

Schedule of the ECML connectomics workshop

<http://connectomics.chalearn.org/workshop>

(Monday September 15th, Nancy France [↗](#))



Understanding the brain structure and some of its alterations caused by disease, is key to accompany research on the treatment of epilepsy and Alzheimer's disease and other neuropathologies, as well as gaining understanding of the general functioning of the brain and its learning capabilities. At the neural level, recovering the exact wiring of the brain (connectome) including nearly 100 billion neurons, having on average 7000 synaptic connections to other neurons, is a daunting task.

The goal of this workshop is to bring together researchers in machine learning and neuroscience to discuss progress and remaining challenges in this exciting and rapidly evolving field. We aim to attract machine learning and computer vision specialists interested in learning about a new problem, as well as computational neuroscientists who may be interested in modeling connectivity data. We will discuss also the results of the First ChaLearn Neural Connectomics Challenge [↗](#) (144 participants).

Session 1 - State of the art in neuro-imaging (Chair: Demian Battaglia):

- 09:00 - 09:15 Welcome and introduction (Vincent Lemaire)
- 09:15 - 10:15 **Keynote** - Neuroscience - Dynamics in Small Neuronal Networks [↗](#) (Elisha Moses [↗](#))
- 10:15 – 10:30 Coffee break + posters
- 10:30 – 11:00 **Overview:** Neuroscience and algorithms - Activity, connectivity and other challenges in living neuronal networks [↗](#) (Jordi Soriano [↗](#))

Session 2 – Challenge winners – part 1 (Chair: Jordi Soriano):

- 11:00 – 11:30 Challenge Presentation and price giving ceremony (Demian Battaglia)
- 11:30 – 11:50 [1]: 1st price paper : “*Simple connectome inference from partial correlation statistics in calcium imaging*”, Antonio Sutera, Arnaud Joly, Vincent François-Lavet, Zixiao Aaron Qiu, Gilles Louppe, Damien Ernst and Pierre Geurts
- 11:50 – 12:10 [2]: 2nd price paper: “*Supervised Neural Network Structure Recovery*”, Idefons Magrans de Abril and Ann Nowé
- 12:10 – 12:30 [3]: 3rd price paper: “*Signal Correlation Prediction Using Convolutional Neural Networks*”, Lukasz Romaszko
- **Break** : 12: 30-13:45: Lunch + posters

Session 3: Expanding the horizon (Chair: Isabelle Guyon)

- 13:45 – 14:35 **Keynote** -- Causal discovery in time series [↗](#) (Florin Popescu [↗](#))
- 14:35 – 14:55 [4]: “*SuperSlicing Frame Restoration for Anisotropic ssTEM*”, Dmitry Laptev and Joachim Buhmann
- 14:55 – 15:15 [5]: “*Large-Scale Automated Identification of Mouse Brain Cells in Confocal Light Sheet Microscopy Images*”, Paolo Frasconi, Ludovico Silvestri, Paolo Soda, Roberto Cortini, Francesco Pavone and Giulio Iannello
- 15:15 – 16:15 Poster session + coffee break
 - Poster 1: “*Inferring Causation from Correlation in Sparse Networks*”, Alexander Niederbühl, Volker Pernice and Stefan Rotter
 - Poster 2: “*Efficient combination of pairwise feature networks*”, Pau Bellot and Patrick Meyer
 - Poster 3: “*Predicting Spiking Activities in DLS Neurons with Linear-Nonlinear-Poisson Model*”, Sisi Ma
 - Poster 4: “*Mapping neuronal activity with cellular resolution on a brain-wide scale*”, Ludovico Silvestri, Nikita Rudinskiy, Marco Paciscopi, Irene Costantini, Leonardo Sacconi, Paolo Frasconi, Bradley Hyman and Francesco Pavone
 - Poster 5 to 11 : Poster of the 7 oral presentations ([1], [2], [3], [4], [5], [6], [7])

Session 4 : Back to the challenge (Chair: Demian Battaglia)

- 16:15 – 16:35 [6]: “*Neural Connectivity Reconstruction from Calcium Imaging Signal using Random Forest with Topological Features*”, Wojciech Czarnecki and Rafal Jozefowicz
- 16:35 – 16:55 [7]: “*Reconstruction of Excitatory Neuronal Connectivity via Metric Score Pooling and Regularization*”, Chenyang Tao, Wei Lin and Jianfeng Feng
- 16:55 – 17:30 Discussion [Isabelle Guyon, moderator]
- 17:30: Ajourn.



The proceedings of the workshop will be available here : <http://connectomics.chalearn.org/workshop>
Conference venue : <http://ecmlpkdd2014.loria.fr/attending/conference-venue/>