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# Connectomics in NeuroImaging


Third International Workshop, CNI 2019  
Held in Conjunction with MICCAI 2019  
Shenzhen, China, October 13, 2019  
Proceedings

*Editors*

Markus D. Schirmer   
Harvard Medical School  
Boston, MA, USA

Islem Rekik  
Istanbul Technical University  
Istanbul, Turkey

Ai Wern Chung   
Harvard Medical School  
Boston, MA, USA

Archana Venkataraman   
Johns Hopkins University  
Baltimore, MD, USA

Minjeong Kim  
University of North Carolina  
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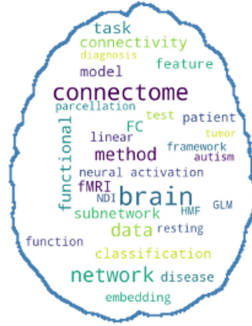
# Preface

The Third International Workshop on Connectomics in NeuroImaging (CNI 2019) was held in Shenzhen, China, on October 13, 2019, in conjunction with the 22nd International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI).

Connectomics is the study of whole brain association maps, i.e., the connectome, with a focus on understanding, quantifying, and visualizing brain network organization. Connectomics research is of interest to the neuroscientific community largely because of its potential to understand human cognition, its variation over development and aging, and its alteration in disease or injury. As such, big data in connectomics are rapidly growing with emerging international research initiatives collecting large, high-quality brain images with structural, diffusion, and functional imaging modalities. CNI aimed to propel research which leverages this increasing wealth of connectomic data. It brought together computational researchers (computer scientists, data scientists, computational neuroscientists) to discuss advancements in connectome construction, analysis, visualization, and their use in clinical diagnosis and group comparison studies. CNI 2019 was held as a single-track workshop that included two keynote speakers (Yong He from the Beijing Normal University, Beijing, China, and Fan Zhang, from Harvard Medical School, Boston, USA), oral paper presentations, and poster sessions.

Large, open source datasets, such as the Human Connectome Project (HCP) and the Autism Brain Imaging Data Exchange (ABIDE), have spurred the development of new and increasingly powerful machine learning strategies in connectomics, for which testing in a controlled setting is lacking. For the first time, CNI combined the workshop with a Transfer Learning Challenge. We provided training and validation sets of functional connectivity data of an attention deficit hyperactivity disorder (ADHD) cohort with age-matched neurotypical controls. The test data was withheld before the challenge to ensure comparability of the results. Therefore, CNI not only continued to showcase the latest contributions in this area, but acknowledged the challenge of validating new methodologies by providing a platform to address the open questions of their generalizability and clinical relevance.

The quality of submissions to our workshop was very high. Authors were asked to submit papers of 8–10 pages in length for review. A total of 14 papers were submitted to the workshop in response to our call for papers. Each of the 14 papers underwent a rigorous double-blind peer-review process, with each paper being reviewed by at least two reviewers from the Program Committee, composed of 20 well-known experts in the field of connectomics. Based on the reviewing scores and critiques, 13 papers were accepted for presentation at the workshop, and chosen to be included in this Springer LNCS volume. In order to allow the authors to address the reviews, the page limit was further extended per submission. The large variety of connectomics



**Fig. 1.** Word cloud based on the abstracts of accepted submissions.

techniques applied in neuroimaging applications were well represented at the CNI 2019 workshop as demonstrated in Fig. 1.

We are grateful to the Steering and Program Committees for reviewing the submitted papers and giving constructive comments and critiques, to the authors for submitting high-quality papers, to the presenters for excellent presentations, and to all CNI 2019 attendees who came to Shenzhen from all around the world.

October 2019

Markus D. Schirmer  
Archana Venkataraman  
Islem Rekik  
Minjeong Kim  
Ai Wern Chung

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# Contents

Unsupervised Feature Selection via Adaptive Embedding and Sparse Learning for Parkinson’s Disease Diagnosis . . . . .	1
<i>Zhongwei Huang, Haijun Lei, Guoliang Chen, Shiqi Li, Hancong Li, Ahmed Elazab, and Baiying Lei</i>	
A Novel Graph Neural Network to Localize Eloquent Cortex in Brain Tumor Patients from Resting-State fMRI Connectivity. . . . .	10
<i>Naresh Nandakumar, Komal Manzoor, Jay J. Pillai, Sachin K. Gujar, Haris I. Sair, and Archana Venkataraman</i>	
Graph Morphology-Based Genetic Algorithm for Classifying Late Dementia States . . . . .	21
<i>Oumaima Ben Khelifa and Islem Rekik</i>	
Covariance Shrinkage for Dynamic Functional Connectivity. . . . .	32
<i>Nicolas Honnorat, Ehsan Adeli, Qingyu Zhao, Adolf Pfefferbaum, Edith V. Sullivan, and Kilian Pohl</i>	
Rapid Acceleration of the Permutation Test via Transpositions . . . . .	42
<i>Moo K. Chung, Linhui Xie, Shih-Gu Huang, Yixian Wang, Jingwen Yan, and Li Shen</i>	
Heat Kernels with Functional Connectomes Reveal Atypical Energy Transport in Peripheral Subnetworks in Autism. . . . .	54
<i>Markus D. Schirmer and Ai Wern Chung</i>	
A Mass Multivariate Edge-wise Approach for Combining Multiple Connectomes to Improve the Detection of Group Differences. . . . .	64
<i>Javid Dadashkarimi, Siyuan Gao, Erin Yeagle, Stephanie Noble, and Dustin Scheinost</i>	
Adversarial Connectome Embedding for Mild Cognitive Impairment Identification Using Cortical Morphological Networks . . . . .	74
<i>Alin Banca and Islem Rekik</i>	
A Machine Learning Framework for Accurate Functional Connectome Fingerprinting and an Application of a Siamese Network. . . . .	83
<i>Ali Shojae, Kendrick Li, and Gowtham Atluri</i>	
Test-Retest Reliability of Functional Networks for Evaluation of Data-Driven Parcellation . . . . .	95
<i>Jianfeng Zeng, Anh The Dang, and Gowtham Atluri</i>	



**Constraining Disease Progression Models Using Subject Specific  
Connectivity Priors . . . . . 106**  
*Anvar Kurmukov, Yuji Zhao, Ayagoz Mussabaeva, and Boris Gutman*

**Hemodynamic Matrix Factorization for Functional Magnetic  
Resonance Imaging . . . . . 117**  
*Michael Hütel, Michela Antonelli, Jinendra Ekanayake,  
Sebastien Ourselin, and Andrew Melbourne*

**Network Dependency Index Stratified Subnetwork Analysis of Functional  
Connectomes: An Application to Autism . . . . . 126**  
*Ai Wern Chung and Markus D. Schirmer*

**Author Index . . . . . 139**