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# Connectomics in NeuroImaging

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

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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

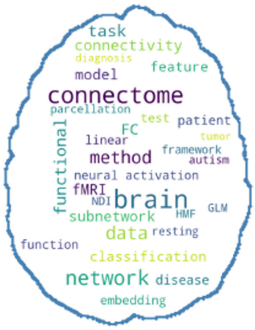


**Fig. 1.** Word cloud based on the abstracts of accepted submissions.

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

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