

MVN Annual Research Showcase 9th September 2021

Invited Keynote Lecture: Functional Vision in Macular Degeneration

Preeti Verghese

Individuals with macular degeneration typically lose vision in the central region of one or both eyes. A binocular scotoma occurs when vision loss occurs in overlapping locations in both eyes, i.e. the *intersection* of the scotomata in the two eyes. When this region includes the foveae in both eyes, acuity and eye movements are impacted. To examine the consequences of a binocular scotoma, we carefully mapped out its extent and measured accuracy and eye movements in a visual search task. Individuals with binocular scotomata had unique challenges (and adaptations) to visual search, while those with non-overlapping scotomata performed similarly to controls.

However, vision can also be impacted when the scotomata in the two eyes do not overlap. We tested the prediction that stereopsis is impacted by the *union* of the two eyes' scotomata. In other words, a scotoma in either eye will impact stereopsis, whether or not it is in a binocularly overlapping region. To test this hypothesis, we mapped the periphery with local disparity stimuli to compare functional stereopsis to the pattern of vision loss in each eye. Our results show that regions with impaired stereopsis are indeed consistent with the union of the scotoma in the two eyes—the region corresponding to a scotoma in either eye is stereo blind, but coarse stereopsis is present outside this region.

Biography

Preeti Verghese is a Senior Scientist at the Smith-Kettlewell Eye Research Institute, San Francisco. She obtained a B. Tech. in Electrical Engineering before going on to a Ph.D. in Neuroscience. She received the Presidential Early Career Award for Scientists and Engineers in 1999. She is a member of the Editorial Boards of both *Vision Research* and *Journal of Vision*, and was President of the Vision Sciences Society in 2016-17. Her research interest is in how we gather visual information to interact with the real world and how vision loss impacts this process.

Annual Research Award Lecture: Multiplicity of motor actions in natural visually-driven behaviours & the impact of motor actions on visual processing

Riccardo Storchi

Most of what we know about visual processing comes from studies in which subjects (animals or humans) don't move. However, in everyday life the visual system is constantly engaged with ongoing motor actions and behaviours. Understanding visual processing in such conditions is a fundamental challenge.

To tackle this challenge my recent research has been focussed on (i) developing a detailed quantification of mouse visually relevant actions and behaviours and on (ii) understanding the impact of motor actions on visual processing.

The first part of this talk will review recent work from our and other groups on natural and instinctive visually driven actions. The second part of the talk will describe the impact different motor actions on mouse visual system in constrained and freely moving conditions.

Biography

Riccardo Storch has a BSc and a MSc in Biomedical Engineering from Polytechnic University of Milan (2001-2005), a PhD in Neuroscience from University of Modena and Reggio (2008-2011) and an MSc in Computational Neuroscience and Neuroinformatics at the University of Manchester (2008-2009). He worked as Research Associate in Rob Lucas Lab (2001-2016) before obtaining a Sir David Sainsbury Fellowship from NC3Rs (2017-2020) and a Sir Henry Wellcome Fellowship from Wellcome Trust (2021-2025)