Zhengyang Jin

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EDUCATION AND TRAINING

[09/2021 – 10/2022] **MSc. (Honours) in Artificial Intelligence and Adaptive Systems**

University of Sussex https://www.sussex.ac.uk/

City: Brighton | **Country:** United Kingdom | | **Final grade:** Distinction (3.73/4.00) | **Level in EQF:** EQF level 7

[09/2018 – 06/2021] **BSc. (Honours) in Computer Science and Artificial Intelligence**

University of Sussex https://www.sussex.ac.uk/

City: Brighton | **Country:** United Kingdom | | **Final grade:** First-Class (3.72/4.00) | **Level in EQF:** EQF level 6

RESEACH EXPERIENCE

[06/2024 – Current] **HLP Lab, University of Rochester**

Research Intern (Remote). Supervised by Prof T. Florian Jeager & Yuhao Zhu.

- Analyse the performance of the human auditory system under **cross-talker generalization** based on previous research, from neural pathways to behavioural experimental recordings.

- Design new DNN **ASR model** based on human experimental data to improve the model's performance in both accuracy and generalization.

[09/2023 – 05/2024] **A*STAR I²R Singapore**

Research Engineer. Supervised by Prof Mengmi Zhang.

- **Biological neural connectomes modelling** (based on Zebrafish and C. elegans), designing DNN according to the network structural connections and optimizing parameters.

- **Constructing virtual scenes** based on **Unity 3D** as a training set for visual algorithms.

- Performance optimization, model training, parameter fine turning for **continuous learning networks**.

[11/2022 – 02/2023] **Alonso lab, University of Sussex**

Visiting Student. Supervised by Prof Claudio Alonso & Dr Andre Chagas.

- Participated in the construction of a drosophila larva hatching platform and **data science analysis**.

- Training and fine-tuning of video deep learning networks for biological experiments.

[09/2022] **Dissertation Project - Extending Bio-Inspired DNNs To Colour Vision**

Supervised by Prof Benjamin Evans.

- Modified the existing end-to-end neural network structure based on the characteristics of the mammalian **visual pathway**'s front end (retina and part of V1), such as visual **colo**

ur opponency channels, **Gabor filters**, and **Gaussian filters**. This is aimed at compensating for the traditional visual model's sensitivity to **texture**, thereby enhancing the model's sensitivity to **shape** features, and improving the model's **robustness** and **gen eralization** abilities.

[06/2021] **Dissertation Project - Tuning the Kuramoto Model to the output of a Neural Mass Model**

Supervised by Prof Luc Berthouze.

- **Complex networks dynamics fitting.** Employed mathematical models describing synchronization phenomena (**Kuramoto model**) to fit the motion state of a **Neural Mass Model (Jansen-Rit)**.

- Rewrote the original set of equations, expanding and applying the two models to **real human brain structures** (including 90 brain area nodes with coupling strength and physical distance (time delay)).

WORK EXPERIENCE

[03/2023 – 08/2023] **AI Engineer Intern**

HyperTunnel

City: London | **Country:** United Kingdom

-Developed and optimized swarm intelligence evolutionary algorithms, enhancing the efficiency of surveying robots for underground construction. Dynamic adaptive optimization of multi-objective functions.

-Implementation of AI-driven solutions for dynamic excavation tasks, improving geological detection and operational precision.

[10/2021 – 06/2022] **Mentee of EMBRACE Mentoring Program**

Microsoft

City: London/Remote | **Country:** United Kingdom

- Applying fairness ML algorithms to improve the feedback of products or advertisements among diverse populations.

- Explore users' preferences and habits with reinforcement learning, adjusting the product's features and interface, to achieve a better user experience.

PUBLICATIONS

[2024] **A dynamic fitting method for hybrid time-delayed and uncertain internally-coupled complex networks: from Kuramoto model to Neural Mass Model**

Reference: Jin, Z. (2024) 'A dynamic fitting method for hybrid time-delayed and uncertain internally-coupled complex networks: from Kuramoto model to Neural Mass Model', Complex Networks & Their Applications XII. pp. 27–38.

[2025] **Latent speech representations learned through self-supervised learning predict listeners' generalization of adaptation across talkers**

Reference: Jin, Z., Zhu, Y. and Jaeger, T.F. (2025) 'Latent speech representations learned through self-supervised learning predict listeners' generalization of adaptation across talkers', Cognitive Science 2025.

HONOURS AND AWARDS

[06/2023] **A*STAR International Scholarship Awarding institution:** A*STAR Research Singapore

[07/2022] **Spirit of Sussex Award Awarding institution:** University of Sussex

[07/2021] **Sussex Chancellor's Masters Scholarship Awarding institution:** University of Sussex

[06/2021] **Sussex Chancellor's International Scholarship Awarding institution:** University of Sussex

MISCELLANEOUS

Technical Skills

Python/Torch/Tensorflow, Matlab/Simulink, LaTeX, C/C++/C#, .Net/Unity3D, Raspberry Pi, Adobe XD, Html/Css/Javascript, Git/Docker/Bash/Shell, Java/SpringBoot.

