Penghui Du

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Education

2024/08 - Now **École Polytechnique Fédérale de Lausanne**, *Master in Neuro-X*.

2020/08 - 2024/07 **Southern University of Science and Technology (SUSTech)**, *With Outstanding BSc Award*.

- Major in Intelligent Medical Engineering, GPA: 3.84 / 4, Rank 2 / 22.

2023/02 - 2023/07 **University of Zurich & ETH Zurich**, *Visiting Student in Neuroinformatics*.

Research Experience

Harvard Medical School (Research Assistant), *Supervisor: Dr. Jingyuan Chen.*

2023/07 - 2024/02 We applied a connectivity based analytical scheme on a resting-state fPET-fMRI dataset, aiming to characterize the cortical organization of glucose metabolic dynamics and understand how it differs from the hemodynamics based functional network structures. (Poster presentation at OHBM 2024, manuscript in preperation).

- **Contribution:** Main contributor; Writing the majority of the code;

Southern University of Science and Technology, *Supervisor: Dr. Quanying Liu.*

2023/05 - 2023/08 We conducted a comprehensive review of how cognitive science can be merged with large language models, with the goal of integrating principles of cognitive science into tests for artificial general intelligence (AGI).

- **Contribution:** Second author; Literature research; Writing the manuscript; Figure design.

2022/09 - Now We collected calcium imaging data from zebrafish under various drug conditions using epifluorescence microscope, and explored the effects of distinct drugs on the activity and connectivity of brain networks (In Preperation).

- **Contribution:** Main contributor; Writing Code for preprocessing and data analysis.

2022/03 - 2022/07 We proposed a transfer learning framework to investigate the relationship between cognitive tasks, and compared the task relations reflected by transfer learning to that defined by task-evoked activities.

- **Contribution:** Analyzed fMRI data collected from *Neurosynth*; Writing the manuscript.

Publications and Posters

2024 / 06 **Du, P.**, Coursey, S., Xu, T., Polimeni, J., Wey, H., Liu, Q., & Chen, J. (2023, December). Human Cerebral Cortex Organization Estimated by Functional PET-FDG "Metabolic Connectivity". Poster Presented at *The Organization for Human Brain Mapping (OHBM) 2024 Annual Meeting. (Manuscript in Preperation)*

2024 / 03 Qu, Y., Wei, C., **Du, P.**, Che, W., Zhang, C., Ouyang, W., Bian, Y., Xu, F., Hu, B., Du, K., Wu, H., Liu, J., & Liu, Q. Integration of cognitive tasks into artificial general intelligence test for large models[J]. Accepted by *iScience*.

2024 / 01 Qu, Y., **Du, P.**, Wei, C., Che, W., Zhang, C., Ouyang, W., Bian, Y., Xu, F., Hu, B., Du, K., Wu, H., Liu, J., & Liu, Q. Promoting interactions between cognitive science and large language models[J]. *The Innovation*, 2024, 5(2).

2023 / 07 Qu, Y.*, Che, W.*, **Du, P.**, Jian, X., & Liu, Q. (2023, July). Assessing Generalization of Cognitive Tasks Using Multi Regional Modular Recurrent Neural Networks With Transfer Learning. Poster accepted to *5th Chinese Computational & Cognitive Neuroscience Conference*.

2022 / 07 Qu, Y., Jian, X., Che, W., **Du, P.**, Fu, K., & Liu, Q. (2022, July). Transfer learning to decode brain states reflecting the relationship between cognitive tasks. In *International Workshop on Human Brain and Artificial Intelligence* (pp. 110-122). Singapore: Springer Nature Singapore.

Awards

2024 / 07 Southern University of Science and Technology - **Outstanding BSc Award**

2022 / 10 Department of Biomedical Engineering - **"Fortunatt" Scholarship**

2022 / 10 SUSTech Outstanding Student Scholarships - **First Prize**

2022 / 06 China College Student Innovation Training Program – **Undergraduate Research Grant**

2022 / 06 2022 Guangdong Biomedical Engineering Design Competition – **First Prize**

2022 / 05 13th "Challenge Cup" Guangdong Entrepreneurship Plan Competition – **First Prize**

2019 / 11 Certified Software Professional-Senior – **First Prize**

2019 / 05 The 13th Asia and Pacific Informatics Olympaid – **Bronze Medal**

2018 / 11 National Olympaid in Informatics in Provinces – **First Prize**

Summer Schools and Competitions

2023 / 10 **Larminar fMRI Course**, *at Martinos Center for Biomedical Imaging*.

2022 / 08 **2022 Neuromatch Academy Computational Neuroscience Summer School**.

2022 / 07 **2022 CLS-CIBR-IDG Summer School in neuroscience**, *with Merit Student Award*.

2022/03 - 2022/06 **2022 Guangdong Biomedical Engineering Design Competition**, *Supervisor: Prof. Quanying Liu*.

- We developed a deep learning model to label key organs in CT images for radiotherapy, proposed an improved pre-training approach for high accuracy and lower computational cost. **(Team Leader)**

2021/11 - 2022/05 **13th "Challenge Cup" Entrepreneurship Competition**, *Supervisor: Prof. Quanying Liu*.

- We developed a business plan for manufacturing intelligent brain health monitors for severely ill newborns, and won first prize in the competition. **(Team Leader)**

Presentations

23 Feb 2024 **The Organization of Human Cerebral Cortex Estimated by Functional PET-FDG: The Promise and Controversy of Metabolic Connectivity** , *at "Science on Tap", Harvard Medical School*.

Teaching experience

S 2021 & S 2022 **JAVA Programming A**, *Teaching Assistant*, SUSTech.

- **Responsibilities include:** Grading exams and assignments; Holding weekly sessions to help students fully understand course materials; Designing assignments.

S 2022 & F 2022 **Workshop on Basic Programming**, *Organizer*, SUSTech.

- **Responsibilities include:** Designing informal workshops to help students gain a better grasp for basic programming; Leading review sessions for exam preparation.

Extracurricular Experience

2023/02 - 2023/07 **Member of Foundation for the Reformed Student Houses**, Zurich.

2021/10 - 2024/07 **"Sapling" Animal Protection Society**, SUSTech.

2021/06 - 2022/06 **Student Tutor**, Shuren college, SUSTech.

2020/08 - 2021/06 **Member of Volunteer Union**, SUSTech.

Language Ability

English: TOEFL score 113.

Programming and Software Skills

Proficient: JAVA, Python, Matlab, C/C++, Latex, Freesurfer, Connectom Workbench.

Working Knowledge: MNE, SPM, FSL, AFNI, R, HTML, CSS, Git, Linux.