Yongjie Zhu

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EDUCATION

Ph.D. Mathematical Information Tech., University of Jyväskylä, Finland, 12/2020
Supervisors: Tapani Ristaniemi and Fengyu Cong

M.S. Biomedical Engineering, Dalian University of Technology, China, 6/2016
Supervisor: Tianshuang Qiu

B.S. Biomedical Engineering, Dalian University of Technology, China, 6/2013

ACADEMIC APPOINTMENTS

2021– University of Helsinki, Finland
Postdoctoral Researcher, Department of Computer Science
Supervisor: Aapo Hyvärinen

RESEARCH INTEREST

My research focuses on unsupervised machine learning, mainly nonlinear ICA, tensor component analysis, and disentangled representations, applicable to analyze brain imaging data especially recorded during natural stimuli. Specifically, I would like to develop a computational model/method to examine the spatiotemporal dynamics of functional networks and associate them with behavioral roles. I'm also interested in applying unsupervised learning to disentangle the underlying cognitive stages/processes in order to better understand the principles of information processing in the brain

PUBLICATIONS

Preprints

2020 Ye, C., Xu, Q., Hu Z., Astikainen, P., **Zhu, Y.**, Liu X., Liu, Q. "Individual Differences in Working Memory Capacity Are Unrelated to the Magnitude of Benefits from Object-and Dimension-Based Retro-Cues." *PsyArXiv*. doi:10.31234/osf.io/jzyfr

Peer-Reviewed Journals

2021 **Zhu, Y.**, Wang X., Mathiak K., Toiviainen P., Ristaniemi T., Xu J., Chang Y., Cong F. "Altered EEG Oscillatory Brain Networks During Music-Listening in Major Depression." *International Journal of Neural Systems* x (x), 2150001. doi:10.1142/S0129065721500015. [pdf] [code] [Discussion] [Response] [Response.pdf]

2020 Liu, J., **Zhu, Y.**, Sun, H., Ristaniemi, T., Cong, F. "Sustaining Attention for a Prolonged Duration Affects Dynamic Organizations of Frequency-Specific Functional Connectivity." *Brain topography* 33(6), 677-692. doi:10.1007/s10548-020-00795-0. [dataset]

2020 Ye, C., Liang, T., Zhang, Y., Xu, Q., **Zhu, Y.**, Liu, Q. "The two-stage process in visual working memory consolidation" *Scientific Reports*, 10(1), 1-11. doi:10.1038/s41598-020-70418-y

2020 Liu, J., Zhang, C., **Zhu, Y.**, Liu, Y., Sun, H., Ristaniemi, T., ... and Parviainen, T. Wegmann, and J. Jiao. "Dissociable effects of reward on P300 and EEG spectra under conditions of high vs. low vigilance during a selective visual attention task." *Frontiers in human neuroscience*, 14, 207. doi:10.3389/fnhum.2020.00207.

2020 **Zhu, Y.**, Liu, J., Ye, C., Mathiak, K., Astikainen, P., Ristaniemi, T., Cong, F. "Discovering dynamic task-modulated functional networks with specific spectral modes using MEG." *NeuroImage* 116924. doi:10.1016/j.neuroimage.2020.116924. [pdf] [code]

2020 **Zhu, Y.**, Liu, J., Ristaniemi, T., Cong, F. "Distinct patterns of functional connectivity during the comprehension of natural, narrative speech. International journal of neural systems." *International Journal of Neural Systems* 30(03), 2050007. doi:10.1142/S0129065720500070. [pdf]

2020 **Zhu, Y.**, Zhang, C., Poikonen, H., Toiviainen, P., Huotilainen, M., Mathiak, K., ... and Cong, F. "Exploring Frequency-Dependent Brain Networks from Ongoing EEG Using Spatial ICA During Music Listening." *Brain Topography* 33, 289-302. doi:10.1007/s10548-020-00758-5. [code]

2020 Liu, J., Zhang, C., **Zhu, Y.**, Ristaniemi, T., Parviainen, T., Cong, F. "A Multi-Scale Analysis of 27,000 Urban Street Networks: Every US City, Town, Urbanized Area, and Zillow Neighborhood." *Computer Methods and Programs in Biomedicine* 184, 105120. doi:10.1016/j.cmpb.2019.105120

