Li Zhu

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RESEARCH INTERESTS

Functional Brain Imaging, Dynamical Brain Networks, Multi-modal Neuroimaging, Analog/Mixed Circuit Design, Multivariate Time Series Analysis, Spatio-Temporal Data Analysis, Graph Theory, Machine Learning, Brain Computer Interface.

EDUCATION

Rutgers University **Piscataway, NJ**
Ph.D. in Electrical and Computer Engineering *2013–2017*
Advisor: Professor Laleh Najafizadeh

Huazhong University of Science and Technology **Wuhan, China**
M.E. in Electronics and Communication Engineering *2005–2008*
Advisor: Professor Hongyuan Wang

Wuhan University of Technology **Wuhan, China**
B.E. in Information Engineering *2000–2004*

RESEARCH EXPERIENCE

- **Functional Brain Networks Analysis Using Multiplex Visibility Graph**
  Presented a novel approach based on multiplex visibility graph to evaluate the integration among brain regions when it is in action, without ignoring the nonlinear characteristics of the corresponding recording time series.

- **Optimal EEG Electrode/fNIRS Optodes Configuration in EEG-fNIRS Multi-Modal Experiment**
  Investigated the optimal sensor configuration by taking a combined signal processing and experimental approach, with the criterion that sensors from two modalities should be arranged such that the recorded signals from each modality are representative of co-localized activities.

- **Investigation of Averaging Strategies for fNIRS-based Functional Brain Imaging Experiments**
  Presented a new averaging strategy, based on dynamic time warping, for improving the detection and estimation power of fNIRS experiments, by compensating the existence of trial-to-trial variability in the nonlinear latency of hemodynamic response.

HONORS & AWARDS

- TA/GA Professional Development Award, Rutgers University *2015–2016*
- Runner-up Best Student Paper Award at IEEE ISCAS 2014 *2014*
- ECE Research Excellent Award, Rutgers University *2014*
- ECE Graduate Fellowship, Rutgers University *2013–2014*
- The Best Newcomer Award, Research Institute, Skyworth Group Co., Ltd. *2005*
- First-Class Scholarship, Wuhan University of Technology *2003-2004*

- University-Wide Excellent Student Cadre, Wuhan University of Technology *2003*

TEACHING EXPERIENCE

14:332:233–Digital Logic Design
Teaching Assistant, Rutgers University *Fall 2014*

PROFESSIONAL SERVICE & MEMBERSHIPS

- Student Chapter Coordinator in IEEE Princeton / Central Jersey Section
- Student Member of the Institute of Electrical and Electronics Engineers (IEEE).
- Student Member of the Optical Society (OSA).

WORKING EXPERIENCE

Grandbeing Technology Co., Ltd. **Shenzhen, China**
R&D Manager, Senior Electrical Engineer *2008–2013*

- Dedicated in system design and hardware development on professional digital Audio/Video products. Responsible for supervising the prototype manufacturing process.
- Attendee of the monthly operation conference of the company. Led R&D hardware and Design Quality Control teams, with around 30 engineers.

Research Institute, Skyworth Group Co., Ltd. **Shenzhen, China**
Hardware Engineer *2004–2008*

- Designed high-definition Audio/Video products with micro processors, A/V decoders/encoders, and high-speed interface controllers.
- Schematic design, circuit design, PCB layout, firmware debugging.
- Plentiful experience of prototyping, troubleshooting, and design for manufacturing.

SKILLS

- **Neuroimaging Techniques:** Plentiful experience in brain imaging data analysis, and designing/conducting EEG-fNIRS experiments. Operated various brain imaging systems (Brain Products, Toshiba, TechEn, and NIRx) and experimental presentation tools (E-Prime).

- **Computer Programming:** MATLAB (advanced), R (intermediate). Also basic ability with: Assembly Language, C, C++, Python.

- **Hardware Design Software:** Cadence Capture CIS, Virtuoso, Spectre, Mentor Graphics PADS Logic, Layout.

- **Hardware Design Tools:** Oscilloscope, spectrum analyzer, logic analyzer, signal generator, ESD Generator, Surge simulator, multimeter. Circuit wire bonding and chipset soldering.

