Neuro / rontiers '2019

Reconstruction & Applications

SEU-ALLEN Joint Center,

Institute for Brain and Intelligence,

Southeast University

Date

Sept 15-17, 2019

Venues

- Talks (演讲) : Liuyuan Hotel, Southeast University (东南大学 榴园宾馆 新华厅)
- Posters/Demos/Exhibits/Reception(展报/软件展示/赞助商展示/招待会):
 Institute for Brain & Intelligence(东南大学 李文正楼 北 402 房间)

Organizers Francisco Clascá, Erik Meijering, Julie Harris, & Hanchuan Peng

Local Chairs Liya Ding, Huimin Yan

Web braintell.seu.edu.cn/allencenter/nra2019

21i







Agenda

9/15/2019

9:30am Registration Desk Open (Liuyuan Hotel)

10:00am SEU Campus Tour (optional)

11:30am-12:40pm Lunch

1:00pm Meeting Kick-off & Introduction

Talk Session 1: Imaging of neurons, circuits, and their activities

Chair: Francisco Clascá

1:10pm Heping Cheng (PKU): "Two-photon imaging of brain activity in freely behaving animals"

1:40pm Dawen Cai (Univ. Michigan): "Mapping neuronal identities and connections in neural circuits by light microscope"

2:10pm Dirk Feldmeyer (RWTH Aachen University): "Paired recordings from synaptically coupled neurons – a challenge for neuronal reconstructions"

2:40pm Guoqiang Bi (USTC): "High-speed volumetric imaging for brain mapping from mice to monkeys"

3:10pm - 3:30pm Tea Break

Talk Session 2: Enabling tools for neuron reconstruction & mapping

Chair: Qingfeng Wu

3:30pm Yimin Wang (Shanghai Univ.): "Efficient and precise neuron reconstruction facilitated by virtual reality"

4:00pm Lei Qu (Anhui Univ.): "3D registration of biological images and models"

4:30pm Rembrandt Bakker (Radbound U): "Web-based workflow for the manual registration of reconstructed neuron morphologies"

5:00pm Rodrigo Munoz-Castaneda (CSHL): "Creation and anatomically-based registration of brain histological atlases at cellular resolution"

5:45pm - 8:00pm Reception with Exhibitors & Demos (Venue: Institute for Brain &

Chair: Liya Ding

9/16/2019

Talk Session 3: Large-scale reconstruction of neurons and their circuits

Chair: Dawen Cai

9:00am Bingxing Huo (CSHL): "A comparative study of motor cortical connectivity in marmoset and mouse"

9:30am Chung-Chuan Lo (NTHU): "Building connectome-derived computational models of the fruit fly brain: the challenges and the future"

10:00am Hanchuan Peng (AIBS/SEU-ALLEN): "Scale-up automation of data production for whole-brain neuron morphology"

10:30am - 11:00am Group Photo

11:00am – 11:20am Tea Break

11:20am - 11:50pm Data Highlight & Brainstorming

Chair: Giorgio Ascoli

- Songling Ding (Allen Institute): "3-D reconstruction of whole brain structures for common coordinate frameworks"
- Ronggui Cory Hu (SIBCB, CAS): "Retinoic acid metabolism and signaling in autism spectrum disorders : novel perspectives and beyond"

12:00pm - 1:15pm Lunch

1:30pm - 2:15pm Methods Highlight & Brainstorming

Chair: Erik Meijering

- Jian Yang (BJUT): "Nested U-Net architecture based image segmentation for 3d neuron reconstruction"
- Min Liu (Hunan Univ.): "Detection and application of 3d critical point in neuron microscopy images"
- Yimin Wang (Shanghai Univ.): "The key challenges for the next generation massivescale neuron reconstruction system"

Talk Session 4: Connectomes

Chair: Guoqiang Bi

2:15pm Francisco Clascá (UAM): "Connectomics at the meso- and microscales: lessons from the mouse thalamocortical system"

2:45pm Moritz Helmstaedter (MPI): "Cerebral cortex connectomics"

3:15 Tea Break (informal break without breaking-up sessions)

