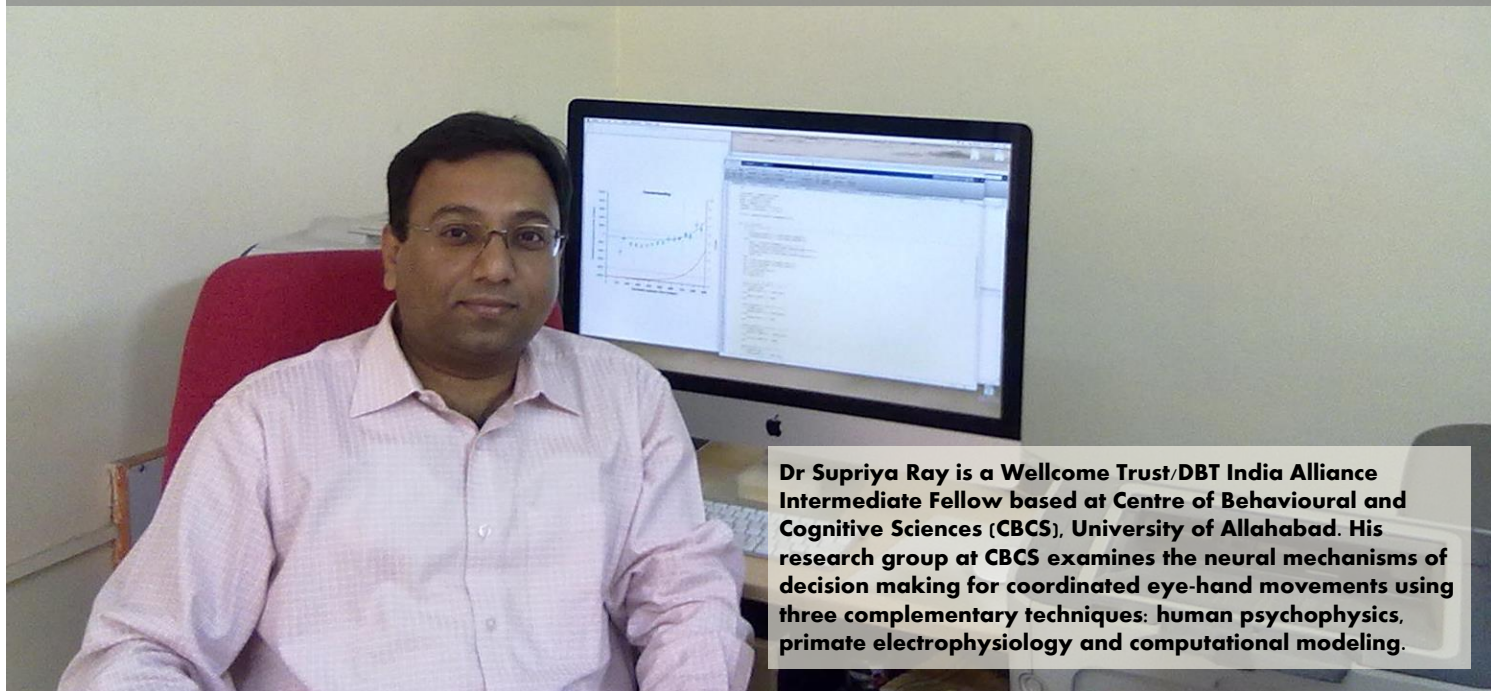


INDIA ALLIANCE FELLOW IN SPOTLIGHT

DR SUPRIYA RAY

Intermediate Fellow, Allahabad University



Dr Supriya Ray is a Wellcome Trust/DBT India Alliance Intermediate Fellow based at Centre of Behavioural and Cognitive Sciences (CBCS), University of Allahabad. His research group at CBCS examines the neural mechanisms of decision making for coordinated eye-hand movements using three complementary techniques: human psychophysics, primate electrophysiology and computational modeling.

What are you working on? and what impact do you hope it will have?

Most of our daily activities involve visually guided movements, we see something and then act on it. Usually saccadic eye movement, which rapidly orients gaze to an object of interest, precedes limb movement. Visual perception and attention are closely linked to eye movement. Have you ever seen your own eye movement in mirror? We simply cannot, because our perceptual ability is suppressed around the time of saccade. More interestingly, attention shifts covertly to the future location of gaze, which means, the mind's eye moves before physical eye movement. However, sometimes a situation may also arise when you must inhibit your intended or planned eye movement – you may not want to put your life at risk by taking eyes off the road while driving, or making an eye contact with your neighbor's aggressive canine who has mistaken you as an intruder, or when you are watching news on television and your spouse is excited to tell you about upcoming vacation plan.

