# ZIQI WEN

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## EDUCATION

**Carnegie Mellon University - School of Computer Science**, *Pittsburgh, PA*
Master of Computational Data Science | **GPA:** 3.87/4.0 *Aug. 2022 - May 2024*
*Selected Coursework: Cloud Computing, Distribute System, Large Language Models, Deep Learning System*

**Zhejiang University** *Hangzhou, China*
Bachelor of Engineering in Computer Science and Technology | **GPA:** 3.88/4.0 *Aug. 2018 - Jun. 2022*
Minor in Psychology | **Minor GPA:** 4.0/4.0

**Imperial College London** *Remote*
Data Science Online Summer School *Jul. 2020 - Aug. 2020*

## RESEARCH EXPERIENCE

**Center for the Neural Basis of Cognition & Computer Science Department, Carnegie Mellon University**
***Shape and texture bias in computer vision models and their benefits*** *Feb. 2023 - Present*
Supervisor: Prof.Tai Sing Lee

· **Emergence of Shape Bias in Convolutional Neural Networks through Activation Sparsity**

- Enforcing the sparse coding constraint using a non-differential Top-K operation can lead to the emergence of structural encoding in neurons in convolutional neural networks.
- The emergence of shape bias benefits for different network structures with various datasets on different tasks. (e.g. object recognition, image synthesis)
- Accepted as **NeurIPS 2023(oral)** (top 2%)

· **Does resistance to style-transfer equal Shape Bias? Evaluating shape bias by distorted shape**

- Show that stylized trained neural network still focus on local feature rather than global shape.
- Provide Distorted Shape Testbench as an alternative measurement of global shape sensitivity, evaluate both human and multiple deep learning models, challenge the conclusions from style transfer-based evaluation.

**Human-Computer Interaction Institute, Carnegie Mellon University**
***Understanding the emergence of online interpersonal conflict*** *Apr. 2023 - Present*
Supervisor: Prof. Robert E. Kraut & Prof. John M. Levine

· Analysis how task conflict is escalated into interpersonal conflict by the behavior of the new users in the conversation of Wikipedia talk page, and how it is deescalated by the behavior of the new users.

**State Key Laboratory of CAD & CG, Zhejiang University**
***Efficient Neighbor Gathering Methods for Large-scale Point Clouds*** *Apr. 2021 - Nov. 2021*
Supervisor: Prof. Zhaopeng Cui

· Searched for efficient architecture for Dynamic Graph CNN using One-Shot Neural Architecture Search to achieve better and faster performance on tasks such as point cloud segmentation and classification on large-scale data sets (e.g. S3DIS).
· Using Fixed Radius Nearest Neighbors (FRNN) to replace KNN, which speeds up the baseline 4 times and reduces memory cost by 34% with similar accuracy.

**Student Research Training Program, Zhejiang University**
***Visualization Tools for Biological Neuron Models on the Web*** *Apr. 2020 - May 2021*
Supervisor: Prof. Nenggan Zheng

· Implemented the visualization of the SWC neuron model with three different neuron visualization methods based on different shader algorithms using WebGL and three.js.

## PUBLICATIONS

**Ziqi Wen**, Tianqin Li, Tai Sing Lee. *Does resistance to style-transfer equal Shape Bias? Evaluating shape bias by distorted shape.* Submitted to ICLR 2024. Under review.

Tianqin Li, **Ziqi Wen**, Yangfan Li, Tai Sing Lee. *Emergence of Shape Bias in Convolutional Neural Networks through Activation Sparsity.* **NeurIPS 2023(Oral)**.

Xujie Shen, **Ziqi Wen**, Yawei Li, Ligeng Zhu, Hujun Bao, Zhaopeng Cui. *Efficient Neighbor Gathering for Point Cloud Processing.* Submitted to 3D Vision (3DV 2024). Under review.

## ACADEMIC PROJECTS

**Twitter Analytics Web Service (Java)** *Carnegie Mellon University | Spring 2023*

- Design, build, and deploy a performant, reliable, scalable and fault-tolerant cloud native web service that uses the microservice model and the REST interface to respond to queries that require running an analytics job on a large (1.2TB) Twitter data set within a limited budget.
- Use Vert.X as application framework, deploy on AWS, use Aurora Mysql as the database engine, reach over 18000 RPS within 1.2$ per hour budget.

**Distributed Bitcoin Miner (Go)** *Carnegie Mellon University | Fall 2022*

- Implement a self-defined protocol for providing reliable communication with simple client and server APIs on top of the Internet UDP protocol, which is reliable and ensure integrity, named Live Sequence Protocol (LSP).
- Implement a simple distributed bitcoin miner based on LSP, consisted of server, client and miner.

**AFSK KISS Modem (C++)** *Zhejiang University | Fall 2020*

- Bulit a KISS modem following AFSK protocol using STM32f051 and STM32f407 microcomputer.
- Applied the Fast Fourier Transform (FFT) algorithm to demodulate.

**Simple Pascal Compiler (C++)** *Zhejiang University | Spring 2021*

- A compiler which implement all the function of Pascal except Object and Union.
- It is well-functional to compile another compiler written by Pascal.

**MiniSQL (C#)** *Zhejiang University | Spring 2021*

- Implemented a standalone and functioning database management system from scratch that supports a subset of SQL with B+ Tree indexes from scratch.

**3D Graphics Engine (C++)** *Zhejiang University | Fall 2020*

- Developed an OpenGL-based 3D graphics engine, which supports model import, real-time lighting and shadows, NURBS surface and L-tree system.

## SKILLS

**Programming Language:** C, Python, Go, C++, C#, Java, Matlab
**Cloud Computing Service:** Amazon Web Services (AWS), Microsoft Azure
**Microservices Development:** Docker, Kubernetes
**Embedded System Development:** STM32 microcomputer, Raspberry pie
**Distributed Programming Framework:** Kafka, Samza, Spark
**Database engine:** Mysql, HBase, Neo4J, MongoDB