3:15 Lightning Talks for Posters & Demos (2 minutes/each, at most 4 slides/each)

Chair: Bingxing Huo

Poster/Demo line-up:

- Junqi Yang (PKU): "The development and applications of hybrid voltage indicators"
- Danke Zhang (SIAT): "Reconstructing the connectome of a cortical column with biologically-constrained associative learning"
- Logan Walker (U. Michigan): "nTracer2: An ImageJ/FIJI plug-in for multispectral neuronal tracing and annotation indensely labeled brains"
- Yanjun Duan (SEU-ALLEN): "Protocol of full neuron reconstruction and process at SEU-ALLEN"
- Shengdian Jiang (SEU-ALLEN): "MorphoHub: an informatics platform for managing massive data production of neuron morphology"
- Lufeng Ding (USTC): "An interactive software for mapping histological slice images to the Allen Mouse Brain Atlas"

- Donghuan Lu and Sujun Zhao (Tencent and SEU-ALLEN): "Quality control for reconstructions of neuron morphology at whole mouse brain level"
- Chao Wang (Hunan Univ.): "Efficient 3d junction detection in biomedical images based on an upgraded ray-shooting model and reverse mapping"
- Guanxiao Qi (Forschungszentrum Juelich GmbH): "A novel type of fast-spiking, parvalbumin+ interneuron with an 'hourglass' shape of axonal projection pattern in layer 4 of the somatosensory (barrel) cortex"
- Rembrandt Bakker (Radbound U): "Scalable Brain Atlas Composer: web-based API for brain atlasing and visualization workflows"
- Tielin Zhang (Inst Automation, CAS): "A tree-based deep neural network for unstructured neuron type classification in rat brain"
- Xuan Zhao (SEU-ALLEN): "Studying the frequently encountered errors during automatic neuron reconstruction"
- Peng Wang (SEU-ALLEN): "Direction field guided neuron reconstruction"
- Zijun Zhao (Columbia Univ.): "Single cell full morphology reconstruction data analysis: quality control & cell type classification"

4:00pm - 6:00pm Posters, Demos, Exhibitors with Light Snack (Venue: Institute for

Brain & Intelligence; 东南大学 李文正楼 北 402 房间)

Chair: Liya Ding

6:00pm - Shuttle for banquet

9/17/2019

Talk Session 5: Data analysis

Chair: Dirk Feldmeyer

8:30am Alexander Bird (ESI): "Dissecting Sholl analysis into its functional components"

9:00am Peng Xie (ALLEN Institute & SEU-ALLEN): "Full morphology reconstruction and analysis reveal cell type diversity in mouse thalamic nuclei"

9:30am Panel: New Frontiers of Massive Scale Single Neuron Biology

Moderator: Hanchuan Peng

Panelists: Giorgio Ascoli, Fang Xu, Dawen Cai, Moritz Helmstaedter, Wei Xie

10:00am-10:15am Tea Break

Talk Session 6: Biology & Technology

Chair: Wei Xie

10:15am Giorgio Ascoli (GMU): "Scaling up the morphological characterization of neuron types"

10:45am Qingfeng Wu (IGDB-CAS): "Spatial organization of clonally-related neurons in nuclear brain structure"

11:15pm Erik Meijering (UNSW): "Advances in automated neuron reconstruction"

11:45am Award Ceremony & Closing Remarks

12:00-12:45pm Lunch

1:00pm-7:00pm Team-building event (optional)

)26i0

This conference is sponsored and hosted by Institute for Brain & Intelligence - Southeast University (东南大学脑科学与智能技术研究院, <u>http://braintell.org</u>), and co-sponsored by Allen Institute for Brain Science (<u>http://alleninstitute.org</u>), OE-Bio Co., Ltd. (武汉沃亿生物有限公司 <u>http://www.oebio.com/</u>), ThinkerTech (千奥星科南京生物科技有限公司, <u>http://www.thinkerbiotech.com/</u>), Hong Kong Plexon (<u>https://plexon.com/</u>),南京奥力科学 仪器有限公司 (<u>http://www.njoly.com/</u>).





