Xingyu Tan

Computer Science, UNSW, Sydney, Australia

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Education

University of New South Wales & CSIRO's Data61   **May. 2024 – Aug. 2027**
Doctor of Philosophy in Computer Science and Engineering   *Sydney, Australia*

University of New South Wales   **Sep. 2022 – Dec. 2023**
Master of Philosophy in Computer Science and Engineering   *Sydney, Australia*

University of New South Wales   **Sep. 2019 – May. 2022**
Bachelor of Science in Computer Science with Distinction   *Sydney, Australia*

Publications

- **Hydra: Structured Cross-Source Enhanced Large Language Model Reasoning**
  Xingyu Tan, Xiaoyang Wang, Qing Liu, Xiwei Xu, Xin Yuan, Liming Zhu, Wenjie Zhang
  The 2025 Conference on Empirical Methods in Natural Language Processing (Main Conference) (**EMNLP 2025, CORE A***), 2025

- **Paths-over-Graph: Knowledge Graph Empowered Large Language Model Reasoning**
  Xingyu Tan, Xiaoyang Wang, Qing Liu, Xiwei Xu, Xin Yuan, Wenjie Zhang
  The ACM on Web Conference (**WWW 2025, CORE A***), 2025

- **Higher-Order Peak Decomposition**
  Xingyu Tan, Jingya Qian, Chen Chen, Sima Qing, Yanping Wu, Xiaoyang Wang, Wenjie Zhang
  The 32nd ACM International Conference on Information and Knowledge Management (**CIKM 2023, CORE A**), 2023

- **Maximum Fairness-aware (k, r)-Core Identification in Large Graphs**
  Xingyu Tan, Chengyuan Guo, Xiaoyang Wang, Wenjie Zhang, Chen Chen
  The 34th Australasian Database Conference (**ADC 2023**), 2023

- **Cohesive Subgraph Detection and Search in Large Graphs**
  Xingyu Tan
  Master of Philosophy Dissertation, **UNSW Sydney**, 2024

- **Innovation Mechanism Exploration of Regional Economic Development**
  Xingyu Tan
  vol.14, pp.83, **Motherland**, 2017

Working Papers

- **Graph is a Natural Regulation: Revisiting Vector Quantization for Graph Representation Learning**
  Zian Zhai, Fan Li, **Xingyu Tan**, Xiaoyang Wang, Wenjie Zhang
  Under Review

- **STCS: Singed k-Truss Community Search in Large Signed Networks**
  Xingyu Tan, Xiaoyang Wang, Wenjie Zhang
  Under Review

Academic Experience

University of New South Wales   **Jan. 2023 – Present**
Teaching Academic Staff   *Sydney, Australia*

- Teaching academic (TA) and course administrator (Admin) for:

  COMP9311 Database Systems   Admin: 2025T1, 2024T1;   TA: 2023T3, 2023T1
  COMP9315 Database Systems Implementation   Admin: 2025T1
  COMP9313 Big Data Management   TA: 2024T2
  ZZSC9001   Foundations of Data Science   TA: 2023T3

- Each term served approximately 800 (up to 1,200) students. The **COMP9311 2024T1** offering received the *Annual Best Teaching Course* award in CSE, UNSW.

University of Wollongong   **Jun. 2023 – Dec. 2023**
Teaching Academic Staff   *Sydney, Australia*

- Teaching academic for **CSIT115 Data Management and Security** (2023S2).

University of New South Wales   **Aug. 2022 – Feb. 2023**
Research Assistant   *Sydney, Australia*

- Researching on fairness in GNN over incomplete graphs.

Honors, Awards

- **Scholarship**: WWW2025 Student Travel Award (2025).
- **Scholarship**: CSIRO's Data61-UNSW Joint PhD Full Scholarship (2024 - 2028).
- **Scholarship**: CIRES-ADC Travel Grant (2023).
- **Scholarship**: UNSW Australia's Global University Award PUCA1026 (2022).
- **Scholarship**: UNSW International Academic Excellence Award PUCE1015 (2019).

Projects

Gazzar: E-commerce Recommendation Platform   **Full-Stack Development [Code ⓞ] [Handbook]**
- Led a team to deliver a game e-commerce site with an integrated recommendation engine and an admin console.
- Built the stack with ReactJS + Ant Design + UmiJS (front end) and Django (back end); persisted data in MySQL with AWS RDS and Redis for caching.
- Implemented a behaviour-driven recommender (interests, cart, history) using classical ML; added promotion features (discount "Surprise Shop", lottery).
- Owned CI/CD and deployment; shipped to Heroku; ran three iterations with clear backlog, review, and testing.

Online Forum Platform   **Back-end Development [Code ⓞ]**
- Built an internal/external discussion platform with role-based access control.
- Implemented session sharing over a distributed setup using Redis; added JWT-based login and token auth; password recovery via JavaMail & JAF.
- Used timed tasks to aggregate visits/likes and sync to DB; integrated Elasticsearch for accurate search.
- Applied Bloom filters for blacklist checks and spam alerts to cut DB hits and save Redis memory.

Loop Mania: Pixel Tower Defense Game   **Full-Stack Development [Code ⓞ]**
- Led three iterations: requirement analysis, architecture design, and delivery; authored the overall UML.
- Built the UI with JavaFX; implemented back end in Java with clear design patterns for monsters, buildings, store, gear, weapons, multi-mode gameplay, and dynamic win conditions.
- Achieved 95% test coverage; shipped a stable release.

BigBrain: Card Game-based Q&A Platform   **Front-end Development [Code]**
- Owned the front end, designing admin and player layers with clean O&O separation.
- Implemented admin auth, game create/edit, start/stop, lobby invite, timed answering, and ranking.
- Delivered the full ReactJS front end with tests in 3 weeks.

Flockr: Online Chat Room   **Back-end Development [Code]**
- Implemented the back end in Python for admin auth; message CRUD, timed send, pin, like; and channel auth.
- Exposed REST endpoints via Flask HTTP; wired all front-end calls.
- Used JWT for token auth and key generation.
- Optimised group messaging with multi-threading to support delayed/timed send and avoid message loss.
- Worked on GitLab CI; achieved 97% test coverage with pytest/httptest; deployed to Heroku in 6 weeks.

Courses & Technical Skills

- **Courses**: Discrete Mathematics, Programming Fundamentals, Computer Systems Fundamentals, Data Structures and Algorithms, Computer Networks & Applications, Web Front-End Programming, Software Fundamentals, O-O Design & Programming, Database Systems, Algorithms & Programming Tech, Artificial Intelligence, Neural Networks & Deep Learning, Professional Issues and Ethics.

- **Computer Languages**: C/C++, Python, Java, JavaScript, MIPs, SQL

- **Machine Learning**: Pytorch, TensorFlow, Conda

- **Development Tools**: React JS, HTML, MySQL, PostgreSQL, Vue, Django

- **Others**: Linux, Git, TCP/UDP/IP, MATLAB, Latex etc.