

# Shuyue Jia (Bruce)

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## CONTACT INFORMATION

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## RESEARCH STATEMENT

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I am a Ph.D. candidate working on

- **Evidence-based Medicine**
- **Multimodal Foundation Models** for Medical and Clinical Applications
- **Retrieval-Augmented Generation (RAG), Tool Using, and Automate Workflows**
- **Visual and Language Multimodal Learning**
- **Generative AI**, *e.g.*, Diffusion Probabilistic Models
- **AI for Medicine, Healthcare, and Science**, *e.g.*, Medical Imaging with AI

My ultimate goal is to **develop safe, reliable, and extensible Artificial General Intelligence (AGI) systems** that can improve human lives. As part of my research, I actively develop open-source software, toolkits, and machine/deep learning libraries. I am also interested in creating new benchmark databases to further advance the field. Source codes of all my works will be shared on 🌐 GitHub, the trained models and datasets will be released on 🤗 Hugging Face, and some of my applied research on Vision and Language will be developed as 🛠️ **products**.

## ACADEMIC APPOINTMENTS

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**Boston University, MA, USA** **Research Assistant** May 2024 - Present

- Principal Investigator: Prof. Vijaya B. Kolachalama
- Projects: Evidence-based Medicine, Foundation Models, Generative AI, and Medical Imaging with AI

**City University of Hong Kong, Hong Kong** **Research Assistant** Sept 2021 - Apr 2023

- Principal Investigator: Prof. Shiqi Wang
- Projects: Image Quality Assessment (IQA) and Perceptual Optimization

## EDUCATION


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**Boston University, Boston, MA, USA** Sept 2023 - May 2028 (expected)

- Ph.D. Candidate in Computer Engineering, Department of Electrical and Computer Engineering
- Supervisor: Prof. Vijaya B. Kolachalama
- Expertise: Foundation Models, Generative Models, Vision and Language Multimodal Learning, Medical Imaging

**City University of Hong Kong, Hong Kong** May 2021 - June 2023

- M.Phil. in Computer Science, Department of Computer Science
- Supervisor: Prof. Shiqi Wang
- Expertise: Image Quality Assessment, Perceptual Optimization, and Deep Learning
- Thesis: No-reference Image Quality Assessment via Non-local Modeling

- B.Eng., Intelligence Science and Technology Major, School of Automation Engineering
- Supervisor: Prof. Yimin Hou and Prof. Jinglei Lv
- Thesis: Brain-computer Interface Signals Classification and Its Applications based on Deep Learning Methods
- Creator and Maintainer of  GitHub repo **EEG-DL** (**obtained 900+ stars and 200+ forks**), a Deep Learning library written by TensorFlow for EEG Tasks (Signals) Classification.

- Visiting Student, Department of Computer Science
- Selected coursework: Computer Systems and Architecture (A+), University Writing and Communication (PASS)

## PEER-REVIEWED PUBLICATIONS

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### Journal Publications

- MedPodGPT: A Multilingual Audio-augmented Large Language Model for Medical Research and Education  
**Shuyue Jia**, Subhrangshu Bit, Edward Searls, Lindsey Claus, Pengrui Fan, Varuna Jasodanand, Meagan Lauber, Divya Veerapaneni, William Wang, Rhoda Au, Vijaya B. Kolachalama \*  [Product]  [Paper]  [Codes]  
*The Journal of the American Medical Association (JAMA, IF in 2023: 63.1), Under Review*
- MedSyn: Text-guided Anatomy-aware Synthesis of High-Fidelity 3D CT Images  [Paper]  [Codes]  
Yanwu Xu, Li Sun, Wei Peng, **Shuyue Jia**, Katelyn Morrison, Shyam Visweswaran, Motahhare Eslami, Kayhan Batmanghelich \*  
*IEEE Transactions on Medical Imaging (IEEE T-MI, IF in 2024: 8.9)*
- GCNs-Net: A Graph Convolutional Neural Network Approach for Decoding Time-resolved EEG Motor Imagery Signals  [Paper]  [Codes]  [Slides]  [Survey]  
**Shuyue Jia**, Yimin Hou, Xiangmin Lun, Ziqian Hao, Yan Shi, Yang Li, Rui Zeng, Jinglei Lv \*  
*IEEE Transactions on Neural Networks and Learning Systems (IEEE T-NNLS)*  
*IF in 2022: 14.255, Top 0.1% most cited articles published in Engineering in 2022*  
 GitHub Repo obtained **900+ stars and 200+ forks**
- Deep Feature Mining via Attention-based BiLSTM-GCN for Human Motor Imagery Recognition  
**Shuyue Jia** \*, Yimin Hou, Xiangmin Lun, Shu Zhang, Tao Chen, Fang Wang, Jinglei Lv  [Paper]  [Codes]  [Slides]  
*Frontiers in Bioengineering and Biotechnology*  
*IF in 2021: 6.064, Top 1% most cited articles published in Engineering in 2022*
- A Novel Approach of Decoding EEG Four-Class Motor Imagery Tasks via Scout ESI and CNN  [Paper]  [Codes]  
Yimin Hou, Lu Zhou \*, **Shuyue Jia**, Xiangmin Lun  
*Journal of Neural Engineering*  
*IF in 2020: 5.379, Top 1% most cited articles published in Engineering in 2020*  
 GitHub Repo obtained **190+ stars and 40+ forks**
- PMU Measurements based Short-term Voltage Stability Assessment of Power Systems via Deep Transfer Learning  [Paper]  
Yang Li \*, Shitu Zhang, Yuanzheng Li, Jiting Cao, **Shuyue Jia**

