

DR VIVEK NITYANANDA

CURRENT POSITION: BBSRC David Phillips Fellow, Biosciences Institute, Newcastle University (2019-present)

PREVIOUS APPOINTMENTS:

- Postdoctoral Research Associate, Institute of Neuroscience, Newcastle University (2013-2019)
- College for Life Sciences Fellow, Wissenschaftskolleg zu Berlin, Institute for Advanced Study (2016-2017)
- Marie Curie Research Fellow, Queen Mary University of London (2011-2013)
- Human Frontiers Science Program Fellow, Queen Mary University of London (2010-2011)
- Postdoctoral Research Associate, University of Minnesota (2009-2010)

EDUCATION: PhD, Indian Institute of Science, Bangalore, 2008

PUBLICATIONS

- O’Keeffe J, Yap SH, Cornejo IL, **Nityananda V**, Read J (2022) A Computational Model of Stereoscopic Prey Capture in Praying Mantises. *PLoS Computational Biology*. 8(5): e1009666.
- **Nityananda V**, Balakrishnan R. (2021) Synchrony of Complex Signals in an Acoustically Communicating Katydid. *Journal of Experimental Biology*. 224 (9): jeb241877.
- Greenfield MD, Aihara I, Amichay G, Anichini M, **Nityananda V**. (2021) Rhythm Interaction in Animal Groups - Selective Attention in Communication Networks. *Philosophical Transactions of the Royal Society B*. 376(1835), 20200338.
- Henry MJ, Cook PF, de Reus K, **Nityananda V**, Rouse AA, Kotz SA. (2021) An ecological approach to measuring synchronization abilities across the animal kingdom. *Philosophical Transactions of the Royal Society B*. 376, 20200336.

- Bouwer FL, **Nityananda V**, Rouse AA, ten Cate Carel. (2021) Rhythmic abilities in humans and non-human animals: a review and recommendations from a methodological perspective. *Philosophical Transactions of the Royal Society B*, 376, 20200335.
- **Nityananda V**, Chittka L. (2021) Different effects of reward value and saliency during bumblebee visual search for multiple rewarding targets. *Animal Cognition*, 24, 803–814.
- **Nityananda V**. (2020) Insect Neurobiology: Divergent neural computations in predatory insects, *Current Biology*, R159-R161.
- **Nityananda V**, O’Keefe J, Umeton D, Simmons A, Read J. (2019) Second-order cues to figure motion enable object detection during prey capture by praying mantises. *Proceedings of the National Academy of Sciences, USA*, 116, 27018-27027.
- **Nityananda V**, Joubier C, Tan J, Tarawneh G, Read JCA. (2019) Motion-in-depth perception and prey capture in the praying mantis *Sphodromantis lineola*. *Journal of Experimental Biology*, 222: jeb198614.
- Tarawneh G, Jones L, **Nityananda V**, Rosner R, Rind C, Read JCA. (2018) Apparent Motion Perception in the Praying Mantis: Psychophysics and Modelling. *Vision*, 2, 32.
- Tarawneh G, **Nityananda V**, Rosner R, Errington S, Herbert W, Arranz-Paraiso S, Busby N, Tampin J, Read JCA, Serrano-Pedraza I. (2018) Contrast thresholds reveal different visual masking functions in humans and praying mantises. *Biology Open*, 7: bio029439
- **Nityananda V**, Tarawneh G, Henriksen S, Umeton D, Simmons A, Read JCA. (2018) A novel form of stereo vision in the praying mantis. *Current Biology*, 28, 588-593 (cover image).
- **Nityananda V**, Read JCA. (2017) Stereopsis in animals: evolution, function and mechanisms. *Journal of Experimental Biology*, 220, 2502-2512.
- Tarawneh G, **Nityananda V**, Rosner R, Errington S, Herbert W, Cumming BG, Read JCA, Serrano-Pedraza I. (2017) Invisible noise obscures visible signal in insect motion detection. *Scientific Reports*, 7, 3496.

