

Jyotika Bahuguna, PhD

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Employment History

- 01/06/2021-Present **Post-doctoral position:** CoAx Lab, Department of Psychology, CMU, Pittsburgh, USA . My principal investigators are [Prof. Timothy Verstynen](#), [Prof. Jonathan Rubin](#) and [Prof. Eric Yttri](#).
- 15/05/2019-30/04/2021 **Post-doctoral position:** INS Institute of Systems Neuroscience, Aix-Marseille University, Marseille, France. My principal investigators are [Dr. Demian Battaglia](#), [Dr. Nicole Malfait](#) and [Dr. Alexander Eusebio](#).
- 2016-2019 **Post-doctoral position:** Computation in neural circuits group, INM-6/IAS-6, Juelich Research center, Germany. My principal investigators were [Prof. Dr. Abigail Morrison](#) and [Dr. Tom Tetzlaff](#).
- 2014-2016 **Scientific Researcher:** Computation in neural circuits group, INM-6/IAS-6, Juelich Research center, Germany. My principal investigators were [Prof. Dr. Abigail Morrison](#) and [Dr. Tom Tetzlaff](#).

Education

- 01/09/2010-30/05/2016 **Phd:** Neuroscience (magna cum laude) - joint degree from University of Freiburg, Germany and Department of computer science and technology, KTH, Stockholm.
Supervisors: [Prof. Dr. Arvind Kumar](#) (KTH Stockholm), [Prof. Dr. Ad Aertsen](#) (Bernstein Center Freiburg) and [Prof. Dr. Jeanette H Kotaleski](#) (KTH/Karolinska Institute, Stockholm).
Thesis title: *Structure-Dynamics relationship in basalganglia: Implications for brain function.*
- 2006-2010 **MS by Research,** Computer Science (CGPA: 9.2 / 10) in Mobile Robotics, IIIT-Hyderabad, India
Supervisors: [Prof. Dr. Madhav Krishna](#) and [Prof. Dr. B Ravindran](#)
Thesis title: *A Markov Decision Process (MDP) framework for active localization.*
- 2000-2004 **Bachelors in Engineering.** Computer Science, DDIT, India.

Research Publications

Journal Articles

- Ludovic, S., **Bahuguna Jyotika**, Theo, G., N, P.-D., Kevin, D., Izhumi, S., Bernard, P., Demian, B., & Philippe., I. (n.d.). Cerebellar connectivity maps embody idiosyncratic adaptive behavior in mice. *under review*.
- **Bahuguna Jyotika**, Antoine, S., Nicole, M., & Demian, B. (n.d.). Similar but unique spatiotemporal frequency network characterizes the different trial types in a visuomotor task. *In prep*.

- **Bahuguna Jyotika**, Ajith, S., & Arvind, K. (2020). Uncoupling the roles of firing rate and spike bursts in shaping the gpe-stn beta band oscillations. *PLoS Computational Biology*.
<https://doi.org/10.1371/journal.pcbi.1007748>
- **Bahuguna Jyotika**, Philipp, W., & Abigail, M. (2018). Exploring the role of striatal d1 and d2 medium spiny neurons in action selection using a virtual robotic framework. *European Journal of Neuroscience*, 49. <https://doi.org/10.1111/ejn.14021>
- Sebastian, S., Martin, A., **Bahuguna Jyotika**, Ad, A., & Arvind, K. (2017). Activity dynamics and signal representation in a striatal network model with distance-dependent connectivity. *eNeuro*, 4.
<https://doi.org/10.1523/ENEURO.0348-16.2017>
- **Bahuguna Jyotika**, Tom, T., Arvind, K., Jeanette-Hellgren, K., & Abigail, M. (2017). Homologous basal ganglia network models in physiological and parkinsonian conditions. *Frontiers in Computational Neuroscience*, 11. <https://doi.org/10.3389/fncom.2017.00079>
- **Bahuguna Jyotika**, Ad, A., & Arvind, K. (2015). Existence and control of go/no-go decision transition threshold in the striatum. *PLoS Computational Biology*, 11.
<https://doi.org/10.1371/journal.pcbi.1004233>
- **Bahuguna Jyotika**, Balaraman, R., & Madhav, K. K. (2009). Mdp based active localization for multiple robots. <https://doi.org/10.1109/CASE.2009.5234142>





Book Chapters

- **Bahuguna Jyotika**, & Arvind, K. (2017). *Striatum: Structure, dynamics and function* (M. A. Ahmed, Ed.). John Wiley Sons, Ltd.






