CSN Info

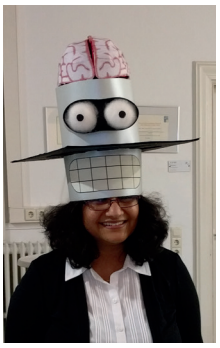
Edition 3 | July 2016

Institute of Neuroscience and Medicine (INM-6)
Computational and Systems Neuroscience

Institute for Advanced Simulation (IAS-6)
Theoretical Neuroscience

JARA Brain Institute I (JBI-1)

Congratulations to recent doctoral graduates



Jyotika Bahuguna

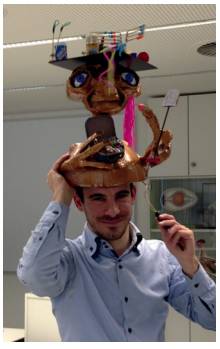
Structure-Dynamics relationship in Basal ganglia: Implications for brain function

Jyotika Bahuguna passed her defense by talking about striatal asymmetry, Go/No-Go bias, the functional classification of homologous networks in basal ganglia (Dichotomous GPe) and bursting in STN-GPe circuit and pathological oscillations

Maximilian Schmidt

Modeling and simulation of multi-scale spiking neuronal networks

In his defense Maximilian Schmidt explores what the influence of the network structure on brain dynamics is and if a spiking network model can reproduce such multi-scale dynamics.



Emiliano Torre

Statistical analysis of synchrony and synchrony propagation in massively parallel spike trains

Emiliano Torre talked about the new developed methods to find correlations in massively parallel data: SPADE, to detect groups of synchronous neurons, ASSET to detect sequences of synchronous events.

Papers

Exploring the Usefulness of Formal Concept Analysis for Robust Detection of Spatio-Temporal Spike Patterns in Massively Parallel Spike Trains
Yegenoglu A, Quaglio P, Torre E, Grün S, Enders D.
In: Graph-Based Representation and Reasoning 22nd International Conference on Conceptual Structures, ICCS 2016, Annecy, France. pp 3 – 16. ISBN: 978-3-319-40984-9, July 2016
DOI:10.1007/978-3-319-40985-6_1

ASSET: Analysis of Sequences of Synchronous Events in Massively Parallel Spike Trains
Torre E, Canova C, Denker M, Gerstein G, Helias M, Grün S
PLoS Comput Biol 12(7): e1004939,
DOI:10.1371/journal.pcbi.1004939

Handling Metadata in a Neurophysiology Laboratory
Lyuba Zehl, Florent Jaillet, Adrian Stoewer, Jan Grewe, Andrey Sobolev, Thomas Wachtler, Thomas G Brochier, Alexa Riehle, **Michael Denker and Sonja Grün**
Methods, Front. Neuroinform, 27 Jun 2016
DOI:10.3389/fninf.2016.00026

NESTML: a modeling language for spiking neurons
Plotnikov D, Rumpe B, Blundell I, Ippen T, Eppler JM, Morrison A
Lecture Notes in Informatics (LNI), Gesellschaft für Informatik, Bonn 2016, p. 93 – 108.
http://www.se-rwth.de/publications

Automatic generation of connectivity for large-scale neuronal network models through structural plasticity
Diaz-Pier S, Naveau M, Butz-Ostendorf M, Morrison A
Front. Neuroanat. 10:57., 26 May 2016
DOi:10.3389/fnana.2016.00057

Reaction-diffusion-like formalism for plastic neural networks reveals dissipative solitons at criticality
Dmytro Grytskyy, Markus Diesmann, and Moritz Helias
Phys. Rev. E 93, 062303 – 6 June 2016
DOI 10.1103/PhysRevE.93.062303

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Biophysical network modelling of the dLGN circuit: Different effects of triadic and axonal inhibition on visual responses of relay cells
Heiberg T, Hagen E, Halnes G, Einevoll GT
PLOS Comput Biol. 2016 May 20;12(5):e1004929.
ECollection 2016
DOI:10.1371/journal.pcbi.1004929