- Learning from Mixed Datasets: A Monotonic Image Quality Assessment Model [📄 Paper] [🔗 Codes]  
Zhaopeng Feng, Keyang Zhang, **Shuyue Jia**, Baoliang Chen, Shiqi Wang \*  
*IET Electronics Letters*

***Top 10% most cited articles published in Engineering in 2023***

- Improving Performance: A Collaborative Strategy for the Multi-data Fusion of Electronic Nose and Hyperspectral to Track the Quality Difference of Rice [E Paper]  
Yan Shi, Hangcheng Yuan, Chenao Xiong, **Shuyue Jia**, Jingjing Liu, Hong Men \*  
*Sensors & Actuators: B. Chemical*

***IF in 2021: 9.221, Top 10% most cited articles published in Engineering***

## Conference and Workshop Publications

- No-reference Image Quality Assessment via Non-local Dependency Modeling [📄 Paper] [🔗 Codes] [📄 Slides] [📄 Poster]  
**Shuyue Jia**, Baoliang Chen, Dingquan Li, Shiqi Wang \*  
*IEEE 24<sup>th</sup> International Workshop on Multimedia Signal Processing (IEEE MMSP'22)* (**Poster Presentation**)

## Thesis

- No-reference Image Quality Assessment via Non-local Modeling [📄 Permanent Link] [📄 Defense Slides]  
**Shuyue Jia**  
M.Phil. Thesis, City University of Hong Kong, May 2023.
- Brain-computer Interface Signals Classification and Its Applications based on Deep Learning Methods  
**Outstanding Thesis Award** [📄 Related Publication] [📄 Defense Slides]  
**Shuyue Jia**  
B.Eng. Thesis, Northeast Electric Power University, May 2020.

## Note:

1. 📄 Google Scholar Profile
2. \* denotes the Corresponding Author

## INDUSTRY EXPERIENCE

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<b>Philips Research</b> , Shanghai	<b>Natural Language Processing Intern</b>	Jul - Oct 2020
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- Interned at the Precision Diagnosis & Image Guided Therapy (PD&IGT) Department.
- **Medical Concept Mapping**: three levels to map the query to a standard term → BPE and FMM & BMM algorithms for sub-words generation and matching (syntax-level), word vector cosine similarity (semantics-level), and knowledge graph (pragmatics-level).
- **Medical NER**: compared the performances of different models → CRF++, Character-level BiLSTM + CRF, Character-level BiLSTM + Word-level BiLSTM / CNNs + CRF, and deployed the models using Flask and Docker as web apps.
- **Dynamic Webs Crawling**: crawled 620k pages from the NSTL via Python threading and tricks to prevent anti-reptile.

## OPEN-SOURCE PROJECTS

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**Software** - PodGPT [📦 Product] [📄 Paper] [🔗 Codes]

- An online platform for deploying our latest multimodal foundation models for medical and clinical applications.

**Library** - MedPodGPT Library [📄 Paper] [🔗 Code]

- A library for benchmarking multilingual medical Large Language Models (LLMs)

**Library** - EEG Deep Learning Library (**900+ stars and 200+ forks**) [📄 Paper] [🔗 Code]

- A Deep Learning (DL) library written by TensorFlow for EEG tasks (signals) classification.

**Toolkit** - PromptCraft [🔗 Code] [PyPI Package]

- A prompt perturbation toolkit from the character, word, and sentence levels for prompt robustness analysis.

**Benchmark Dataset** - GSM8K-Consistency [Dataset (available on 🤗 Hugging Face)]

- A benchmark dataset for analyzing the consistency of Arithmetic Reasoning on GSM8K.

## AWARDS AND SERVICES

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### Fellowships and Scholarships

Doctoral Research Fellowship, Boston University, USA	2024 - 2028
Distinguished Computer Engineering Fellowship, Boston University, USA	2023 - 2024
Research Assistantship, City University of Hong Kong, Hong Kong	2021 - 2023
Innovation Scholarship, Northeast Electric Power University, China	2017 - 2019
Excellent Student Scholarship, Northeast Electric Power University, China	2016 - 2020

### Mathematics and Physics Competition Awards

2019 Interdisciplinary Contest In Modeling, USA	<i>Honorable Mention Award</i>	[📄 Thesis (English)]	Apr 2019
2018 Mathematical Contest In Modeling, China	<i>First Prize</i>	[📄 Thesis (Chinese)]	Aug 2018
The 32 <sup>nd</sup> Chinese Physics Olympiad (CPhO), China	<i>Third Prize</i>		Oct 2015
2015 National High School Math League, China	<i>Second Prize</i>		Sept 2015

### Academic Services

Speaker Program Chair, Keynotes and Panel Sessions, IEEE Local Conferences, Boston, USA	2024
Local Conference Committee Members, IEEE Boston Section, Boston, USA	2024

### Invited Reviewer

**More than 100 paper reviews**

IEEE Transactions on Multimedia (T-MM)  
IEEE Transactions on Circuits and Systems for Video Technology (T-CSVT)  
IEEE Transactions on Neural Networks and Learning Systems (T-NNLS)  
IEEE Transactions on Industrial Informatics (T-II)  
IEEE Journal of Biomedical and Health Informatics (JBHI)  
IEEE Open Journal of the Industrial Electronics Society (OJ-IES)  
IEEE Open Journal of the Computer Society (OJ-CS)  
IEEE MultiMedia (MM)  
IEEE Sensors Journal  
Journal of Medical Internet Research