Yuanfang XIANG

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EDUCATION

Bachelor of Engineering in Artificial Intelligence 09/2022-06/2026 (Expected)

■ **Nanjing University,** Nanjing, China

- Relevant Coursework:
  Mathematical Analysis (94/100), Advanced Algebra (91/100), Discrete Mathematics (91/100), Mathematical Logics (92/100). Machine Learning (91/100), Advanced Machine Learning (100/100), Knowledge Representations and Processing (95/100).
- GPA: 90.4/100 (Top 15%)
- Thesis: *On Inconsistency Rectifying in Biological Knowledgebases based on Abductive Learning* (In progress)

■ **University of California, Berkeley,** USA **(Exchange Programme)** 06/2023-08/2023

- Coursework: Data Structures (A), Functional Neuroscience (A+)

PUBLICATION

- **Yuanfang Xiang**, Lun Ai, Adaptive Data-Knowledge Alignment in Genetic Perturbation Prediction, In *International Conference on Learning Representations*, 2026 (Under Review, Preprint: arxiv.org/abs/2510.00512)
- Feng Pan, Haibo Li, Jinwei You, Jiao Cang, Yanchufei Zhang, **Yuanfang Xiang**, Chenchen Yu, Lianjun Pan, Qipeng Zhang, Regulation of Endothelin Receptor Expression by MicroRNAs in the Corpus Cavernosum of Type 2 Diabetes Mellitus-Induced Erectile Dysfunction, *Biochemical Pharmacology*, 2025 (DOI: 10.1016/j.bcp.2025.117397)
- Jing Zhao, Jingjing Liu, Nuo Zhang, Jing Wang, Lingfeng Qin, **Yuanfang Xiang,** Jiao Zhang, Qingwei Meng, Xiuxiu Wang, Wei Wei, Polyphosphate-driven metabolic network dynamically regulates bioelectricity generation in electroactive microorganism Shewanella, *Trends in Biotechnology*, 2025 (Under review)

RESEARCH EXPERIENCE

Research on Neuro-Symbolic Integration in Genetic Perturbation Modelling 10/2024- Present

■ Major Research Participant, Prof. Julio Saez-Rodriguez's Group, EMBL-EBI

- **Objective:**

To enable human-comprehensible and self-refined understandings in genome-scale systems biology modellings.

- **Main work:**

1. Constructed a microbial genome-scale perturbation model with Abductive Learning (a Neuro-Symbolic framework) for predicting genome-scale response to genetic perturbations.
2. Integrated Transcriptional Regulatory Networks (TRNs) and Genome-scale Metabolic Networks (GEMs) as knowledge bases for explainability and structured priors.
3. Developed neuro-symbolic fusion mechanisms with knowledge refinement strategies to address knowledge-data inconsistencies in real-world applications.
4. Contributed to an ICLR 2026 paper on neuro-symbolic methods for genetic perturbation prediction.

Research on Applications of Abductive Learning 04/2024- Present

■ Research Participant, LAMDA (Learning And Mining from DatA) Group, Nanjing University

- **Supervisor:** Prof. Zhi-Hua Zhou
- **Objective:**

To apply Abductive Learning (ABL) to integrate knowledge-driven and data-driven AI in biological discovery.

- **Main work:**

1. Conducted literature research on theories and algorithms of neuro-symbolic approaches and their biological applications.
2. Developed an ABL-based system integrating external knowledge bases with gene expression prediction methods.
3. Analyzed general and theoretical advances in machine learning (online learning, rehearsal learning, reinforcement learning, learn wares, etc.).
4. Built foundations for my bachelor thesis *On Inconsistency Rectifying in Biological Knowledgebases based on Abductive Learning*.

Research on Transcriptomic Data Mining for Neuroscience 10/2023- 01/2025

■ Research Participant, Prof. Qi-Peng Zhang's Lab, Nanjing University

● **Objective:**

To investigate neural regulations on instinctive behaviors focusing on micro-RNA-mediated leptin regulations and neural regulation of addictive behaviors.

● **Main work:**

1. Performed transcriptomic data alignment, enrichment analysis and ontology annotation.
2. Analyzed miRNA sequencing data related to leptin regulations.
3. Conducted literature review and theoretical and computational research on neural mechanisms of addictive behaviors.
4. Contributed to a Biochemical Pharmacology paper on microRNA regulation in diabetes-induced erectile dysfunction.

COURSE PROJECT

***NEMU* RISC-V Emulator Project** (Introduction to Computer Systems) 08/2023- 12/2023

- Developed a full-system RISC-V emulator on x86 architecture using C, including:
  - Built a virtual machine emulating RISC-V instructions and hardware behaviors.
  - Implemented peripheral devices (I/O mapping, keyboard, VGA, audio, etc.).
  - Designed an operating system with system calls, time piece-sharing, virtual memory, file systems, etc.
- Achieved compatibility with modern games through system integration.
- Approximately 20,000 lines of code total; personally contributed ~7,000 lines.

Deep Neural-network based Image Super-Resolution (Python Programming) 05/2023- 06/2023

- Constructed an Image Super-Resolution model based on convolution neural-networks (CNN) and Generative Adversarial Networks (GAN).

COMPETITION

The Collegiate Computing Competition of China 03/2025–08/2025

■Second Prize, Team Leader

- Created genetic perturbation prediction models using abductive learning and genome-scale modeling.

AI+ Innovation Competition, Nanjing University 06/2024–11/2024

■First Prize (Ranked1st), Team Leader

- Developed an abductive learning and biological ontology-based AI method in gene expression and regulation prediction, and a synthetic biology research workflow for constructing regulation pathways based on the AI method.

iGEM (International Genetic Engineered Machine) Competition 11/2023–10/2024

■Gold Medal & Nominated Track Best Prize, Dry Lab Team Leader

- Developed AI models to predict regulatory and metabolic mechanisms of polyphosphate metabolism in electroactive microbes.

HONORS

- **People's scholarship**, Nanjing University (2023, 2024, 2025)

EXTRACURRICULAR ACTIVITIES

- Volunteer, Nanjing University Freshman Recruitment (2023-2024)

SKILLS

■ **Languages**: Chinese (Native) • English (fluent, TOEFL: 107)

■ **Computer skills**: Proficient in Python and C (capable of independently developing systems with 5,000+ lines of code)

■ **Methods**: Neuro-Symbolic AI Systems, AI for Life Sciences, Transcriptomic Analysis