**Qinghua Zhou** **Last update: Oct 14, 2024**

Contact Information

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## Intro

**About me:**

- I am a researcher working in the fields of machine learning and artificial intelligence. My research interests lie in exploring pathways towards robust, stable and trustworthy AI systems. This includes the development of high-performance software and efficient scaling of large-scale simulations. My most current work is on the principled theoretical and computational analysis of modern computer vision and large language models, their structures, functions, optimization, and methods to edit or attack them.

## Research Background

- Robust, resilient, certifiable and trustworthy AI systems
- Learning from high dimensional low-sample size data in medical applications

## Academics

**King's College London**, UK 2022–2025

- Postdoctoral Research Associate in Methods and Algorithms of Artificial Intelligence.
- Right to work in UK with Global Talent Visa
- Supervisor: Prof. Ivan Tyukin

**University of Leicester**, UK 2019–2023

- Ph.D. Computer Science Research.
- Graduate Teaching Assistant studentship
- Supervisors: Prof. Yudong Zhang and Prof. Ivan Tyukin

**University of Sydney**, Australia. 2016–2018

- B.Sc., Science (Advanced Mathematics)
- Majors in both Physics and Applied Mathematics

## Experience

- **Industry Collaboration with TG-0** 2024
  Department of Mathematics, King's College London, and TG-0
  - Development of reservoir computing algorithms
  - Development of low-cost and efficient algorithmic alternatives for specialised hardware
- **Graduate Teaching Assistant** 2019–2021
  School of Computing and Mathematical Sciences, University of Leicester.
  - Assistance in teaching undergraduate to Masters modules.
  - Student assessment and administration.
  - Delivering tutorial sessions in lecture format.
- **Research Assistant Coordinator** 2019–2020
  In cooperation for Department of Cardiovascular Sciences, University of Leicester.
  - Processing gene expression data from the GEO database.
  - Development of machine learning approach for knowledge discovery.
  - Coordinate a small group of research assistants in the same project.
- **ICTMEL 2020-2021 Conference Publicity and Social Media Chair** 2020–2021
  Manage advertisement and publicity of the 2020-2021 EAI ICTMEL Conferences.

## References

Available upon request.

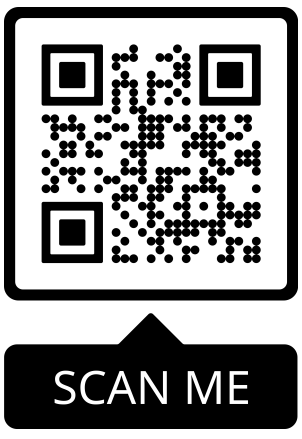
## Selected Publications

- Sutton, O.J.*, **Zhou, Q.***, Wang, W., Higham , D.J., Gorban, A.N., Bastounis, A., Tyukin, I.Y. 2024. Stealth edits for provably fixing or attacking large language models. NeurIPS 2024: `https://arxiv.org/abs/2406.12670v1`. Live demo: huggingface-spaces/stealth-edits. + SIAM News Article coming soon!
- Sutton, O.J., **Zhou, Q.**, Tyukin, I.Y., Gorban, A.N., Bastounis, A. and Higham, D.J., 2024. How adversarial attacks can disrupt seemingly stable accurate classifiers. *Neural Networks*, 106711.
- **Zhou, Q.**, Sutton, O., Zhang, Y.D., Makarov, V.A., Gorban, A.N., Tyukin, I.Y., 2023. Neuromorphic tuning of feature spaces to overcome the challenge of low-Sample high-dimensional data. In proceedings with oral presentation in *International Joint Conference on Neural Networks*.
- **Zhou, Q.**, Wang, S., Zhu, H., Zhang, X., & Zhang, Y. (2023). Multiple-instance ensemble for construction of deep heterogeneous committees for high-dimensional low-sample-size data. *Neural Networks*, 167, 380-399.
- **Zhou, Q.**, Gorban, A.N., Mirkes, E.M., Bac, J., Zinonyev, A., Tyukin, I.Y., 2022. Quasi-orthogonality and intrinsic dimensions as measures of learning and generalisation. In proceedings with oral presentation in *International Joint Conference on Neural Networks*
- **Zhou, Q.**, Wang, S., Zhang, X., Zhang Y.D., 2021. WVALE: Weak Variational Autoencoder for Localisation and Enhancement of COVID-19 Lung Infections. *Computer Methods and Programs in Biomedicine*, p.106883. + Physicsworld front page recommendation.
- **Zhou, Q.**, Zhang, X. and Zhang, Y.D., 2021. Ensemble learning with attention-based multiple instance pooling for classification of SPT. *IEEE Transactions on Circuits and Systems II*.
- Tyukin, I.T., Gorban, A.N., Alkhudaydi, M.H., and **Zhou, Q.**, 2021. Demystification of Few-shot and One-shot Learning. *International Joint Conference on Neural Networks*, pp. 1-7.
- **Zhou, Q.**, Mirkes, EM., Zhang, Y., Tyukin, I., Gorban, AN., Yu, X., Wang S., Charlton M., Coats, T., Sims MR., Thompson, JP. 2020, Machine learning technique for severity classification in sepsis patients. *Intensive Care Medicine Experimental 2020*, 8(Suppl 2):73 ID 000473.
- More publications on Google Scholar Page

## Other Works

- **Zhou, Q.**, Sutton, O., Gorban, A.N., Mirkes, E.M., Bac, J., Zinonyev, A., Tyukin, I.Y., 2024. Towards more principled understanding of neural architectural search (work in process)
- **SlideRule** - an interactive interface for natural language model assisted theorem prover
- **ConceptCells-TF** - Tensorflow accelerated version of neuromorphic Concept Cells

## QR Code




*Equal contributions