Han Zhang Ph.D.

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EDUCATION BACKGOUND

2008–2011. Ph.D. in Cognitive Neuroscience, State Key Laboratory of Cognitive Neuroscience and Learning (SKLCNL), Beijing Normal University (BNU).

2006–2008 M.S. student in Computer Science and Application, SKLCNL, BNU. (Recommended for admission to Ph.D. study)

2001–2005 B.S. in Information Science and Electronic Engineering, Zhejiang University.

RESEARCH INTERESTS

- Independent component analysis (ICA): methodology and applications on fMRI and fNIRS.
- Computational methodology for resting-state brain functional images.
- Brain functional integration modeling.
- Brain plasticity due to disease and practice.

PUBLICATIONS

- Zhang Y.J., **Zhang H.** et al., Spatio-frequency analysis of resting-state functional connectivity based on fNIRS. (Prepare to submit to **NeuroImage**)
- **Zhang H.**, Zhang Y.J., Duan L., Ma S.Y., Lu C.M., Zhu C.Z., Is resting-state functional connectivity revealed by functional near-infrared spectroscopy test-retest reliable? **J Biomed Opt (**2011**)**, 16(2), 067008. (SCI, 5-yrs-IF: 2.911)
- **Zhang H.**, Duan L., Zhang Y.J., Lu C.M., Liu H., Zhu C.Z., Test-retest assessment of independent component analysis-derived resting-state functional connectivity based on functional near-infrared spectroscopy. **NeuroImage** (2011), 55(2), 607-615. (SCI, 5-yrs-IF: 7.168)
- **Zhang H.**, Zuo X.N., Ma S.Y., Zang Y.F., Milham M.P., Zhu C.Z., Subject order-independent group ICA (SOI-GICA) for functional MRI data analysis. **NeuroImage** (2010), 51(4), 1414-1424. (SCI, 5-yrs-IF: 7.168)
- **Zhang H.**, Zhang Y.J., Lu C.M., Ma S.Y., Zang Y.F., Zhu C.Z., Functional connectivity as revealed by independent component analysis of resting-state fNIRS measurements. **NeuroImage** (2010), 51(3), 1150-1161. (SCI, 5-yrs-IF: 7.168)
- Wang L., Zhu C.Z., He Y., Cao Q.J., Wang Y.F., **Zhang H.**, Zhong Q.H., Zang Y.F., Altered Small-World Brain Functional Networks in Children with Attention-Deficit/Hyperactivity Disorder. **Hum Brain Mapp** (2008), 30, 638-649. (SCI, 5-yrs-IF: 7.036)
- **Zhang H.**, Zhu C.Z. 2010. Brain plasticity due to long-term piano practice as revealed by intrinsic functional-network-connectivity based on resting-state fMRI. 50th Annual Meeting of Society for Psychophysiological Research (SPR), Portland, Oregon, USA. (Travel award)
- **Zhang H.**, Ma S.Y., Zhang Y.J., Zuo X.N., Zang Y.F., Zhu C.Z. 2009. Concatenating-order Independent Group ICA: MOI-GICA. 15th Annual Meeting of the Organization for Human

Brain Mapping, San Fransisco, USA. (Poster)

- **Zhang H.**, Han Y., Yang H., Tang H.H., Gong Q.Y., Zang Y.F., Zhu C.Z. 2008. Plastic Functional Connectivity due to Music Training: a Resting State fMRI Study. 14th Annual Meeting of the Organization for Human Brain Mapping, Melbourne, Australia. (Poster)

INVITED TALKS/LECTURES

- Lecture: "FMRI data processing using SPM and ICA" (2011.6), General Hospital of Tianjin Medical University.
- Invited talk: "ICA in Brain Functional Imaging" (2011.4), Tsinghua Center for BioMedical Imaging Research (CBIR), Tsinghua University.
- Invited talk: "ICA on FMRI Data" (2010.5), SKLCNL, BNU.
- Lectures: "FMRI Data Processing using SPM5" and "Group ICA Analysis using MICA" (2009.12), SKLCNL, BNU.
- Lecture: "FMRI Data Processing using SPM2", Neuroimage Training Workshop (2007.8), BNU.
- Lectures: "In-depth FMRI Data Processing using SPM2/5" (2007.6.14-21, 2007.7.9-16 and 2007.12.3-10), SKLCNL, BNU.