- **Nityananda V**, Tarawneh G, Errington S, Read JCA, Serrano-Pedraza I. (2017) The optomotor response of the praying mantis is driven predominantly by the central visual field. *Journal of Comparative Physiology A*, 203, 77-87.
- **Nityananda V**. (2016) Attention-like processes in insects. *Proceedings of the Royal Society B*, 283, 20161986, DOI: 10.1098/rspb.2016.1986
- **Nityananda V**, Bissianna G, Tarawneh G, Read JCA. (2016) Small or far away? Size and distance perception in the praying mantis. *Philosophical Transactions of the Royal Society B*, 371, 20150262.
- **Nityananda V**, Tarawneh G, Nicolas JCA, Rosner R, Crichton S, Read J. (2016) Insect stereopsis demonstrated using a 3D insect cinema. *Scientific Reports*, 6, 1-9.
- **Nityananda V** & Chittka L. (2015) Modality-specific attention in foraging bumblebees. *Royal Society Open Science*, 2: 150324 (**cover image**). DOI: 10.1098/rsos.150324
- **Nityananda V**, Tarawneh G, Jones L, Busby N, Davies R, Read JCA. (2015) The contrast-sensitivity function of the praying mantis *Sphodromantis lineola*. *Journal of Comparative Physiology A*, 201, 741-750.
- Lamba S* & **Nityananda V***. (2014) Self-deceived individuals are better at deceiving others. *PLoS One*, 9, e104562. (***both authors contributed equally**).
- **Nityananda V**, Skorupski P & Chittka L. (2014) Can bees see at a glance? *Journal of Experimental Biology*, 217, 1933-1939.
- **Nityananda V**. (2013) Making sense of the world. (Invited review of Sensory Ecology, Behaviour and Evolution by Martin Stevens) *Journal of Evolutionary Psychology*, 11, 89-92.
- **Nityananda V** & Pattrick J. (2013) Bumblebee visual search for multiple learned target types. *Journal of Experimental Biology*, 216, 4154-4160.
- **Nityananda V** & Bee M. (2012) Spatial release from masking in a free-field source identification task by gray treefrogs. *Hearing Research*, 285, 86-97 (**cover image**).
- **Nityananda V** & Bee M. (2011) Finding your mate at a cocktail party: frequency separation promotes auditory stream segregation of concurrent voices in multi-species frog choruses. *PLoS One*, 6, e21191.

- **Nityananda V** & Balakrishnan R. (2009) Modelling the role of cooperation and competition in the evolution of katydid acoustic synchrony. *Behavioural Ecology*, 20, 484-489.
- **Nityananda V** & Balakrishnan R. (2008) Leaders and followers in katydid choruses in the field: consistency, spacing and call intensity. *Animal Behaviour*, 75, 723-735.
- **Nityananda V**, Stradner J, Balakrishnan R & Römer H. (2007) Selective attention in a synchronising bushcricket: physiology, behaviour and ecology. *Journal of Comparative Physiology A*, 193, 983-991.
- **Nityananda V** & Balakrishnan R. (2007) Synchrony during acoustic interactions in the bushcricket Mecopoda 'Chirper' (*Tettigoniidae:Orthoptera*) is generated by a combination of chirp-by-chirp resetting and change in intrinsic chirp rate. *Journal of Comparative Physiology A*, 193, 51-65.
- **Nityananda V** & Balakrishnan R. (2006) A diversity of songs among morphologically indistinguishable katydids of the Genus Mecopoda (*Orthoptera: Tettigoniidae*) from Southern India. *Bioacoustics*, 15, 223–250.

FELLOWSHIPS AND GRANTS

- **2022:** Turing Global Fellowship to **Olga Procenko**: '*Affective state and visual decision-making in bumblebees*': **£2430**
- **2022:** Leverhulme Research Grant (**Co-I**): '*Bee-ing Human: An Interactive Bee-Book for the 21st Century*': **£448,672** – project led by **Prof Jennifer Richards**
- **2022:** NERC Growing Roots Fund (**Co-I**), **£6,995** – awarded to Then Try This, non-profit organization based in Cornwall
- **2021:** ASAB undergraduate scholarship to **Jared Firth**: '*Prey shape and selective attention in mantises*': **£1300**
- **2019:** BBSRC David Phillips Fellowship: '*Attention-like processes in insects: applications to pollinator biology and health*': **£1,005,836**
- **2016:** Wissenschaftskolleg zu Berlin, Institute of Advanced Study, College for Life Sciences fellowship: '*A natural history of attention*': **£12,520**