Invited Presentations

- Predicting behavior in visuomotor tasks from oscillatory portraits of cortical eeg (talk). In: **CENTURI, Marseille, France** (Marseille, France). November 20, 2020.
- Exploring the role of striatal d1 and d2 medium spiny in action selection using a virtual robotic framework (talk). In: **13th International Basal Ganglia Society Meeting (IBAGS), Biarritz, France** (Biarritz, France). 2019.
- Exploring the role of striatal d1 and d2 medium spiny in action selection using a virtual robotic framework (poster). In: **Gordon Research Seminar (GRS)** (Ventura, California, USA). 2018.
- Exploring the role of striatal d1 and d2 medium spiny in action selection using a virtual robotic framework (talk). In: **Stockholm-Okazaki Workshop on Multi-scale dynamics of basal ganglia in brain function and dysfunction** (Stockholm, Sweden). 2018.
- Exploring the role of striatal d1 and d2 medium spiny in action selection using a virtual robotic framework (talk). In: **NEST conference 2017** (Juelich, Germany). 2017.
- Functionally classifying an ensemble of healthy and pathological basal ganglia network models (talk). In: **Bernstein Seminar 2016** (Bernstein Center Freiburg, Germany). 2016.
- Existence and control of go/no-go decision transition threshold in the striatum (talk). In: **11th Göttingen Meeting of the German Neuroscience Society** (Göttingen, Germany). 2015.
- Functionally classifying an ensemble of healthy and pathological basal ganglia network models (talk). In: **2nd International Symposium of the Clinical Research Group 219** (Cologne, Germany). 2015.


Research Skills

- Computational modeling  Numerical simulations of spiking neural networks, Firing rate models, Dynamical systems analysis, Reinforcement learning, Spike Timing Dependent Plasticity , Effective connectivity.
- Data analysis  Linear mixed models, Generalized linear models, Graph theoretical methods, Machine Learning, Signal processing
- Non-Neuroscience  Mobile Robotics, Linux device drivers
- Programming  Python, Matlab, NEST, statsmodels, scikit, latex, C ,C++, Java, Perl, Shell scripting, Gazebo, brain connectivity toolbox

Teaching Experience

- 2019,2020  (Online) Lecture on Basal Ganglia at **Neuroinspired Lectures** organized by [Prof. Dr. Abigail Morrison](#)
- 2015, 2017, 2018  Co-organized (with [Prof. Dr. Abigail Morrison](#)) and tutored **Simulation of Biological neural networks** course at Bernstein center Freiburg, Freiburg, Germany. This course introduces the fundamentals of computational neuroscience using the simulator NEST.
- 2015, 2018  Tutor at **Computational Approaches to Memory and Plasticity (CAMP)** summer school, Bengaluru, India organized by [Prof. Dr. Arvind Kumar](#), [Prof. Dr. Rishikesh Narayan](#) and [Prof. Dr. Upinder Bhalla](#).
- 2013  Tutor at **Quantitative Methods** course by [Prof. Dr. Arvind Kumar](#), [Prof. Dr. Ad Aertsen](#) and [Prof. Dr. Stefan Rotter](#) at Bernstein Center Freiburg, Freiburg, Germany.
- 2011,2012  Tutor for **Advanced scientific programming** in Freiburg, Germany.

Reviewer

-  Nature communications, PLoS ONE, Frontiers in Computational Neuroscience.