Yuanyuan Gao

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Education

PhD in Mechanical Engineering (3.5/4.0)	Rensselaer Polytechnic Institute	New York	2015-2020
Visiting Scholar	University of Buffalo	Buffalo	2018-2019
Researcher	Harvard University	Boston	2016-2017
MS in Mechanical Engineering (3.6/4.0)	Beihang University	Beijing	2010-2013
BS in Aircraft Safety Engineering (3.4/4.0)	Beihang University	Beijing	2006-2010

Projects

Research Assistant **Rensselaer Polytechnic Institute (US rank #50)** **2015-2020**

Project 1: Predicting surgical skills from neuroimaging data by CNN
- Designed a CNN model of modality-specific kernels to extract biomarkers from neuroimaging data to predict the motor skill level (from R^2 = 0.50 to R^2 = 0.73).

Project 2: Motion artifact removal in neuroimaging data by DAE
- Constructed a denoise autoencoder (DAE) model to achieve 70% more noise removal.

Project 3: Predicting learning curve characteristics by KPLS and k-means
- Implemented Kernel PLS and k-means to predict the learning curve characteristics (R^2 = 0.81).

Publications

Journal Papers
- Functional brain imaging reliably predicts bimanual motor skill performance in a standardized surgical task. **Gao, Y.** *et al.* 2020.IEEE TBME (Under review). ***Preprint***
- Deep learning-based motion artifact removal in functional near-infrared spectroscopy (fNIRS). **Gao, Y.** *et al.* 2020.Neuroimage (Under review).***Preprint***
- A comprehensive review of experimental neuroimaging studies of the effect of transcranial electrical stimulation on human motor skills, **Gao, Y.** *et al.* 2020. Front. Neurosci. (Accepted). ***Preprint***
- A Machine Learning approach to predict surgical learning curves. **Gao, Y.** *et al.* 2019. ***Surgery***

Conference Presentations
- Transcranial direct current stimulation speeds up surgical bimanual motor learning and increases functional activation. Gao, Y. et al. 2020. MHSRS Young Investigator breakout session, Award paper. ***link***
- A deep learning approach to remove motion artifacts in fNIRS data analysis (Oral presentation). Gao, Y. et al. 2020. OSA Biophotonics Congress: Optics in the Life Sciences, Florida. ***link***
- Monitoring the effect of transcranial Electric current Stimulation (tES) during a bimanual motor task via functional Near-InfraRed Spectroscopy (fNIRS) (Poster presentation). Gao, Y. et al. 2020. OSA Biophotonics Congress: Optics in the Life Sciences, Florida. ***link***
- fNIRS as a quantitative tool to assess and predict surgical skills (Oral presentation). Gao, Y. et al. 2019. OSA Biophotonics Congress: Optics in the Life Sciences, Florida. ***link***
- Neuroimaging biomarkers for surgical skill level prediction (Poster presentation). Gao, Y. et al. 2019. SPIE.Bios, San Francisco, CA.

Skills

Programming	Python | MATLAB | SQL | C/C++/C# | VB | SPSS | Minitab | G*Power
Language	English and Mandarin
Research	Deep learning | machine learning | data analysis | data science | statistics