- **2016:** Wellcome Trust Small Arts Award (**Co-I**) (for a play about insect senses with **Cap-A-Pie Theatre**, Newcastle): **£15,177**
- **2016:** EngageFMS-Creative Arts Practice Award (for a play about insect senses with **Cap-A-Pie Theatre**, Newcastle): **£3,350**
- **2015:** Great North Museum fellowship for public engagement: **£1,500**
- **2014:** Centre for Behaviour and Evolution, Newcastle University small funds grant – with Dr. Ghaith Tarawneh and Dr. Ronny Rosner: **£1,893**
- **2011:** Centre for Ecology and Evolution, London grant: ‘*The evolution of self-deception*’ –with Dr. Shakti Lamba, University of Exeter: **£2,000**
- **2011:** Marie Curie International Incoming Fellowship: ‘*Visual search and attention in bumblebees*’: **£142,210**
- **2010:** Human Frontiers in Science Program Long Term Fellowship: “*Visual search and attention in bumblebees*”: **£96,380**
- **2008:** International Society for Behavioral Ecology Travel Fellowship
- **2006:** International Congress of Neuroethology Travel Fellowship

EVIDENCE OF VISIBILITY AND ESTEEM

- **Academic Editor:** PLoS One, 2018 –onwards.
- **27 Presentations at international conferences:** 2004-2020
- **24 Invited talks at universities and conferences worldwide:** 2011-2021
- **Symposium organizer:** Bee Cognition and Agriculture, 2022
- **Symposium organizer:** State-dependency and Selective Attention in Invertebrates, International Congress of Neuroethology 2022, Lisbon.
- **Organizing team member,** Easter conference of the Association for the Study of Animal Behaviour, 2022.
- **Invited grant and fellowship reviewer:** BBSRC responsive mode grant, BBSRC David Phillips Fellowships, National Science Centre Poland, Leverhulme Trust, University of Konstanz, Newton International Fellowships, Student’s Conference on Conservation Science Bengaluru, Wissenschaftskolleg zu Berlin, College for Life Sciences
- **Member,** Future Leaders Fellows Development Network

- **Prize:** Best postdoc paper prize, Faculty of Medical Sciences, Newcastle University, 2018.
- **Award (shortlisted):** Times Higher Education Research Project of the Year (STEM) Award, 2017.
- **Award:** Shyamrao Kaikini Award for the best PhD thesis in Ecology.
- **Media coverage of research:** New York Times, The Atlantic, BBC Breakfast, BBC One, CBBC Newsround, National Geographic TV, The Financial Times, Wired Magazine, El País, Time Magazine, Quartz, The Telegraph, BBC Newcastle, BBC Teesside, BBC focus Science and Technology, Public Radio International, Huffington Post (UK, US, France), Metro (UK, International), Nature, Science, Current Biology.

PEER REVIEW ACTIVITY

Animal Behaviour, Behavioural Ecology, Biology Letters, Current Biology, Current Opinion in Insect Science, Current Science, Ecological Entomology, Ethology, Functional Ecology, Journal of Comparative Physiology A, Journal of Experimental Biology, Methods in Ecology and Evolution, PLoS Biology, PLoS One, Psychological Science, Resonance, Royal Society Interface, Scientific Reports.

ACADEMIC SERVICE

- Newcastle University Peer Review College Member, 2022-present
- NERC funder strategy group, Newcastle University, 2021-present
- Early Career Representative, Behavioural Science and Psychology Theme, 2020-present.
- Steering Committee Member, Behavioural Science and Psychology Theme, 2021-present.
- Executive Committee member, Centre for Behaviour and Evolution, Newcastle University, 2015-present.

- Seminar series organizer, Centre for Behaviour and Evolution, Newcastle University, 2019 – Present
- Mentor on programs for Biosciences Institute (Newcastle), International Society for Neuroethology, Animal Behaviour Collective, Association for the Study of Animal Behaviour.
- External Examiner: Lund University, University of Cambridge, University of Adelaide
- Member, Equality, Diversity, Inclusivity and Accessibility Committee, Association for the Study of Animal Behaviour, 2020- present.
- Member, Inclusion and Diversity Committee, International Society for Neuroethology, 2020-Present.
- Engage and Aspire Working Group member, Newcastle University: 2019 – 2020.
- Newcastle University Race Equality Network Advisory Board member: 2019-2022.
- Postdoctoral Committee, Faculty of Medical Sciences, Newcastle University, 2017-2019.
- Equality, Diversity and Inclusion committee member, Institute of Neuroscience, Newcastle University, 2014 -2019.
- Co-founder and member, Postdoctoral Committee, Newcastle University, 2014-2019.
- Joint Postdoctoral Representative, Research Strategy Group, Queen Mary University of London, 2012-2013.
- Co-organizer, Neurobiology, Behaviour and Cognition seminar series, Queen Mary University of London, 2012-2013.
- Associate Faculty Member for behavioural neuroscience, Faculty of 1000, 2011-2013.
- Joint Secretary, London Evolutionary Research Network, 2012.
- Secretary, Ecological Students Society, Indian Institute of Science, 2003-2006.

