Chunyang Zhang

Ph.D. Candidate · School of Engineering and Information Technology · University of New South Wales
20/11 Castan Street, Coombs, ACT 2611, Australia
(+86) 188-1060-3233 | bitzhangcy@gmail.com | https://bitzhangcy.github.io/ | https://github.com/bitzhangcy

Education

University of New South Wales *Canberra, Australia*
Doctor of Philosophy (Ph.D.) *2024.01 - Ongoing*

- Major Concentration - Computer Science
- Supervisor - Prof. Dr. Daoyi Dong
  - Professor of ANU College of Engineering, Computing and Cybernetics
  - Fellow of the IEEE and Future Fellow of the Australian Research Council
- Supervisor - Dr. Huadong Mo
  - Senior Lecturer of School of Engineering and Information Technology

Beihang University *Beijing, China*
Master of Engineering (M.E.) *2020.09 - 2023.06*

- Major Concentration - Control Science and Engineering
- Supervisor - Prof. Dr. Qing Gao
  - Professor of School of Automation Science and Electrical Engineering
  - Chief Scientist of Key R&D Plan of Ministry of Science and Technology
- Supervisor - Prof. Dr. Jinhu Lü
  - Vice President of Beihang University
  - Dean and Professor of School of Automation Science and Electrical Engineering
  - Fellow of the IEEE/CAA/ORSC/CICC
- GPA - 3.59/4.0
- Rank - 10/128

Beijing Institute of Technology *Beijing, China*
Bachelor of Science (B.S.) *2016.09 - 2020.07*

- Major - Mechatronics Engineering
- Supervisors - Prof. Dr. Derong Chen and Prof. Dr. Yuxin Xu
- GPA - 3.51/4.0
- Rank - 3/30

Personal Statement

Over the past several years, my main focus has been on intelligent control theory in nonlinear systems, deep learning-based anomaly detection for various sensory data, and distributed optimization for robust operation. Currently, I am pursuing a fully-funded Ph.D. at the University of New South Wales. Along my academic journey, I have made contributions to the field, including authoring six journal papers and presenting four conference papers.

Research Interests

[1] Deep Learning with Its Application to Anomaly Detection
[2] Safe Reinforcement Learning and Distributed Optimization
[3] Intelligent Control Theory

Research Experiences

University of New South Wales *Canberra, Australia*
Ph.D. Research *2022.08 - Ongoing*

- **Deep Learning for Anomaly Detection [Ongoing Project]**
  - Deep learning for anomaly detection: A survey
  - Encoder-decoder-based Transformer and Masked autoendoer
  - Knowledge distillation and ensemble learning
  - Generative probabilistic diffusion model
  - Multi-scale message passing graph neural network

Beihang University *Beijing, China*
Graduate Research *2022.01 - Ongoing*

- **Safe Reinforcement Learning and Optimal Control [Ongoing Project]**
  - Model-based and policy-based learning algorithm
  - Constrained Markov decision process with long-term safety and theoretical convergence
  - Bi-level partial differential equations constrained optimization

Beihang University *Beijing, China*

Graduate Research *2022.01 - 2023.06*

- **Deep Learning for Partial Differential Equations**
  - Deep learning for partial differential equations: A survey
  - Neural operator learning
  - Message passing graph neural networks
  - Inverse design and system identification

Beihang University and Beijing Institute of Technology *Beijing, China*

Graduate Research and Undergraduate Thesis *2019.08 - 2021.12*

- **Robust Control Approach of Stochastic Partial Differential Systems**
  - Robust parallel controller design and Stability analysis
- **Universal Integral Sliding-Mode Control of General Nonlinear ODE Systems**
  - Robust control design via piecewise affine linear models and Universal controller problem

Selected Publications [10]

Journal Articles (Published) [3]

