

# Rajani Raman

2-2-2 Hikaridai Seika-cho, Soraku-gun – Kyoto, Japan 619-0288

☎ (+81) 7026264022 • ✉ rajani.raman@atr.jp

## Position

### Postdoctoral Research Scientist

2017–Present

*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

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

## Skills

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

## Publications

- **Raman R**, Hosoya H (2019) CNN explains tuning properties of anterior, but not middle, face-processing areas in macaque IT. bioRxiv doi:10.1101/686121. (under review)
- **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.

- o **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.
- o **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

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- o Does CNN explain tuning properties of macaque face-processing system? CCN-2019, Berlin, Germany.
- o Does CNN explain tuning properties of macaque face-processing system? 8th Multidisciplinary Sensing Area Group Meeting, 2019, Japan. (oral + poster)
- o Evaluating CNNs as a model of face processing network of the macaque, 42<sup>nd</sup> Annual Meeting of the Japan Neuroscience Society-2019, Japan. (oral)
- o Does CNN explain the properties of the middle face patch area of primate? Society for Neuroscience 2018 Annual Meeting, San Diego, CA.
- o Understanding face-processing in primate using CNN, 41<sup>st</sup> Annual Meeting of the Japan Neuroscience Society-2018, Japan.
- o Understanding Anisotropies Related to the Filling-In at the Blind Spot in the Light of Natural Image Statistics, JNNS-2017, Japan.
- o Fresh view of filling-in within the context of hierarchical predictive coding, CBC 2015, IIT Gandhinagar, India.
- o A possible explanation of orientated bar filling-in at the blind-spot in the light of hierarchical predication mechanism. CCP 2015, IIT Guwahati, India.
- o 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

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

## Awards

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

## Professional Associations

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- o Society for Neuroscience; The Japan Neuroscience Society.

## References

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**Haruo Hosoya**  
Senior Researcher  
BICR, ATR  
Kyoto, Japan  
✉ hosoya@atr.jp

**Sandip Sarkar**  
Professor  
ANPD, SINP  
Kolkata, India  
✉ sandip.sarkar@saha.ac.in

**Mitsuo Kawato**  
Director  
BICR, ATR  
Kyoto, Japan  
✉ kawato@atr.jp