TEACHING AND MENTORSHIP

- **Training courses completed:** Learning and Teaching in Higher Education, Newcastle University Mentoring, Royal Society Leadership Effectiveness Course
- Lectures on evolution and human behaviour (Newcastle University 2020 onwards), comparative cognition (Newcastle University, 2014 onwards), sensory ecology and

animal communication (Queen Mary University of London, 2012-2013) and animal behaviour (Indian Institute of Science, 2006-2008).

- Design of module and evaluation of coursework for Evolution and Human Behaviour (Newcastle University, 2020 onwards), Comparative Cognition (Newcastle University, 2014 onwards).
- Tutoring, essay feedback and marking, School of Psychology, Newcastle University, 2020 onwards.
- Designed and taught the post-graduate level course: “*An introduction to MATLAB*” with Dr. Natasha Mhatre (Western University, Ontario), Indian Institute of Science, 2009.

- **Postdoctoral supervision**

1. Theo Robert, ‘Attention-like processes in insects’, 2020-present.
2. Diana Umeton, ‘Mantis stereo vision and object recognition’, 2017-2018.

- **Doctoral supervision**

1. Olga Procenko, “Cognitive biases and visual search in bumblebees”, 2020-present.
2. Co-supervisor, Matthew Quinn, “Visual processing in mosquito larvae”, 2021-present.
3. Co-supervisor, Paul Hands, “Spatial, temporal and human factors affecting image quality and experience of 3D in television, cinema and gaming”, 2013-2016.

Outcome: Successfully defended.

- **Postgraduate supervision**

1. Skye Riddell, ‘Iridescence and prey capture’, 2022
2. Marin Nicolas, ‘Learning and attention in bees’, 2022
3. Mitsiou Grelot-Valade, ‘Pesticides and bee visual attention’, 2022
4. Lucy Turner, ‘Overconfidence and competition’, 2021.
5. Jack Hardman, ‘Mechanisms of generalization and learning in bees and ANNs’, 2021.
6. Sol Lucas, ‘Mechanisms of generalization and learning in bees and ANNs’, 2021.

7. Marion Callendret, 'Bottom-up attention in bumblebees', 2020-2021.
8. Kelsey Bezaire, 'Mechanisms of generalization and learning in bees and ANNs', 2020.
9. Vera Vinken, 'Mechanisms of generalization and learning in bees and ANNs', 2020.
10. Cat Pattie, 'Modelling stereo correspondence in praying mantis visually-guided behaviour', 2020.
11. Ruaridh Hinchcliffe, 'Overconfidence and competition', 2020.
12. Dune Ganot, 'Selective attention in 3D in mantises', 2019.
13. Hai Jerry Tan, 'Looming and motion-in-depth perception in mantises', 2018.
14. Coline Joubier, 'Mantis perception of motion-in-depth', 2018.
15. Adam Simmons, 'Mantis stereo vision and object recognition', 2017.
16. Raúl Luna Del Valle, "Automated classification of mantis tracking behaviour", 2017.
17. Geoffrey Bissiana, "How the praying mantis takes distance into account when calculating prey size", 2015.
18. Jimmy Tampin, "Spatial vision in the praying mantis", 2015.
19. Judith Nicolas, "Investigating stereopsis in praying mantises using virtual stimuli", 2014.
20. Jonathan Patrick, "Bumblebee working memory and multiple target types", 2012.

- **Undergraduate supervision**

1. Beth Green, 'Stress and bee behavioural flexibility', 2022
2. Chloe Sowell, 'Bottom-up attention in bumblebees', 2022
3. Charlie Smith, "Choice and Overconfidence", 2021.
4. Karolina Agatha Tarapata, 'Visual attention and learning in bees', 2021.
5. Tan Yi Ting, 'Selective spatial attention in mantises', 2020.
6. Edward Hayden, "Skill Interest and Overconfidence", 2019.
7. Sin Yap, 'The correspondence problem and mantis 3D vision', 2019.
8. Yie Jie Loh, 'Selective spatial attention in mantises', 2019.
9. Hui Chan, "Parallax contributions to solving the stereo correspondence problem in the mantis", 2018.