SCHOLARSHIP/AWARDS

2011 First Class of the Excellent Academic Award, SKLCNL (2 out of 300 students).
2011 Award of Excellent Scientific Contribution, SKLCNL.
2011 Scholarship of the Graduate Students, BNU.
2010 Academic Fund for Youth Scientists, Ministry of Education, China.
2010 Travel Award for 50th Annual Meeting of Society for Psychophysiological Research (SPR), Portland, Oregon, USA.
2010 "Tomorrow Star" Award, GlaxoSmithKline R&D China (2 PhD students in China & Singapore).
2010 Reward of the Achievements in Scientific Research, BNU.
2010 Engagement Fund of Outstanding Doctoral Dissertation, BNU (4 students in SKLCNL).
2009 Second Class of the Excellent Academic Award, SKLCNL.
2005 First class scholarship, Zhejiang University.

RESEARCH POSITIONS

- **Reviewer**. PLoS ONE (SCI, IF = 4.351).
- **Research Assistant/Biostatistics Consultant** in Data Processing Lab at Imaging Center for Brain Research (ICBR), BNU. In charge of establishing fMRI data processing pipeline, SPM training and consultation for all lab members.
- **MR Scanning operator**. Operating Siemens 3T Trio MRI scanner in ICBR at SKLCNL as assistant engineer.
- **Member** of the SPR.
- **Student member** of Organization of Human Brain Mapping (OHBM).

ACADEMIC EXPERIENCE/SKILLS

Bioimaging Data Analyzing

- Operating Siemens 3T Trio MRI scanner/ETG-4000 optical imaging system.
- Proficiency of MATLAB scripting, Linux bashing, SPM99/2/5/8, FSL, AFNI.

Software and Toolbox Development

- Subject-Order-Independent Group ICA (SOI-GICA) Toolbox for fMRI.
- Toolbox of Functional Connectivity Analysis for NeuroImage Computing (NIC) Group.
- ICA based Resting-state Functional Connectivity (RSFC) Computing Toolbox for fNIRS.

Functional Near Infrared Spectroscopy (fNIRS)

- Propose ICA-based RSFC method for resting-state fNIRS (rs-fNIRS).
- Reliability evaluation of ICA-derived, FNIRS-based RSFC.
- Investigate Spatio-frequency characteristics of fNIRS-based RSFC.
- ICA-based multimodal data analysis based on simultaneous fMRI and fNIRS recording.

ICA–Methodology and Applications for Brain Functional Images

- Develop randomness theory for ICA and propose SOI-GICA to solve randomness problem.
- Temporal ICA on rs-fNIRS data.
- Develop new Group ICA method to analyze rs-fNIRS data from groups.

Apply Functional Integration to Brain Disorders and Plasticity

- High-risk depression and its treatment effect evaluation.
- Post-stroke rehabilitation in stroke patient.
- Brain plasticity due to long-term piano training.
- Phantom limb pain.

Other Functional Integration Methods

- Structure equation model (SEM), dynamic causal modeling (DCM), psycho-physiological interaction (PPI), temporal clustering analysis (TCA), complex network analysis, coherence analysis, Granger causality analysis, principle component analysis (PCA).

PATENTS

- Software Copyright (No. 0184144): Subject-Order Independent Group ICA Toolbox (COGICAT beta1.0)

RESEARCH GRANTS

As P. I.

- Independent Component Analysis on fNIRS/fMRI. Academic Funding For Youth Scientist (Ministry of Education, China), 2010-2011.
- Independent Component Analysis on Functional Brain Imaging Analyses: methodology and applications, Engagement Fund of Outstanding Doctoral Dissertation, BNU, 2010-2011.

As Co-operator

- Post-stroke Plasticity of Brain Connectivity: a longitudinal fMRI & DTI Study. National Science Foundation of China, 2010-2012. (Grant No. 30970773).
- FNIRS-based resting-state functional connectivity study: a methodological study and applications to children development, SKLCNL director funding, 2010-2012.
- Investigation on Brain Functional Integration based on Synthetically Medical Intervention on Depressed Patients, International Technical Co-operation Projects of China, 2008-2010. (Grant No. 2007DFA30780).
- Combination of Patten Recognition Techniques and Multi-modal MR Imaging for

Discriminative Analysis of ADHD, National Science Foundation of China, 2006-2008. (Grant No. 30500130).

- Investigation on Key Problems in Information Processing of Clinic Medicine, State Key Basic Research Projects of China (Fund 973), The Ministry of Science and Technology of China, 2004-2008. (A sub-project under Grant No. 2003CB716101).
- Investigation on functional connectivity in motor system for musicians, National Science Foundation of China, 2005-2007. (No. 30470575).