Hobbies

Baking, Bartending, Tennis, Cello, Swimming.

Motivation Letter for VoCS Application

Dear VoCS Admission,

I am writing this letter to apply for the VoCS Doctoral Projects (DC16/DC17/DC19), particularly eager to delve deeper into the collaborative analysis of multimodal physiological data, including glottal impedance signals and vocal tract shape parameters. While researching cross-talker generalization at the HLP Lab at the University of Rochester, I observed a sharp contrast between the drastically increased error rates of traditional ASR systems in accented speech scenarios (WER > 35%) and the stable performance of the human auditory system (WER < 8%). This cognitive-machine performance gap is the core motivation driving my exploration of the deeper mechanisms of speech communication. As a researcher deeply engaged in the intersection of artificial intelligence and cognitive neuroscience, my aspiration is to develop more interpretable, human cognition-aligned AI systems by computationally modeling biological perceptual mechanisms, while also leveraging modern AI methods to inspire research in cognitive science—ultimately benefiting both fields. I believe that my academic background, extensive interdisciplinary research experience across international institutions, and industry internships make me an ideal candidate for this position.

I completed my MSc and BSc in Artificial Intelligence at the University of Sussex with Distinction and First-Class honors, respectively. This reflects my strong computational background, but I have also systematically studied advanced neuroscience courses (such as Computational Neuroscience and Brain and Behaviour) and participated in multimodal decision-making research on Drosophila larvae in the Alonso Lab, building a unique interdisciplinary knowledge framework. In a course project, I developed a spiking neural network model based on thalamocortical circuits to simulate human speech segregation ability in noisy environments, achieving an SI-SNRi of 10.7 dB on the LibriMix dataset. This experience gave me a profound appreciation of how computational principles in biological systems can drive innovation in engineering systems.

Recently, I have been collaborating with Prof. Florian Jaeger and Yuhao Zhu to investigate cross-talker accent generalization using computational models (Deep ASR). By applying word-level ASR feature similarity metrics, we simulated human accent generalization in cross-talker scenarios, and our findings have been accepted for publication at CogSci 2025. This research involves a deep integration of linguistics, cognitive science, deep learning, and signal processing, with a technical stack including Python, R, Praat, and a PyTorch-based adaptive front-end feature extraction framework. More importantly, this study highlights a key methodological paradigm in speech cognition research: using machine learning models as tools for validating cognitive theories (Model-as-Hypothesis), which closely aligns with the "Bidirectional Learning between Cognitive and Computational Models" advocated in the VoCS Doctoral Projects. Additionally, my research in complex system modeling (published at the Springer Complex Networks conference) constructed the first multi-scale coupled model of the

human brain, integrating anatomical connectivity and functional dynamics. Using multimodal MRI data from the HCP database of 89 adults (ages 22-35), we extracted structural connectivity matrices of 90 brain regions via DTI and determined fiber tract density (as coupling strength) and physical distances (converted into signal transmission delays ranging from 5-28 ms). These skills provide a valuable reference for my potential work in human brain data processing.

My research interests focus on understanding the underlying mechanisms of the human neural system (whether in the visual or auditory pathway) as a foundation for designing cognitively-informed AI systems. Recently, I have been studying Cross-Talker Generalization, and I believe that voice cognition mechanisms could potentially reflect human learning patterns, as voice serves as an efficient and uniquely human means of information transmission. Voice inherently carries multi-level acoustic information, such as phoneme-level, segment-level, and word-level features, along with other expressive characteristics like emotion and speaker state. How humans process and structure these multi-dimensional speech features is a promising research question. I hope to leverage the unique opportunity provided by the VoCS Doctoral Training Program to deepen my expertise, explore this research domain, and contribute targeted studies that advance the field. The VoCS program's interdisciplinary academic and industry-integrated training framework offers an ideal innovation ecosystem. This comprehensive experience, spanning fundamental research to real-world applications, will not only enhance my understanding of EU speech technology standards but also foster my ability to collaborate in cross-cultural research teams. I am confident that through systematic training in this program, I will grow into a versatile researcher with both experimental expertise and engineering implementation skills, making meaningful contributions to the field.

Sincerely,
Zhengyang Jin
Zhengyang_Jin@outlook.com

Contact of Referees

1. Prof. T. Florian Jaeger
Email: Fjaeger@ur.rochester.edu
Job Title: Professor, Brain and Cognitive Sciences and Computer Science.
Institution: University of Rochester
Website: https://www.hlp.rochester.edu/

2. Prof. Yuhao Zhu
Email: yzhu@rochester.edu
Job Title: Associate Professor in Computer Science and Brain and Cognitive Sciences
Institution: University of Rochester
Website: https://yuhaozhu.com/

3. Prof. Benjamin Evans
Email: B.D.Evans@sussex.ac.uk
Job Title: Assistant Professor in Computer Science & AI
Institution: University of Sussex
Website: https://profiles.sussex.ac.uk/p555479-benjamin-evans