Similarity in neuronal firing regimes across mammalian species
Mochizuki, Onaga, Shimazaki, Shimokawa, Tsubo, Kimura, Saiki, Sakai, Isomura, Fujisawa, Shibata, Hirai, Furuta, Kaneko, Takahashi, Nakazono, Ishino, Sakurai, Kitsukawa, Lee, Lee, Jung, Babul, Maldonado, Takahashi, Arce-McShane, Ross, Sessle, Hatsopoulos, Brochier, Riehle, **Chorley, Grün,** Nishijo, Ichihara-Takeda, Funahashi, Shima, Mushiake, Yamane, Tamura, Fujita, Inaba, Kawano, Kurkin, Fukushima, Kurata, Taira, Tsuitsui, Ogawa, Komatsu, Koida, Toyama, Richmond, Shinomoto. (2016)
Journal of Neuroscience, 36(21): 5736 – 5747., 25 May 2016
DOI:10.1523/JNEUROSCI.0230-16.2016

Pronounced Surface Band Bending of Thin-Film Silicon Revealed by Modeling Core Levels Probed with Hard X-rays
Wippler, David, Regan G. Wilks, Bart E. Pieters, **Sacha Jennifer van Albada,** Dominic Gerlach, Juergen Huepkes, Marcus Bär, and Uwe Rau
ACS Appl Mater Interfaces. 2016 Jun 29.
DOI:10.1021/acsami.6b04666

Effect of Heterogeneity on Decorrelation Mechanisms in Spiking Neural Networks: A Neuromorphic-Hardware Study
Thomas Pfeil, Jakob Jordan, Tom Tetzlaff, Andreas Grübl, Johannes Schemmel, Markus Diesmann, and Karlheinz Meier
Phys. Rev. X 6, 021023, 18 May 2016
DOI:10.1103/PhysRevX.6.021023

Accepted Papers

Designing workflows for the reproducible Analysis of Electrophysiological Data
Denker M, Grün S
In: Brain Inspired Computing, eds Amunts K, Grandinetti L, Lippert T, Petkov N. Springer Series Lecture Notes in Computer Sience [In Press]

Emergence of synchronous spike patterns in monkey motor cortex during a delayed reach-to-grasp task
Torre E, Quaglio P, Denker M, Brochier T, Riehle A, Grün S.
Journal of Neuroscience [In Press]

Activities

9th Bernstein Sparks Workshop: Recent advances in recurrent network theory: fluctuating correlated dynamics across scales
25 – 27 May 2016, Göttingen, Germany
Together with Farzad Farkhooi (U Berlin), Guillaume Lajoie (U Washington), and Merav Stern (Hebrew U), Moritz Helias organized a Sparks workshop funded by the Berstein Network. The workshop focused on recent developments on the theory of fluctuating dynamics of neuronal networks on multiple scales and was very well received by all participants.
http://www.nncn.de/en/news/events/

Tag der Neugier 2016
5 June 2016
A successful day for the INM-6. With interesting lectures around brain research INM-6 presented as an important part of the research community at Forschungszentrum Jülich.

INM-6 Retreat 2016
6 – 7 June 2016
Intense Work, developing new ideas for tomorrow's research and a nice together – this year's Retreat is a good template for the next.

MAMC - Multi-area models of cortex - Workshop CNS 2016
7 July 2016, Jeju Island, South Korea
Organizer: Sacha van Albada.
This workshop aims to provide an overview over current multi-area cortical modelling efforts, prominent experimental findings addressed by such models, and ways in which systematic knowledge can be gained from large-scale simulation studies, for instance with the help of mean-field theory.
As part of the workshop Maximilian Schmidt gives a talk about "A multi-scale spiking network model of macaque visual cortex"
http://www.fz-juelich.de/goto?id=1950562

NEST user workshop 2016
3 – 4 November 2016, Karlsruhe, Germany, FZI Research center for information technology
http://www.nest-initiative.org/nest-activities/

Figure 3 Overview of the NEST-SpiNNaker-Elephant Demo

The workshop theme is "Motor control and reinforcement learning with spiking networks".

NESTML workshop
3 – 5 December 2016, Jülich, Germany

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