1. **Chunyang Zhang**, Qing Gao, Michael V. Basin, et al. "Robust control of multi-line re-entrant manufacturing plants via stochastic continuum models", *Early Access in IEEE Transactions on Automation Science and Engineering*, 2023, DOI: 10.1109/TASE.2023.3305308, LINK: https://ieeexplore.ieee.org/document/10227338.
2. **Chunyang Zhang**, Dianjun Gong, Qing Gao, et al. "A fuzzy integral sliding-mode parallel control approach for nonlinear descriptor systems", *Information Science*, 2022, 615: 491 - 503, DOI: https://doi.org/10.1016/j.ins.2022.10.035.
3. **Chunyang Zhang**, Qing Gao, Jinhu Lü, et al. "An integral sliding-mode parallel control approach for general nonlinear systems via piecewise affine linear models", *International Journal of Robust and Nonlinear Control*, 2023, 33(8): 4438 - 4458, DOI: https://doi.org/10.1002/rnc.6617.

Conference Papers (Published) [4]

4. **Chunyang Zhang**, Qing Gao, Kexin Liu, et al. "Dynamic sliding-mode control for piecewise affine systems", *in Proceedings of the Chinese Automation Congress, IEEE*, 2020: 5196 - 5201.
5. **Chunyang Zhang**, Qing Gao, Peng Zhang, et al. "Integral sliding-mode control of piecewise linear systems", *in Proceedings of the 39th Chinese Control Conference, IEEE*, 2020: 416 - 421.
6. Wangbo Gao, **Chunyang Zhang**, Qing Gao, et al. "A dynamic robust control approach of hyperbolic nonlinear PDE systems", *in Proceedings of the 41st Chinese Control Conference, IEEE*, 2022: 2478 - 2483.
7. Jingyi Li, **Chunyang Zhang**, and Qing Gao. "Fuzzy integral sliding-mode parallel tracking control approach for a class of nonlinear systems", *in Proceedings of the 42nd Chinese Control Conference, IEEE*, 2023: 2536 - 2541.

Chinese Patents (Issued) [3]

8. Qing Gao, **Chunyang Zhang**, Jinhu Lü, and Kexin Liu, "Integral sliding-mode control method, device and equipment for control system", *Patent for An Invention*, 2020-07-02, Patent Number: ZL 2020 1 0634111.3.
9. Qing Gao, **Chunyang Zhang**, and Jinhu Lü, " Fuzzy dynamic integral sliding-mode control strategy for re-entrant industrial manufacturing systems", *Patent for An Invention*, 2022-04-12, Patent Number: ZL 2022 1 0024338.5.
10. Jinhu Lü, Qing Gao, and **Chunyang Zhang**, "A hierarchical control methodology for re-entrant manufacturing systems", *Patent for An Invention*, 2022-10-22, Patent Number: ZL 2022 1 1015438.8.

Technical Skills

Programming	Python, C++, C, MatLab, LaTeX, Pycharm, Clion
Platform & IoT Hardware	Pytorch, JAX, Tensorflow, Ubuntu, Shell, ROS

Honors & Awards

2023.09 - 2027.01	**University International Postgraduate Award**, University of New South Wales	*Canberra, Australia*
2023.06	**Outstanding Thesis Award**, Beihang University	*Beijing, China*
2023.06	**Excellent Master Graduate**, Beihang University	*Beijing, China*
2020.09 - 2023.06	**First Class Graduate Fellowship**, Beihang University	*Beijing, China*
2017.09 - 2019.06	**National Encouragement Scholarship**, Beijing Institute of Technology	*Beijing, China*
2018.12	**Champion of Formula Student Autonomous China**, Beijing Institute of Technology	*Guangdong, China*
2016.08 - 2020.07	**First Class Undergraduate Fellowship**, Beijing Institute of Technology	*Beijing, China*

Declaration

The above statements are true to the best of my knowledge and belief

Place: Beijing, China

Date: January 15, 2024

Yours Faithfully

(Chunyang Zhang)