

2019 – 2020

Doctorate in Cognitive and Brain Sciences Colloquia Series

LIST:

Marco Perugini - Professor of Department of Psychology, University of Milano-Bicocca: The signal and the noise: Implications of the replicability crisis on research practices (November 2019)

Leonardo Chelazzi - Full Professor of Physiology, University of Verona: Plasticity of Spatial Priority Maps: The Role of Reward and Statistical Learning (February 2020)

Alexandre Pouget - University of Geneva, Switzerland: The agony of choice (June 2020)

Pieter R. Roelfsema - Netherlands Institute for Neuroscience, Amsterdam: Interactions between visual cortical neurons for perception and restoring them for the blind (June 2020)

David Van Essen - Washington University in St. Louis Mapping Human Cerebral Cortex: Structure, Function, Connectivity, Development, and Evolution (September 2020)

Bianca De Haan - Brunel University: Mechanisms and anatomy of selective attention in multi-target environments (October 2020)

DETAIL:

SPEAKER: Marco Perugini *Professor of Department of Psychology, University of Milano-Bicocca*

NOVEMBER 7, 2019 4:00 p.m. - Palazzo Fedrigotti, 1 floor, Conference Room, Corso Bettini 31, Rovereto.

TITLE: The signal and the noise: Implications of the replicability crisis on research practices

ABSTRACT: The recent replicability crisis in Psychology has attracted much attention and it is starting to have an impact on current research practices. In this talk, after an overview, I will present some concrete suggestions on what should be done based on the lessons learned from the replicability debate. The emphasis will be on methodological issues and research practices increasing the likelihood of designing informative experiments and drawing correct inferences from data, helping therefore researchers to separate the signal from the noise.

SPEAKER: Leonardo Chelazzi *Full Professor of Physiology at the University of Verona*

FEBRUARY 6, 2020 4:00 p.m. - Aula Magna, Palazzo Piomarta, Corso Bettini, 84 - Rovereto

TITLE: Plasticity of Spatial Priority Maps: The Role of Reward and Statistical Learning

ABSTRACT: In the past, we have pioneered research exploring the impact of reward on visual selective attention. For example, in a study using visual search, we demonstrated that reward can alter the “landscape” of spatial priority maps, increasing priority for locations associated with greater reward during a learning phase and reducing it for locations associated with smaller reward. Importantly, we could also demonstrate that the effects persisted for several days after the end of the learning episode and generalized to new tasks and stimuli. More recently, we have assessed whether similar effects can be induced via statistical learning. In a series of experiments using variants of a visual search task, unbeknownst to the participants, we manipulated the probability of occurrence of the sought target and/or of a salient distractor across locations. The data indicated that the priority of a given location was increased for a location with frequent targets or rare distractors; vice versa, priority was decreased for a location with rare targets or frequent distractors. Moreover, when the two spatial probability manipulations (i.e., that for the target and that for the distractor) were tipped one against the other, the resulting effect was a weighted average of the two “pure” effects. Importantly, in all cases above, changes in attentional performance were obtained even though participants were not aware of the applied manipulation. We argue that these effects reveal durable changes in priority maps of space. In summary, reward and statistical learning appear to be strong (and implicit) determinants of attentional deployment.

SPEAKER: Alexandre Pouget *University of Geneva, Switzerland*

Thursday, June 4, 2020 | 4:00 p.m. - Online seminar offered by Zoom platform

TITLE: The agony of choice

ABSTRACT: Most of what we understand of the neural basis of perceptual and decision making is currently limited to binary choices based on a single source of evidence whose reliability is fixed over time. In contrast, real life decisions often involve multiple choices and multiple sources of evidence with unknown time varying reliability. I will present a pair of studies in which we have started to explore the neural basis of these realistic decisions. I will start by presenting a neural theory of optimal decision making for 3 or more choices which explains in particular why people agonize when choosing among equally good options. In the second half of the presentation, I'll present a model of Bayesian multisensory decision making based on the theory of probabilistic population codes. I'll show that this theory is consistent with the population response of parietal area LIP in monkeys trained to perform optimal multisensory integration.

SPEAKER: Pieter R. Roelfsema *Netherlands Institute for Neuroscience, Amsterdam*

Thursday, June 25, 2020 | 4:00 p.m. - Online seminar offered by Zoom platform

TITLE: Interactions between visual cortical neurons for perception and restoring them for the blind

ABSTRACT: Our results implicate early visual cortex in visual cognition - in tasks where subjects reason about what they see. I will discuss new evidence supporting the hypothesis that the activity in early visual areas has a causal role in cognition. I will discuss how the neuronal responses emerge as the interaction between brain areas, with a special role for specific classes of interneurons. The early visual cortex acts as a multiscale cognitive blackboard for read and write operations by higher visual areas, which can thereby efficiently exchange information. These results also inspire new approaches to create a visual prosthesis for the blind, by direct interfacing with the visual cortex. I will discuss how high-channel-number interfaces with the visual cortex might be used to restore a rudimentary form of vision in blind individuals.

SPEAKER: David van Essen *Washington University in St. Louis*

SEPTEMBER 3, 2020 5:00 p.m. - Zoom online seminar

TITLE: Mapping Human Cerebral Cortex: Structure, Function, Connectivity, Development, and Evolution

ABSTRACT: David Van Essen is currently Alumni Endowed Professor in the Department of Anatomy & Neurobiology at Washington University in St. Louis. He has served as Editor-in-Chief of the Journal of Neuroscience, founding chair of the Organization for Human Brain Mapping, and President of the Society for Neuroscience. He is currently Principal Investigator for the Human Connectome Project, an ambitious project aimed at mapping brain function and connectivity in healthy adults.

SPEAKER: Bianca De Haan *Lecturer in Psychology, Brunel University* **OCTOBER 1, 2020**

4:00 p.m. - Zoom online seminar

TITLE: Mechanisms and anatomy of selective attention in multi-target environments

ABSTRACT: The ability to attend to multiple visual targets presented simultaneously across both visual fields, is essential for everyday real-world behaviour such as navigating traffic scenes, engaging in team sports, and playing a videogame. The importance of this ability is demonstrated impressively in neurological patients suffering from extinction, most commonly as a consequence of right hemispheric brain damage. These patients are able to report single (unilateral) visual targets in either visual field, but fail to report the contralesional target in (bilateral) situations where an ipsilesional target is concurrently present. As such, these patients provide a unique window of opportunity to study the mechanisms and anatomy critical for selective attention in multi-target environments. In this talk I will present the results of behavioural, fMRI, TMS, and lesion mapping studies that shed light on the mechanisms and anatomy that underlie our ability to attend to multiple simultaneously-presented lateralised targets, and the failure of this ability in extinction patients.