Currently we are investigating how perception and attention influence control of eye movement.

We manipulate detectability of a stop-signal (similar to a red light in a traffic signal) that appears unexpectedly, and examine the ability of human participants to inhibit their impending eye movements in response to that signal. Our data suggests that the detection of the stop-signal was critical to cancel saccadic eye-movement but has no effect on saccadic reaction time. We further manipulated spatial orientation of attention. Participants selected a peripheral target by summoning attention either around the center of the screen, or at the peripheral location of the target. A central visual stop-signal, as mentioned above, appeared infrequently in both cases requiring cancellation of impending saccade. Deployment of attention on the peripheral target relatively expedited saccade but did not affect stopping performance, suggesting divided attention between the saccade-goal and stop-signal.

These findings cannot be accounted for by the classical theory of inhibitory control that assumes a pair of competing mental processes, one that evolves to generate a saccade, and the other that evolves to stop the saccade – whomsoever wins the race, that behaviour is observed. The reason is that the model largely ignores role of cognition, especially perception and attention, in inhibition of action. We are planning to test some of these ideas in coordinated eye-hand movements as well. In future, we will record EEG activity from human participants and action potentials from monkeys to understand underlying mechanisms and interplay between perception, attention and action in the network between frontal and parietal areas of the brain. We hope that our study will improve our understanding of the brain functions and will also help us to explain why attention deficit people sometimes exhibit impulsive behaviour.

What role can scientists play in the society?

Most definitely, **the first and foremost responsibility of a scientist is to accrue and propagate quality scientific knowledge, and to ensure that the benefit of their research reaches the common people.** By 'quality' I mean novel, in-depth and robust. The second most important duty of scientists, I think, is to eradicate superstition and misinformation from society.



Primate lab under construction at Allahabad University



Eye tracking lab, Allahabad University

To this end we must involve ourselves in outreach programs – for example organise scientific exhibitions, science quiz, debates, lab tours etc – at the grass root level of our education system. We should also encourage bright youngsters to consider research as a career option. Further, I believe, scientists in India have much bigger role than just doing research in isolation and presenting their findings in front of only a handful of qualified people who understand their jargon. We have obligation not only to guide our students, but the nation as well, by helping government to make policies that are rational and have strong scientific foundation.

How has Wellcome Trust/DBT India Alliance funding helped you and your research?

I was extremely fortunate to receive funding from Wellcome Trust / DBT India Alliance. When I was planning to relocate to India from USA, my primary concern was how would I buy instruments for my lab, who would support recurring expenses? Wellcome Trust / DBT India Alliance is known for its generosity; however, the best part of this grant is its flexibility – their fellows are free to plan budget that suits the Fellow's requirement. This grant has also helped me to get financial support from my university to build a primate research facility, which is currently under construction. Wellcome Trust / DBT India Alliance always insists on quality of research, their periodic assessment has helped me to refine thoughts and techniques.

What keeps you going everyday?

Actually quite a few things, for example, my never ending urge to know the brain slightly better than before, frequent questions by a bunch of smart students- their excitement to show me what new they have found in their data., and currently, setting up electrophysiology labs for human and non-human primates. I always feel that I still have a lot of things to do and the clock is ticking very fast. I work hard to live up to the expectations of my family, friends and of course my funding organisations.

POSTDOC POSITION AVAILABLE AT DR RAY'S RESEARCH GROUP

Centre for Behavioural and Cognitive Sciences (CBCS), University of Allahabad, Uttar Pradesh, India

[Wellcome Trust/DBT India Alliance Intermediate Fellow](#)

Position of a Postdoctoral Fellow is open in a project funded by The Wellcome Trust/DBT India Alliance. Applications are invited from candidates who have finished their Ph.D in Neuroscience/ Physics/ Mathematics/ Computer Science/ Engineering/ Medicine/ Applied Physics/ Systems Biology / Cognitive Science or related fields from a reputed institute, with good understanding of brain and cognition.

Candidates with experience in electrophysiology or computational modelling will be given preference. An ideal candidate should have at least one publication in a high-impact international peer reviewed journal (or h-index at least 3). Sound knowledge in Statistics, and experience in programming using C / C++ / Matlab is expected. Fellowship will be as per directives by The Wellcome Trust DBT India Alliance.

Interested candidate may apply with their CV, a statement of purpose, reprint(s) of selected paper(s), and contact details of two referees.

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