

# Jiayu Zheng

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## EDUCATION

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### Brown University

*Sc.M. in Data Science*

Providence, RI

*Sep 2022 – Present*

- GPA 4.0
- Machine Learning, Deep Learning, Reinforcement Learning, Computer Visions, Operating Systems, Parallel Computing

### Zhengjiang University

*Sc.B. in Chemistry with Honors (Specialization in Computational Chemistry)*

Zhejiang, China

*Sep 2018 – May 2022*

- Ranking 2%
- Graduated from the Cho Kochen Honors College
- Certificate in **Computer Science**
- C&C++, Java, Mathematical Modeling, Digital Logic Design, Linux application, Advanced Data Structure and Algorithm Analysis

## PUBLICATIONS

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A Molecular Stereostructure Descriptor Based On Spherical Projection

2020

- Licheng Xu, Xin Li, Miaojiang Tang, Luotian Yuan, **Jiayu Zheng**, Shuoqing Zhang, Xin Hong

## EXPERIENCE

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### Teaching Assistant

CS1410: Artificial Intelligence, *Brown University*

Providence, RI

*Sep 2023 – Dec 2023*

- Instructor: Thao Nguyen, Stefanie Tellex
- Mentoring three student groups for their final projects, holding debugging hours twice per week, answering miscellaneous questions on Ed, and grading assignments

### Graduate Research Assistant

BATS Lab, *Brown University*

Providence, RI

*Sep 2023 – Present*

- Advised by Prof. Stephen Bach
- Building soft-prompted weak supervision systems
- Improving the performance of LLMs on out-of-domain datasets with parameter-efficient soft prompting

### Graduate Research Assistant

Conversational AI Lab, *Brown University*

Providence, RI

*Jun 2023 – Present*

- Coadvised by Prof. Shekhar Pradhan and Prof. Ritambara Singh
- Training semantically rich embeddings in language models from images supervision
- Designed relation-aware contrastive loss, which effectively encourages models to discriminate between relations in text

### Undergraduate Research Assistant

*Zhejiang University*

Zhejiang, China

*Apr 2020 – Jul 2021*

- Most work focused on finding appropriate representations of molecules that allow for efficient and precise prediction of properties
- Designed a numeric descriptor that transforms, using spherical projection, the spatial, continuous van der Waals surface to a sequence of 2D matrices, on which CNNs can be applied
- Conducted a thorough ablation study on the accuracy gain brought by different modifications on GNNs in predicting molecular energy

### Head Teaching Assistant

Structural Chemistry and Spectroscopy, *Zhejiang University*

Zhejiang, China

*Feb 2020 – Dec 2021*

- Prepared course materials, designed assignments, and hosted group presentations

## PROJECTS

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### **GourmAIIt** | *Python, PyTorch, C++*

Jul 2023 – Sep 2023

- Implemented the Noisy Student Training, where pseudo labels generated by a teacher model are used to train a larger-or-equal-size student model, which will be used as the teacher model in the next iteration
- Implemented stochastic depth, stepwise unfreezing scheduling, and learning rate scheduling to maximize the performance gain in finetuning ResNet

### **WeenixOS** | *C, Unix kernel, X86\_64 arch*

Feb 2023 – May 2023

- Semester-long project of Operating Systems instructed by Prof. Thomas Doeppner
- Developed a well-functioning kernel-based Unix operating system, the Weenix, written in C
- Implemented a thread pool, a device driver, a VFS, an S5FS, and a virtual memory system
- Implemented system calls, e.g. `do_waitpid`, `do_read`, `do_write`, `do_brk`, `do_fork`, etc.

### **TransformerHub** | *Python, PyTorch*

Sep 2022 – Aug 2023

- Implemented encoder-only, decoder-only, and encoder-decoder Transformer models like Transformer, BERT, GPT, ViT, and CLIP
- Incorporated advanced designs like mixed precision training, rotary position embedding
- Evaluated these models on different tasks, including text summarization, language modeling, and sentiment analysis

## LEADERSHIP AND SOCIAL ENGAGEMENT

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### **Mentor in Data101 bootcamp**

Providence, RI

*Brown University*

*Apr 2023*

- Introduced fundamental concepts of data science to a group of underrepresented high school students in the College-Day data science bootcamp

### **Mentor in WiDS at Brown**

Providence, RI

*Brown University*

*Feb 2023 – Mar 2023*

- Provided tutoring to prospective young women data scientists
- Rendered hands-on guidance of numpy and pandas, and demonstrated a classification task on a time-series weather dataset

## HONORS AND AWARDS

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Outstanding Graduates

2022

Cho Kochen Honors Chollege Scholarship for Innovation

2020, 2021

Outstanding Students

2019, 2021

Zhejiang University Scholarship, First Prize

2019, 2021

## TECHNICAL SKILLS

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**Programming:** Python, C/C++, CUDA C++, Java, SQL (MySQL), Latex

**ML Frameworks:** Tensorflow, PyTorch, Huggingface, LibTorch, Scikit-learn

**Development Tools:** Venv, Conda, Mamba, Docker, Git, ssh, spaCy, Jupyter, CMake, SLURM, Google Cloud Platform, gdb, Hydra, wandb

**Deep Learning Systems:** DeepSpeed(ZeRO), Accelerate, Flexgen, MegatronLM

**LLMs/VLMs:** GPT2/3/4, Claude, OPT, T0++, Llama1/2, Falcon, T5, Flan-T5, Mistral, CLIP