UNDER REVIEW/PREPARATION

[1] L. Zhu and L. Najafizadeh, "Averaging Strategies for fNIRS-Based Functional Brain Imaging Experiments," Under Review.

[2] L. Zhu, A. Haddad, Y. Wang, T. Zeng, L. Najafizadeh, "The Optimal Electrode/Optode Configuration in EEG-fNIRS Multi-Modal Functional Brain Imaging Experiments," Under Review.

[3] Y. Huang, L. Zhu, F. Kong, C. Chun and L. Najafizadeh, "BiCMOS-Based Compensation:Towards Fully Temperature Corrected Bandgap Reference Circuits," Under Review.

[4] L. Zhu and L. Najafizadeh, "Functional Brain Networks Analysis Via Multiplex Visibility Graph," Submitted to IEEE EMBC 2016.

PUBLICATIONS

[1] L. Zhu, A. Haddad, T. Zeng, Y. Wang and L. Najafizadeh, "Assessing Optimal Electrode/Optode Arrangement in EEG-fNIRS Multi-Modal Imaging," OSA Biomedical Optics Meeting, Fort Lauderdale, FL, Apr. 2016.

[2] L. Zhu and L. Najafizadeh, "Temporal Dynamics of fNIRS-Recorded Signals Revealed Via Visibility Graph," OSA Biomedical Optics Meeting, Fort Lauderdale, FL, Apr. 2016.

[3] T. Zeng, L. Zhu, Y. Wang and L. Najafizadeh, "On the Relationship Between Trial-to-Trial Response Time Variability and fNIRS-Based Functional Connectivity," OSA Biomedical Optics Meeting, Fort Lauderdale, FL, Apr. 2016.

[4] L. Zhu and L. Najafizadeh, "Trial-to-Trial Variability in Multi-Modal Imaging, an EEG-fNIRS Study," Accepted for presentation at Human Brain Mapping, Jan. 2015.

[5] L. Zhu and L. Najafizadeh. "Does brain functional connectivity alter across similar trials during imaging experiments?" The 2014 IEEE Signal Processing in Medicine and Biology Symposium (SPMB), New York, NY, Dec. 2014. **Oral Presentation**.

[6] L. Zhu, M. Peifer, L. Najafizadeh, "Towards Improving the "Detection" Power of Brain Imaging Experiments Using fNIRS," OSA Technical Digest, Miami FL, Apr. 2014.

[7] M. Peifer, L. Zhu, L. Najafizadeh, "Real-time classification of finger tapping vs imaginary finger tapping using NIRS data," OSA Technical Digest, Miami FL, Apr. 2014.

[8] Y. Huang, L. Zhu, C. Cheung, and L. Najafizadeh, "A Low Temperature Coefficient Voltage Reference Utilizing BiCMOS Compensation Technique," Proc. IEEE International Symposium on Circuits and Systems (ISCAS), Melbourne, Australia, June 2014, pp 922-925. **Best Student Paper Award (Runner-up)**.

[9] Y. Huang, L. Zhu, C. Cheung, and L. Najafizadeh, "A Curvature-Compensation Technique Based on the Difference of Si and SiGe Junction Voltages for Bandgap Voltage Circuits," The 2014 IEEE International Symposium on Circuits and Systems (ISCAS), Melbourne, Australia, June 2014.

PRESENTATIONS

[1] L. Zhu and L. Najafizadeh, "On The Spatial Alignment of EEG-fNIRS Channels In Multi-Modal Functional Brain Imaging Experiments With Application In Neurovascular Coupling Studies," Poster Presented on Rutgers Brain Health Institute Symposium 2015, Jersey City, NJ, Oct. 2015.

[2] L. Zhu and L. Najafizadeh, "Assessment of Brain Activation During Imagery and Actual Finger Tapping Tasks Using Near Infrared Spectroscopy," Poster Presented on The 2013 IEEE Signal Processing in Medicine and Biology Symposium (SPMB), New York, NY, Dec. 2013.

THESIS

[1] L. Zhu, "The Design of Analog and Digital Sources Compatible HDTV Based on TVP9000", M.E. Thesis, Huazhong University of Science and Technology, 2008.