Penghui Du

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Education

2020/08 - 2024/06 **Southern University of Science and Technology (SUSTech)**, *Undergraduate*.

- Major / GPA: Intelligent Medical Engineering; GPA: 3.84 / 4; Rank 2 / 22.
- 2021 - 2022 Department of Biomedical Engineering **"Fortunatt" Scholarship**
- 2021 - 2022 SUSTech Outstanding Student Scholarships - **First Prize**

2023/02 - 2023/07 **University of Zurich**, *Regular Visiting Student*.

- Main Subject / GPA: Neuroinformatics; 5.3 / 6.

Research Experience

2023/07 - Now **Harvard Medical School (Undergraduate Research Assistant)** , *Supervisor: Dr. Jingyuan Chen*.

- Overview: In this project, we plan to use PET-MRI data to detect boundaries signifying abrupt change in metabolism rate and functional connectivity. Then we will compare the boundary morphologies derived from these two modalities, and quantify how well they align with each other. We also plan to compare the results with other parcellation criteria such as cytoarchitecture and anatomical landmarks.
- Contribution: Principle contributor of the project;

2022/09 - Now **Southern University of Science and Technology**, *Supervisor: Dr. Quanying Liu*.

- Overview: We collected calcium imaging data from zebrafish brains under various drug conditions using epifluorescence microscopy. Subsequent data analysis was performed to explore the effects of distinct drugs on neural activity across various brain regions.
- Contribution: Wrote code for preprocessing and analysis of zebrafish data.

2022/03 - 2022/07 **Southern University of Science and Technology**, *Supervisor: Dr. Quanying Liu*.

- Overview: 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*; Helped with writing the paper.

Publications, Submitted Papers and Posters

2023 / 07 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. (2023, July). Infusing cognitive science into artificial general intelligence test. Submitted.

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.

2022 / 06 **Du, P.**, Che, W., Huang, R., & Liu, Q. (2022, June). CT image segmentation of key organs for nasopharyngeals cancer radiation therapy. Poster accepted to *Comprehensive Design Project Demonstration*, College of Engineering, SUSTech.

Awards

2022 / 07 2022 CLS-CIBR-IDG – **Merit Student of Summer School in Neuroscience**

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

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

2021 / 09 Contemporary Undergraduate Mathematical Contest in Modeling – **Winning Prize**

2019 / 11 Certified Software Professional-Senior (CSP-S) – **First Prize**

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

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

Summer Schools and Competitions

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

- Overview: I studied computational neuroscience fundamentals such as reinforcement learning, leaky Integrate-and-Fire models, Hodgkin-Huxley models with my teammates. We then conducted an project on RNN and working memory, and presented our results to other teams.

2022 / 07 **2022 CLS-CIBR-IDG Summer School in neuroscience**.

- Overview: I attended various neuroscience lectures in the summer school, followed by our team's presentation on a chosen paper. I was recognized with a Merit Student Award.
- Host Institute: Chinese Institute for Brain Research; Tsinghua University; Peking University;

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

- Overview: We utilized a deep learning model, combining Transformer and UNet, for labeling the key organs involved in radiotherapy in CT images. Our unique pre-training approach ensured high segmentation accuracy and reduced computational cost, earning us first prize in the competition.
- Contribution: Team captain; Main developer of the model; Wrote the report.

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

- Overview: We developed a business plan for manufacturing intelligent brain health monitors for severely ill newborns, and won first prize in the competition.
- Contribution: Team Captain. Proposed technical ideas; Wrote business plan.

Teaching experience

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

- **Responsibilities include:** Grading exams and assignments; Holding weekly sessions to assist students in mastery of material; Designing assignments.

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

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

Extracurricular Experience

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

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

Language Ability

English: TOEFL score 106. (Reading 30, Listening 29, Speaking 24, Writing 23)

Technical Skills

Proficient: JAVA, Python, Freesurfer, Matlab, C/C++, Latex, Git, Linux, Machine Learning, Pytorch.

Working Knowledge: MNE, SPM, FSL, AFNI, Connectom Workbench, R, Html, CSS, Tensorflow, Circuit Design, Optical Experimentation.