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EDITORIAL

Editorial

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Although the quest to understand how the brain produces mind is not new—and has been the topic of much discussion in both Eastern and Western philosophical traditions—it still remains one of the great challenges in modern science. In the words of DNA pioneer James D. Watson: "The brain is the last and grandest biological frontier, the most complex thing we have yet discovered in our universe. It contains hundreds of billions of cells interlinked through trillions of connections. The brain boggles the mind." The scientific endeavour to understand how the mind emerges from the brain is the major goal of cognitive neuroscience and is now a major field on its own, and draws from different disciplines such as neuroscience, psychology, computer science and even philosophy. Despite the obvious complexities involved, over the last three decades there has been a rapid and spectacular growth of knowledge in this area and thanks to advances such as fMRI and fast computing it is now possible to render images of brain activity in relation to cognition in humans as well study the activity of hundreds of neurons in relation to behavior. Thanks to animal studies, we are now beginning to understand some of the processing steps involved in the encoding and processing of sensory information; how representations are used by the brain to disambiguate complex and ambiguous sensory environments that are themselves dynamic in nature, and how these sensory representations are eventually converted to categorical decisions in the brain that produces movements and help perform complex spatial tasks such as navigation. These studies are now being complimented by incorporating novel tools from molecular biology to study how neural networks learn and remember. The current issue contains a number of excellent reviews that highlight the advances, the controversies and the future challenges in the different areas mentioned above. Although these articles address very different problems in the field, they are largely driven by a bottom-up approach that links brain to mind. In contrast, there are also numerous articles in the current issue that approach the problem from a top-down approach that address the nature of computations and the algorithms that enable cognition. In this review, I have intentionally brought these distinct approaches together to highlight both the diversity and the complimentary flavour of such research that characterizes cognitive neuroscience. In closing, it is heartening to note that 12 of the 16 articles represent work from Indian scientists. This is worth mentioning since cognitive neuroscience is a relatively new field in the country and underscores the promise and potential of the field in the country, where high quality research comparable to the best in the world can be pursued at research institutes as well as in universities, with comparatively modest research budgets. Finally, I would like to thank all the authors for their time and effort and their scholarly articles. In this context, it is also worth mentioning that most of the faculty have been involved with the Bangalore Cognition Workshop that is conducted every 2 years by the Centre for Neuroscience at IISc., in its effort to promote the field in the country and bring the best cognitive neuroscientists from over the world to India. I would also like to sincerely thank Prof. T.N. Guru Row (Chief Editor) and the editorial committee of the journal for providing me, as a guest editor and author, a forum to showcase and promote cognitive neuroscience research. Special thanks to Mrs Kavitha Harish and her team at the archives as well as the team at Springer for compilation of the articles. In addition, a special thanks to the reviewers, copy editors and proof readers for their efficient work that enabled timely completion of the issue.

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Aditya Murthy did his undergraduate training at St. Xavier's college, Mumbai and Bombay University where he obtained his Masters degree. His doctoral training was with Dr. Allen Humphrey in the Department of Neurobiology at the University of Pittsburgh where he examined the neural mechanisms involved in the processing of motion in the visual system. For his post-doctoral training, he worked with Dr. Jeffrey Schall at Vanderbilt University studying the primate visuomotor system to more directly relate neural activity to psychological functions and behavior. He is currently a faculty at the Centre for Neuroscience, Indian Institute of Science, Bengaluru. His research interests are in the field of motor and cognitive control. His work spans the fields of visual perception, decision-making, and the generation of motor behavior and involve the application of cognitive/psychophysical, neuropsychological, and electrophysiological techniques. He anticipates that in the long term, this work will be useful to understand the basis of different motor disorders and develop brain–machine interface systems that are only beginning to be exploited as engineering and brain sciences are starting to increasingly interface.