness and future direct fitness are not incompatible. *Biology Letters*
6. Nouvian M, **Mandal S**, Jamme C, Claudianos C, d'Ettoire P, Reinhard J, Barron AB, Giurfa M. (2018) Cooperative defence operates by social modulation of biogenic amine levels in honeybees. *Proceeding of Royal Society B*
7. Brahma A, **Mandal S**, & Gadagkar R. (2018) Emergence of cooperation and division of labor in the primitively eusocial wasp *Ropalidia marginata*. *Proceedings of the National Academy of Sciences of the USA*
8. Saha P, Nandi A, Unnikrishnan S, Shilpa MC, Shukla S, **Mandal S**, Mitra A, Gadagkar R. (2018) A route to direct fitness: natural and experimentally induced queen succession in the tropical primitively eusocial wasp *Ropalidia marginata*. *J Insect Behavior*
9. **Mandal S**, Brahma A, & Gadagkar R. (2017) Homing in a tropical social wasp: role of spatial familiarity, motivation and age. *J Comp Physiol A*
10. **Mandal S** & Gadagkar R. (2015) Homing abilities of the tropical primitively eusocial paper wasp *Ropalidia marginata*. *J Comp Physiol A*

Teaching and mentoring experiences

Course design, development and teaching

- 2020 - 2021: Harvard University, MA, USA: [LS/MCB100 - Computational Ethology](#)

Teaching assistant

Responsibilities included leading class discussions, supervising labs, grading assignments, conducting office hours, meeting with students individually.

- 2018: Harvard University, MA, USA [LIFESCI 1A: An integrated introduction to the life sciences: Chemistry, Molecular Biology, and Cell Biology](#)
- 2011 - 2013: Indian Institute of Science, Bangalore, India UB 101(2:1): Introductory Biology-I (Organismal Biology and the Molecular Basis of Life)

Mentoring Experiences

- 2019 - 2021: 6 undergraduates (long-term projects), 1 graduate (Ph.D.) student at Harvard University, MA, USA
- 2012 - 2016: 2 undergraduates, 1 masters', and 1 graduate (Ph.D.) student at Indian Institute of Science, Bangalore, India

Other experiences

Editorial & peer reviewing

- [Frontiers in Psychology - Cognition](#) (Review Editor)
- [Proceedings of the National Academy of Sciences of the United States of America](#)
- [Journal of Experimental Biology](#)

Professional media production

- 2017: Photographer, [Archives and Publications Cell](#), Indian Institute of Science
- 2017: Documentary video production head, [Archives and Publications Cell](#), Indian Institute of Science
- 2015 - 2016: Seminar video production head – [Centre for Contemporary Studies](#), Indian Institute of Science
- Featured photographer - [Sanctuary Asia](#) magazine (2005), [BMC Ecology](#) (2014)

Elected member:

- 2011 - 2014: Joint secretary – [Students' mess \(dining\) committee](#), Indian Institute of Science

- 2011: Secretary – [Ecology Students' Society](#), Indian Institute of Science
- 2007 - 2009: Constituency representative - M.S. program, Students' Union, Presidency college (University)

Volunteering:

- 2020: Founding committee member – [Harvard Diversity, Inclusion & Belonging](#)
- 2019 - 2020: Coordinator - [Seminars, Museum of Comparative Zoology, Harvard University](#)
- 2014 - 2016: Convener, Head of Public outreach & Financial manager [Students' Council](#), [Indian Institute of Science](#)
- 2013: Coordinator – Environment committee, [Students' Council](#), [Indian Institute of Science](#)

Awards for presentations

- 2017: 2nd Best Poster Award in XVI Congress of the European Society for Evolutionary Biology, held in Netherlands
 2015: Winner: Euraxess Science Slam India (Science communication competition organized by the European Union)
 2015: Best Poster Award in 34th International Ethological Conference, held in Australia
 2014: Best Poster Award in 15th Congress of the International Society for Behavioral Ecology, held in USA
 2013: Best Poster Award in the XIV Congress of the European Society for Evolutionary Biology, held in Portugal

Other presentations

Conference talks and poster presentation

1. 2019: Poster at Gordon Research Conference Neuroethology: Behavior, Evolution and Neurobiology, held in the USA
2. 2018: Poster at XVIII Congress of International Union for the Study of Social Insects, held in Brazil
3. 2016: Talk at 15th Congress of the International Society for Behavioral Ecology, held in the UK

Invited talks

Academic

1. 2020: "Computational Ethology" - Boston University, Host: James Traniello, Professor of Biology
2. 2019: "[Understanding animal behavior in the era of machine learning: lessons from ants](#)" - Georgia Institute of Technology, Host: Prof. David Hu, Mechanical Engineering and Biology, Adjunct Professor of Physics
3. 2016: Queen Mary University of London – Host: Prof. Lars Chittka, School of Biological and Chemical Sciences

Public

4. 2020: "Understanding bees for a sustainable future" – at Barnstable County Beekeepers Association, MA, USA
5. 2016: European research day - "Voice of Researcher", Chandigarh, India

Professional memberships

1. 2017: International Union for the Study of Social Insects
2. 2017: Society for the Study of Evolution
3. 2014, 2016: International Society for Behavioral Ecology
4. 2013: European Society of Evolutionary Biology

Field work experiences

1. Temperate closed-canopy forest - Harvard Forest, Petersham, MA, USA
2. Urban ecosystem – Kolkata; Bangalore, India
3. Tropical dry deciduous/ moist deciduous/ wet evergreen forest – i. Nagarhole National Park, Karkataka, India; ii. Mudumalai National Park, Tamilnadu, India; iii. Kalakkad Mundanthurai Tiger Reserve, Tamilnadu, India; iv. Nagzira wildlife Sanctuary, Maharastra, India; Kanha National Park, Madhya Pradesh, India
4. Wetland ecosystem Nal Sarovar Bird Sanctuary, Gajarat, India
5. Marine and mangrove ecosystem - Marine national park, Jamnagar, Gujarat, India
6. Desert ecosystem - Indian Wild Ass Sanctuary, Little Rann of Kutch, Gujarat, India
7. Dry deciduous scrub forest and dry savannah forests - Gir National Park, Gajarat, India
8. Valley and plateau meadow - Kanha National Park, Madhya Pradesh, India