# Poornima Ramesh

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GitHub:

github.com/poornimaramesh

### EDUCATION

PhD in Machine Learning for Science, supervised by Prof. Dr. Jakob Macke 2018–Current Technical University of Munich and University of Tübingen, Germany

#### BS-MS Dual Degree in Physics, GPA: 9.16

2013-2018

Indian Institute of Science Education and Research (IISER) Kolkata, India

#### Indian School Certificate, 94.40%

2013

Cathedral and John Connon School, Mumbai, India

# RESEARCH EXPERIENCE

### PhD Research, supervised by Prof. Dr. Jakob Macke

August 2018 - Current

Technical University of Munich and University of Tübingen, Germany Developing statistical and deep learning methods for neural data:

- Characterizing retinal ganglion cell responses to electrical stimulation using generalized linear models (Sekhar et. al., 2020)
- Generative adversarial networks for characterising variability in neural data (Ramesh et. al., 2019)
- Statistical methods to decode stimulus identity from neural responses to electrical stimulation.
- Generative adversarial networks for simulation-based inference.

### Internship and Masters thesis, supervised by Dr. Jakob Macke

2016 - 2018

Forschungszentrum caesar, Bonn, Germany

Characterising single neuron responses to electrical stimulation using generalised linear models

#### Project, supervised by Dr. Supratim Sengupta

2017

Indian Institute of Science Education and Research (IISER) Kolkata, India

Evolutionary dynamics and game theory; using stochastic methods to model rock-paper-scissors dynamics in diffusing bacterial populations

#### Internship, supervised by Dr. Oishee Chakrabarti

Summer 2015

Saha Institute of Nuclear Physics, Kolkata, India

Experimental investigation of the role of ESCRT proteins in cell death

### Project, supervised by Dr. Sukant Khurana

2014 - 2015

Indian Institute of Science Education and Research (IISER) Kolkata, India

Theoretical work on neurogenesis and BDNF - their role in major depressive disorders;

biological applications of transcranial magnetic stimulation

### Internship, supervised by Prof. Dipak Dasgupta

Summer 2014

Saha Institute of Nuclear Physics, Kolkata, India

Biophysical techniques to study biomolecular recognition

## WORK EXPERIENCE

• Volunteer with Soforthilfe-Corona Bayern, Munich, Germany	2020
• Volunteer translator and data analyst for Crowdfight COVID-19	2020
• Freelance transcriber for CastingWords	2017
• Junior reporter for Daily News and Analysis (DNA) India	2010-2011

## SKILLS

- Programming: Python: numpy, scikit-learn, PyTorch for deep learning, Theano; MATLAB; C++; IATEX
- Languages: English, Tamil, Hindi, Bengali, German
- Mathematics: Machine learning, probability and statistics, signal processing, linear algebra, dynamical systems

## SCHOLARSHIPS AND AWARDS

• Kishore Vaigyanik Protsahan Yojana Fellowship	2013-2018
• Deutsche Akademischer Austauschdienst (DAAD) WISE Fellowship	2016
• Indian National Biology Olympiad: Distinction	2012
• Indian National Physics Olympiad: Distinction	2012
• Science Olympiad Foundation's National Science Olympiad: City Rank 2	2011
Mahindra Scholarship	2010-2011

## TEACHING

•	Module on Large Scale Modeling and Large Scale Data Analysis, Technical University of Munich	2019-2020
•	Fundamentals of Mathematics for Neuroengineering, Technical University of Munich	2018 – 2019
•	Teaching assistant: Numerical Methods for Physics, Indian Institute of Science	
	Education and Research (IISER) Kolkata	Autumn 2017

# PROFESSIONAL ACTIVITIES

- Reviewer for Journal of Computational Neuroscience, International Conference on Machine Learning (ICML)
- Supervision of student for Masters' thesis

## Workshops and Courses

• Munich Brain Course at LMU, Munich, Germany	2019
• CAJAL Course for Computational Neuroscience, Lisbon, Portugal	2018
• School for Mining and Modeling of Neuroscience Data at University of California, Berkeley, USA	2017
• Workshop on Brain, Computation and Learning at IISc, Bengaluru, India	2017
• Physics of Life Monsoon School at NCBS, Bengaluru, India	2015
• Vijyoshi Science Camp at IISc, Bengaluru, India	2013, 2014

## INVITED TALKS

•	Tübingen AI Symposium	2020
•	Real Neurons & Hidden Units Workshop, Neural Information Processing Systems 2019 Conference	2019

### **Publications**

#### Peer-reviewed Articles

Ramesh, Poornima, Mohamad Atayi, and Jakob H Macke (2019b). "Adversarial training of neural encoding models on population spike trains". In: NeuroAI Workshop, Neural Information Processing Systems 2019, Vancouver, Canada.

\*Sekhar, Sudarshan, \*Ramesh, Poornima, \*Giacomo Bassetto, Eberhart Zrenner, \*\*Jakob H. Macke, and \*\*Daniel L. Rathbun (2020). "Characterizing Retinal Ganglion Cell Responses to Electrical Stimulation Using Generalized Linear Models". In: Frontiers in Neuroscience 14, p. 378. ISSN: 1662-453X.

### Conference Presentations

Ramesh, Poornima, Mohamad Atayi, and Jakob H Macke (2019a). "Adversarial training of neural encoding models". In: Bernstein Conference 2019, Berlin, Germany.

Ramesh, Poornima, Mohamad Atayi, and Jakob H Macke (2019c). "Adversarial training of neural encoding models on population spike trains". In: Conference on Cognitive Computational Neuroscience 2019, Berlin, Germany.

\*Sekhar, Sudarshan, \*Ramesh, Poornima, \*Giacomo Bassetto, Eberhart Zrenner, \*\*Daniel L Rathbun, and \*\*Jakob H Macke (2018). "Characterizing retinal ganglion cell responses to electrical stimulation using generalized linear models". In: Bernstein Conference 2018, Berlin, Germany.

#### Under Review

Ramesh, Poornima, Jan-Matthis Lueckmann, Jan F. Boelts, Alvaro Tejero-Cantero, David S. Goncalves Greenberg, Pedro J., and Jakob H. Macke (2020). *GATSBI: Generative adversarial training for simulation-based inference*.

Corna, Andrea, Ramesh, Poornima, Jakob H. Macke, and Günther Zeck (2020). Spatial and contrast discrimination in artificial vision using sinusoidal electrical stimulation.

### References

#### Prof. Dr. Jakob Macke

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### Dr. Pedro J. Goncalves

Forschungszentrum caesar, Bonn, Germany Email: Pedro.Goncalves@caesar.de

<sup>\*</sup> Equal contribution

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