10. Olivia Harding, "Orientation of visual spatial frequency channels in the praying mantis", 2017.
11. Steven Errington, "Noise and motion detection in the praying mantis", 2016.
12. Jeffrey Wu, "High speed video tracking of size and distance measurement by the praying mantis", 2016.
13. Natalie Busby, "The contrast sensitivity function of the praying mantis", 2015.
14. Fjolla Kukaj, "The Rubber Hand Illusion: How gender affects the sense of body-ownership, and exploring whether the latter affects psychosocial attitudes", 2013.
15. Sara Khan, "Reward value and bumblebee visual search", 2012.
16. Mohammed Sayyidul Hasan: "The effect of flower saliency on bumblebee foraging", 2012.
17. Steffen Peterson: "Spatial release from masking in the anuran auditory system", 2010.

PUBLIC ENGAGEMENT

- **Evidence Support Initiative**, along with Then Try This, Cornwall - This is a nation-wide scheme to provide independent scientific advice to local councils. I contributed to a pilot program with the non-profit Then Try This. Following this, we applied for and were awarded funds from NERC to develop the project further.
- **Relevant Training**: Completed distance learning courses in film-making and animation from the National Film and Television School. Hands-on workshops in film-making and editing at the Tyneside Cinema, Newcastle.
- **Science cartoons**: I run a blog featuring my cartoons of recent science papers with a focus on animal behaviour, neuroscience and psychology, 2011-Present: www.stuffscientistssay.blogspot.com.
- **Invited public lectures/presentations**: Association for the Study of Animal Behaviour, Education Series, Pint of Science, Newcastle; National Media Museum, Bradford; Hack the Senses, FabLab, London; Centre for Life, Newcastle Brain Zone launch; Barlow

Lecture Series, Breeze Creatives, Newcastle; SciBar, British Science Association, Newcastle; Explore lifelong learning; Great North Museum, 2015-2021.

- **Talks at schools and colleges:** Kings CE School, Wolverhampton, St Charles College, London, St Paul's Way Trust, London, Mahindra United World College India, Pune, Bangalore Association for Science Education, Bangalore, Government High School, Srirangapattinam, The Valley School, Bangalore, 2005-2021.
- **Great North Museum Fellowship for Public Engagement.** As part of my fellowship, I collaborated on the 'Spineless' **exhibition** on invertebrates at The Great North Museum, Newcastle. I also developed an **animation movie** on insect behaviour with Roots and Wings, Newcastle (<https://vimeo.com/141809158>) and worked with Applied Comics etc. on their **comic** for the exhibition, 2015.
- **Theatre workshops and performances:**
 - I am currently developing a **theatre production** with Cap-A-Pie Theatre Newcastle on insects, sensory biology and pesticides.
 - With Cap-A-Pie Theatre, Newcastle, I developed a **children's theatre production** about insect sensory ecology. We ran 'Insect Drama' workshops with children and adults in August 2015. The production entitled 'Six Legs' played in Newcastle in September 2016 and in primary schools in 2018. I also illustrated and wrote a **comic** as an accompanying program. We developed an **educational pack** supporting the school curriculum based on this show.
 - Performing research theatre workshops with Cap-A-Pie Theatre– culminating in five **theatre performances** based on research at Newcastle University, 2014-2017.
 - Assisted on developing productions - 'The Clearing' and 'Amol's Dreams' along with TheatreScience UK and the National Centre for Biological Sciences, Bangalore, 2009.
- **Writing:**
 - **Winner, WriteScience Poetry Contest:** One of six winners selected in a science poetry competition. Winners were featured on BBC Get Creative, 2015: <http://bbc.in/1lxB56i>
 - **Popular science article:** Yahoo News India, 2014: <http://tinyurl.com/pi2mhwy>
- **STEM ambassador, 2014-2019.**
- **Brain Evolution vodcast – development and animation:** With Alexandra de Sousa (University of Bath), development of and animation for a Brain Evolution Vodcast

funded by the European Society for Evolutionary Biology, 2014:
<http://tinyurl.com/px37qn2>. Two time **finalists at the Evolution Film Festival**.

- **Joint secretary of the London Evolutionary Research Network (LERN: <http://londonevolution.net/>)**, a group of students and postdoctoral researchers that organizes scientific talks and other events on aspects of Evolutionary Biology for the scientific community and the general public. Events included an evolutionary pub **quiz** and a **public debate** between leading national scientists, 2012-2013.
- **Wildlife rescue and film direction:** Volunteer for Snake Rescue Volunteers (SRV), an organization that mitigates human-animal conflict at the Indian Institute of Science, Bangalore. Arising from this I partially filmed, co-directed and edited a 15-minute film on snakes and the experiences of SRV called 'Snakes in the city', 2003-2008.