Rajani Raman

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Positions

Postdoctoral Researcher **2020 – present**
Laboratory for Neuro- and Psychophysiology, KU Leuven, Belgium
Project: How body relevance drives brain organization

Research Scientist **2017 – 2020**
ATR Brain Information Communication Research Laboratory Group, Kyoto, Japan
Project: Evaluation of HCNNs as a model of the face-processing network of macaque

Education

PhD
Saha Institute of Nuclear Physics (SINP), Kolkata, India *2017*
Thesis: Computational mechanism of filling-in in the visual system

Pre-doctoral training
Saha Institute of Nuclear Physics (SINP), India *2011*
Specialization: Computational vision and neuromorphic design

MSc (Physics)
Patna University, India *2009*
Specialization: Electronics and Instrumentation

BSc (Physics)
Jayprakash University, India *2005*

Research Experience

- Postdoctoral work (with Dr. Haruo Hosoya at ATR): Evaluated hierarchical convolutional neural networks as the model of face processing against the observed tuning properties of face patches in macaques.
- PhD work (with Prof. Sandip Sarkar at SINP): Investigated the computational mechanism of the filling-in phenomenon at the blind spot and associated properties in the framework of predictive coding model of natural images.

Research Interests

- Visual recognition and perception; Probabilistic generative models of the visual system; Natural scene statistics.

Skills

- Machine learning; Deep neural networks; Coding in MATLAB and Python.

Publications

- Murris S, Arsenault J, **Raman R**, Vogels R, Vanduffel W (2021) Electrical stimulation of the macaque ventral tegmental area drives category-selective learning without attention. Neuron 33667342, 0896-6273. doi:10.1038/s42003-020-0945-x10.1016/j.neuron.2021.02.013

- **Raman R**, Hosoya H (2020) Convolutional neural networks explain tuning properties of anterior, but not middle, face-processing areas in macaque inferotemporal cortex. Communications biology 3, 221. doi:10.1038/s42003-020-0945-x
- **Raman R**, Sarkar S (2017) Significance of Natural Scene Statistics in Understanding the Anisotropies of Perceptual Filling-in at the Blind Spot. Scientific Reports volume 7, Article number: 3586. doi:10.1038/s41598-017-03713-w.
- **Raman R**, Sarkar S (2016) Predictive Coding: A Possible Explanation of Filling-In at the Blind Spot. PLoS ONE 11(3): e0151194. doi:10.1371/journal.pone.0151194.
- **Raman R**, Sarkar S (2016) A Possible Explanation of Oriented Bar Filling-in at the Blind-Spot in the light of Hierarchical Prediction Mechanism. J. Phys. Conf. Series (759), 012027.

Published Abstracts

- CNN explains tuning properties of anterior, but not middle, face-processing areas in macaque IT. International symposium on "Past, Present and Future of Shitsukan Science and Technologies", 2019, Kyoto University, Japan.
- Does CNN explain tuning properties of macaque face-processing system? CCN-2019, Berlin, Germany.
- Does CNN explain tuning properties of macaque face-processing system? 8th Multidisciplinary Sensing Area Group Meeting, 2019, Japan. (oral + poster)
- Evaluating CNNs as a model of face processing network of the macaque, 42^{nd} Annual Meeting of the Japan Neuroscience Society-2019, Japan. (oral)
- Does CNN explain the properties of the middle face patch area of primate? Society for Neuroscience 2018 Annual Meeting, San Diego, CA.
- Understanding face-processing in primate using CNN, 41^{st} Annual Meeting of the Japan Neuroscience Society-2018, Japan.
- Understanding Anisotropies Related to the Filling-In at the Blind Spot in the Light of Natural Image Statistics, JNNS-2017, Japan.
- Fresh view of filling-in within the context of hierarchical predictive coding, CBC 2015, IIT Gandhinagar, India.
- A possible explanation of orientated bar filling-in at the blind-spot in the light of hierarchical predication mechanism. CCP 2015, IIT Guwahati, India.
- Studies on filling-in across blind spot in the light of hierarchical predictive coding of natural images, ICMCB 2015, IIT Kanpur, India. (oral)

Schools and Workshops

- Does CNN explain selectivity and tuning properties in the primate middle face patch area? Brain and Mind Workshop-2018, Japan.
- Summer School on Computational Approach to Memory and Plasticity, 2014, NCBS, Bangalore, India.
- Cold Spring Harbor Asia Summer School: Computational and Cognitive Neuroscience, 2013, Beijing, China.

Awards

- Senior research fellowship, Department of Atomic Energy, Govt. of India (2013 - 2016).
- Junior research fellowship, Department of Atomic Energy, Govt. of India (2010 - 2013).
- Madhava Maharupi Physics Scholarship at Patna University, India (2007 - 2009).

Professional Associations

- Society for Neuroscience; The Japan Neuroscience Society.

References

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Dr. Haruo Hosoya
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