ZONGYU GUO

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Full of curiosity at the age of 24
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EDUCATION

Visiting Student | **Computational and Biological Learning Lab** — Oct. 2022 – Sept. 2023
University of Cambridge — Cambridge, UK

Ph.D. | **Information and Communication Engineering** — Sept. 2019 – June 2024
University of Science and Technology of China (USTC) — Hefei, China

Bachelor | **Electronic Engineering and Information Science** — Sept. 2015 – June 2019
University of Science and Technology of China (USTC) — Hefei, China

IMPORTANT EXPERIENCE

- I'm a PhD candidate at the University of Science and Technology of China (USTC) advised by Prof. Zhibo Chen <**homepage**>/<**scholar**>. I am expected to receive my PhD degree in June, 2024.
- I am now visiting the computational and biological learning (CBL) group at the University of Cambridge, advised by Prof. José Miguel Hernández-Lobato <**homepage**>/<**scholar**>, funded by the outstanding PhD program in USTC. I started remote collaboration with Miguel from Oct. 2022 to Feb. 2023 and I am now having an in-person visit from Mar. 2023 to Sept. 2023.
- I had an internship in Microsoft Research Asia (MSRA) in the intelligent multimedia (IM) group, working together with mentor Cuiling Lan <**scholar**>, from Dec. 2021 to Dec. 2022.

RESEARCH

As a researcher in machine learning, I am focused on developing effective and practical methods for neural data compression, a topic that is closely related to probabilistic generative models and Bayesian inference. My interest spans multiple areas, including implicit neural representations, Bayesian neural networks, and various probabilistic generative models such as variational autoencoders and diffusion models.

My research faith: The target of data compression is essentially to explore the inherent data relationship, and then use code or discover laws to represent them. Obviously, new compression methods have great potential for data transmission and storage, in handling increasing data sizes and future data formats.

Beyond that, my ultimate goal is **compression for artificial general intelligence (AGI)**. In fact, the popular large language model GPT-4 is the state-of-the-art lossless text compressor, since it uncovers the inherent relationships in human-created language data through in-context learning of the minimum description codelength. If you share the same interests with me, I recommend watching this talk <**website**>.

Based on my background, I am actively looking for a position in machine learning research, not limited to the topics of neural data compression, model compression especially for large language models, probabilistic generative models, or AI for science that probabilistic methods can be effectively used.

SELECTED PUBLICATIONS

Full paper list can be found in my google scholar page <**scholar**>. Over 380 citations (May, 2023).

Conferences:

- **Zongyu Guo**, Cuiling Lan, Zhizheng Zhang, Yan Lu, Zhibo Chen*. "Versatile Neural Process for Learning Implicit Neural Representation". In *Proceedings of the 11th International Conference on Representation Learning*, 2021. (**ICLR 2023**).

- Runsen Feng, **Zongyu Guo**, Weiping Li, Zhibo Chen*. "NVTC: Nonlinear Vector Transform Coding". In *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition*, 2023. (**CVPR 2023**).
- **Zongyu Guo**, Zhizheng Zhang, Runsen Feng, Zhibo Chen*. "Soft then Hard: Rethinking the Quantization in Neural Image Compression". In *Proceedings of the 38th International Conference on Machine Learning*, 2021. (**ICML 2021**).
- **Zongyu Guo**#, Yaojun Wu#, Runsen Feng, Zhizheng Zhang, Zhibo Chen*. "3-D Context Entropy Model for Improved Practical Image Compression". In *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition Workshops*, 2020. (**CVPR Workshop 2020**).
- **Zongyu Guo**, Zhibo Chen*, Tao Yu, Jiale Chen, Sen Liu. "Progressive Image Inpainting with Full-Resolution Residual Network". In *Proceedings of the 27th ACM International Conference on Multimedia*. (**ACM MM 2019**). **Oral** paper with 15 minutes in-person presentation.

Journals:

- **Zongyu Guo**, Zhizheng Zhang, Runsen Feng, Zhibo Chen*. "Causal Contextual Prediction for Learned Image Compression". *IEEE Transactions on Circuits and Systems for Video Technology*. (**TCSVT**).
- **Zongyu Guo**#, Runsen Feng#, Zhizheng Zhang, Xin Jin, Zhibo Chen*. "Learning Cross-Scale Weighted Prediction for Efficient Neural Video Compression". Under reviewed in *IEEE Transactions on Image Processing* (**TIP**), with a minor-revision decision given by AC.

I am also excited to have a great work submitted to NeurIPS 2023, a project that I collaborate together with Gergely Flamich, a PhD student in Cambridge and also my great friend.

- **Zongyu Guo**#, Gergely Flamich#, Jiajun He, Zhibo Chen, José Miguel Hernández-Lobato. "Compression with Bayesian Implicit Neural Representations". Submitted to **NeurIPS 2023**.

Honors and Awards

Outstanding PhD funding program Autumn, 2022
Only seven students were granted for international visiting in 2023, selected from the whole USTC.

National Scholarship Autumn 2021, 2020
The top honor in USTC for graduate students (<3%).
Among my peers, I am the only student achieving this honor in two consecutive years.

Outstanding Undergraduate Student Spring 2019
For undergraduate students (< 10%) in USTC.

Excellent Student Scholarship Silver Prize Autumn 2018
For undergraduate students (< 15%) in USTC.

More Experience

Internship in Microsoft Research Asia (MSRA). Dec. 2021 – Nov. 2022
Intelligent Multimedia Group. Beijing, China

Internship in JD AI Lab. Dec. 2018 – Apr. 2019
Multimedia Group. Beijing, China

Seminar in Far Eastern Federal University (FEFU) June 2017 – July 2017
Seminar for young student leaders from pacific-rim universities. Vladivostok, Russia

Service

Serve as a reviewer for journals including TIP, TNNLS, TCSVT, Neurocomputing.
Serve as a reviewer for conferences including NeurIPS, AAAI, VCIP etc.
Work as a teaching assistant (TA) for the Elements of Video Technology (2021 Graduate Student Course).