

# Gansheng Tan, Ph.D. Student

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## Research Interest

I am a **self-motivated** and **team-minded Ph.D.** student with **5 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 thereby develop new effective treatments for nervous system-related diseases.

## Education

03/2022 – present MO, USA.	<b>Ph.D. Biomedical Engineering</b> <i>Washington University in St. Louis</i>
09/2019 – 03/2022 Shanghai, China	<b>M.Eng. Mechanical Engineering</b> <i>Shanghai Jiao Tong University</i>
06/2017 – 09/2019 Île-de-France, France	<b>Diplôme d'ingénieur (postgraduate degree in engineering)</b> <i>CentraleSupélec</i> Topics: Advanced Statistics, Machine Learning, Signal Processing
09/2015 – 06/2019 Shanghai, China	<b>B.Eng.</b> <i>Shanghai Jiao Tong University</i>

## Research and Professional Appointments

09/2021 - present St. Louis, MO, USA	<b>Research Scholar</b> <i>Department of Neurosurgery, Washington University School of Medicine</i> 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	<b>Graduate Research Assistant</b> <i>Department of Rehabilitation Medicine (Ruijin Hospital) - State Key Laboratory of Mechanical Systems and Vibration, Shanghai Jiao Tong University</i> Developed a framework based on Electroencephalography and Electromyography for individualizing Transcranial Magnetic Stimulation to promote recovery from stroke
05/2019 – 09/2019 Bron, France	<b>Research Fellow</b> <i>Lyon Neuroscience Research Center, French National Institute of Health and Medical Research</i> 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	<b>Graduate Research Assistant</b> <i>Signals and Systems Laboratory, French National Centre for Scientific Research</i> 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	<b>Undergraduate Research Assistant</b> <i>State Key Laboratory of Mechanical Systems, Shanghai Jiao Tong University</i>

## 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, CS <sup>2</sup> 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	<b>Invited Seminar</b> <i>School of Computer Science and Engineering, Nanyang Technological University</i> <i>The interaction between cortical oscillation and muscle synergies</i>
10/2018 – 05/2019 Île-de-France, France	<b>Teaching Fellow</b> <i>Laboratory in Mathematics and Computer Science (MICS), CentraleSupélec</i> Instructor for Convergence, Integration, Probability, and Partial Differential Equation
08/2018 – 05/2019 Île-de-France, France	<b>Vice President of International Student Union</b> <i>CentraleSupélec</i>
04/2018 - 05/2018 Cambridge, U.K.	<b>Exchange Student</b> <i>Department of Engineering, University of Cambridge</i>
10/2017 – 06/2018 Paris, France	<b>Project Manager</b> <i>Tech for Good Explorer &amp; La Condamine</i>

## **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

## **Publications**

**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, J., Liu, J., Sheng, Y., Xie, Q., Brunner, P., Liu, H. Towards the Optimization of Repetitive Transcranial Magnetic Stimulation for Motor Recovery from Hemiparesis: Study of Corticomuscular Network. **2022 American Society of Neurorehabilitation Annual Meeting**.

**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)

**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 problem-solving task (**Submitted**).