2019 **Zhu, Y.**, Liu, J., Mathiak, K., Ristaniemi, T., Cong, F. "Deriving electrophysiological brain network connectivity via tensor component analysis during freely listening to music." *IEEE Transactions on Neural Systems and Rehabilitation Engineering* 28(2), 409-418. doi:10.1109/TNSRE.2019.2953971. [code]

2018 Wang, D., **Zhu, Y.**, Ristaniemi, T., Cong, F. "Extracting multi-mode ERP features using fifth-order nonnegative tensor decomposition." *Journal of neuroscience methods* 308, 240-247. doi:10.1016/j.jneumeth.2018.07.020. [dataset]

2017 Luan, S., Qiu, T., Yu, L., Zhang J., Song A., **Zhu, Y.** "BNC-based projection approximation subspace tracking under impulsive noise." *IET Radar, Sonar and Navigation* 11(7), 1055-1061. doi:10.1049/iet-rsn.2016.0267

2016 Luan, S., Qiu, T., **Zhu, Y.**, Yu, L. "Cyclic correntropy and its spectrum in frequency estimation in the presence of impulsive noise." *Signal Processing* 120, 503-508. doi:10.1016/j.sigpro.2015.09.023

Peer-Reviewed Conference papers

2019 **Zhu Y.**, Li X., Ristaniemi T., and Cong F. "Measuring the task induced oscillatory brain activity using tensor decomposition." In: *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, 8593-8597. doi:10.1109/ICASSP.2019.8682355. [Poster]

2019 Wang D., Wang X., **Zhu Y.**, Toiviainen P., Huotilainen M., Ristaniemi T., and Cong F. "Increasing stability of EEG components extraction using sparsity regularized tensor decomposition." In: *International Symposium on Neural Networks*, (pp. 789-799). doi:10.1007/978-3-319-92537-089

Dissertation

2020 **Zhu Y.** "Identifying task-related dynamic electrophysiological brain connectivity." *University of Jyväskylä*. Finland. [pdf]

2016 **Zhu Y.** "Research on Key Technologies of Interventional Surgery Navigation Guided by Ultrasound Images." *Dalian University of Technology* Dalian, China. [link]

Manuscripts in Peer Review

2021 Li X., **Zhu Y.**, Ruohonen E., Ye C., Astikainen P. "Decreased intersubject synchrony in frontal EEG alpha asymmetry and valence ratings of negative movie content in dysphoric individuals." Under review.

2021 Liu J. **Zhu Y.**, Chang Z., Hämäläinen T., Cong F. "Congruency and vigilance produce separable changes in the late positive complex during a Flanker task." Under review.

CONFERENCE ACTIVITY

2020 Workshops on the 2020 CCN GAC, Virtual Conference. Oct 15–23.

2020 Virtual summer school on "Pattern Recognition in Neuroimaging", Vienna, Austria. Sep 14–18.

2019 The 44th IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP2019), Brighton, UK. May 12–17.

2019 MEG Nord 2019. Jyväskylä, Finland. May 8-10.

2018 The 6th Annual Research Seminar of CIBR. Jyväskylä, Finland. Dec 13.

2018 Seminars on Artificial Intelligence. Jyväskylä, Finland. Febrary 21–22.

2017 The 27th Jyväskylä International Summer School in Finland. Aug 07–18.

2017 "Understanding Learning in the Brain." CIBR Conference, Jyväskylä, Finland. Jun 12–16.

GRANTS AND AWARDS

Awards and Honors

2016 Toshiba Medical Research and Development Center Scholarship of DUT

2016 Outstanding Graduate of Liaoning Province, China (Master)

2013 Outstanding Graduate of Liaoning Province, China (Bachelor)

Grants and Fellowships

2020 Grant for Doctoral study within University of Jyväskylä, 10–12/2020

2019 Conference travel grant for ICASSP Conference in Brighton, UK

2019 Mobility Grant grant for visiting to Medical faculty, RWTH University Aachen, Germany, 7-10, 2019

2016 China Government Scholarship, 10/2016–09/2020

TEACHING EXPERIENCE

Dalian University of Technology

2014 TA. in "Biomedical signal processing." and "Signals and Systems."

SERVICE

AD-HOC Peer Review

Journal of Neural Engineering

Machine Learning: Science and Technology

IEEE Access

Journal of Neuroscience Methods

MEMBERSHIPS

IEEE student member

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