Gansheng Tan, Ph.D. Student

Washington University School of Medicine,
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Research Interest

I am a **self-motivated** and **team-minded Ph.D.** student with **6 years** of experience in **neuromodulation** research and bioelectrical signal processing. I seek to understand neural plasticity through electrophysiology, interact with these signals using an interdisciplinary approach, and develop new effective treatments for nervous system-related diseases.

Education

09/2022 – present, MO, USA. **Ph.D. Biomedical Engineering**
Washington University in St. Louis

09/2019 – 03/2022, Shanghai, China **M.Eng. Mechanical Engineering**
Shanghai Jiao Tong University

06/2017 – 09/2019, Île-de-France, France **Diplôme d'ingénieur (postgraduate degree in engineering)**
CentraleSupélec
Topics: Advanced Statistics, Machine Learning, Signal Processing

09/2015 – 06/2019, Shanghai, China **B.Eng.**
Shanghai Jiao Tong University

Research and Professional Appointments

09/2022 - present, St. Louis, MO, USA **Graduate Research Assistant**
Division of Neurotechnology, Department of Neurosurgery, Washington University School of Medicine in St. Louis
Studying the impact of vibrotactile auricular vagus nerve stimulation on working memory and its mechanistic pathway

09/2021 – 09/2022, St. Louis, MO, USA **Research Scholar**
Department of Neurosurgery, Washington University School of Medicine
Studying the neurophysiological effects of transcutaneous auricular vagus nerve stimulation; investigating the interaction between cortical oscillation and muscle synergies

11/2019 – 03/2022, Shanghai, China **Graduate Research Assistant**
Department of Rehabilitation Medicine (Ruijin Hospital) - State Key Laboratory of Mechanical Systems and Vibration, Shanghai Jiao Tong University
Developed a framework based on Electroencephalography and Electromyography for individualizing Transcranial Magnetic Stimulation to promote recovery from stroke

05/2019 – 09/2019, Bron, France **Research Fellow**
Lyon Neuroscience Research Center, French National Institute of Health and Medical Research
Analyzed the cerebral oscillations underlying the meditative practices; developed a semi-automatic EEG signal preprocessing pipeline for meditation research

01/2018 – 03/2021 Île-de-France, France	**Graduate Research Assistant** *Signals and Systems Laboratory, French National Centre for Scientific Research* Identified neural correlates of Focused Attention meditation and problem-solving state; developed a platform guiding meditators based on mental state classification
10/2015 – 05/2017 Shanghai, China	**Undergraduate Research Assistant** *State Key Laboratory of Mechanical Systems, Shanghai Jiao Tong University*

Skills

Software Engineering (Python, R, MATLAB, Github, Java, C/C++, HTML, CSS, 8 years)
Statistical Learning and Biomedical Data Analysis (5 years)
Clinical and Translational Research (3 years)
Scientific Writing and Illustration (Adobe Illustrator, MS Office, Latex, 5 years)

Awards

2021	2021 China National Scholarship (top 0.5%)
2020	Changjiang Siyuan Scholarship, Shanghai Jiao Tong University, China
2018	Top 10 in Huawei Big Data Challenge in France
2018	Innovative Project Award, CS² Congrès Scientifique du Campus de Saclay, France
2017	Écoles Centrales Group – Chinese Universities Double Degree Scholarship, China
2016	Honor Student, Shanghai Jiao Tong University, China
2015	Excellent Design, Engineering Design Showcase, Shanghai Jiao Tong University, China

Experience

06/2022 Singapore	**Invited Seminar** *School of Computer Science and Engineering, Nanyang Technological University* *The interaction between cortical oscillation and muscle synergies*
10/2018 – 05/2019 Île-de-France, France	**Teaching Fellow** *Laboratory in Mathematics and Computer Science (MICS), CentraleSupélec* Instructor for Convergence, Integration, Probability, and Partial Differential Equation
08/2018 – 05/2019 Île-de-France, France	**Vice President of International Student Union** *CentraleSupélec*
04/2018 - 05/2018 Cambridge, U.K.	**Exchange Student** *Department of Engineering, University of Cambridge*
10/2017 – 06/2018 Paris, France	**Project Manager** *Tech for Good Explorer & La Condamine*

Professional societies

Graduate Student Member of IEEE

Reviewer of IEEE International Conference on Systems, Man, and Cybernetics

Reviewer of Biomedical Sciences

Graduate Student Member of American Society of Neurorehabilitation

Student Member of Society of Neuroscience

Journal publications and conference proceedings

Tan, G., Sheng, Y., Liu, J., Wang, J., Xie, Q., Liu, H., Brunner, P. The Coupling between Brain Oscillation and Muscle Synergies in Patients with Hemiparesis **Neuroscience 2022**.

Tan, G., Wang, J., Liu, J., Sheng, Y., Xie, Q., Brunner, P., Liu, H. Towards individualized Transcranial Magnetic Stimulation for motor recovery from hemiparesis: study of Corticomuscular Network. ASNR meeting Abstract. Neurorehabilitation and Neural Repair. **Neurorehabilitation and Neural Repair** vol. 36 NP1–NP38 (2022).

Tan, G. et al. A framework for quantifying the effects of transcranial magnetic stimulation on motor recovery from hemiparesis: Corticomuscular Network. **Journal of Neural Engineering** (2022).

Tan G., Wang S., Vierge V., Mu W., Wang M., Greco L., Mounier H., Chaillet A. An EEG classifier to discriminate between focused attention meditation and a problem-solving task. **2022 IEEE International Conference on System, Man, and Cybernetics** (2022).

Tan, G., Xu, K., Liu, J. & Liu, H. A Trend on Autism Spectrum Disorder Research: Eye Tracking-EEG Correlative Analytics. **IEEE Transactions on Cognitive and Developmental Systems** 1–1 (2021).

Liu, J., **Tan, G.**, Wang, J., Wei, Y., Sheng, Y., Chang, H., Xie, Q., & Liu, H. Closed-loop construction and analysis of cortico-muscular-cortical functional network after stroke. **IEEE Transactions on Medical Imaging** 1–1 (2022).

Sheng, Y., **Tan, G.**, Liu, J., Chang, H., Wang, J., Xie, Q., & Liu, H. Upper Limb Motor Function Quantification in Post-Stroke Rehabilitation using Muscle Synergy Space Model. **IEEE Transactions on Biomedical Engineering** 1-1 (2022).

Liu, J., **Tan, G.**, Sheng, Y., Wei, Y. & Liu, H. A Novel Delay Estimation Method for Improving Corticomuscular Coherence in Continuous Synchronization Events. **IEEE Transactions on Biomedical Engineering** vol. 69 1328–1339 (2022).

Liu, J., **Tan, G.**, Sheng, Y. & Liu, H. Multiscale Transfer Spectral Entropy for Quantifying Corticomuscular Interaction. **IEEE Journal of Biomedical and Health Informatics** vol. 25 2281–2292 (2021).

Liu, J., Wang, J., **Tan, G.**, Sheng, Y., Chang, H., Xie, Q., & Liu, H. (2021). Correlation Evaluation of Functional Corticomuscular Coupling With Abnormal Muscle Synergy After Stroke. **IEEE Transactions on Biomedical Engineering** vol. 68 3261–3272 (2021).

Liu, J., **Tan, G.**, Sheng, Y., Wang, J., Lu, W., & Liu, H. Delay estimation for cortical-muscular interaction via the rate of voxels change. **2020 IEEE International Conference on Systems, Man, and Cybernetics (SMC)** (2020)