XINHANG LU

CONTACT INFORMATION

CSE (K17), UNSW Sydney
Kensington NSW 2052, Australia

xinhang.lu@unsw.edu.au
https://xinhang.lu

RESEARCH INTERESTS

I am broadly interested in problems at the interface between computer science and economics. Recently, my work has focused on *mechanism design* and *fairness in algorithmic decision-making* (e.g., resource allocation, collective choice).

EDUCATION

Ph.D. in Mathematical Sciences, Nanyang Technological University, Singapore — 2017 – 2021
- Thesis: *Fair Resource Allocation in Rich Domains*
- Supervisor: Xiaohui Bei

B.Eng. in Computer Science and Technology, Southeast University, Nanjing, China — 2013 – 2017

APPOINTMENTS

School of Computer Science and Engineering, The University of New South Wales — Sydney, Australia
Postdoctoral Fellow, Member of the — 2021 – Present
- *Algorithmic Decision Theory Group* led by Haris Aziz and Toby Walsh;
- *Algorithms Group* led by Serge Gaspers.

Department of Computer Science, National University of Singapore — Singapore
Research Fellow — 2021
- Host: Warut Suksompong

AWARDS AND HONOURS

- **AAAI-20 Outstanding Student Paper Award** — 2020
  One paper received this award (of 4 such awards) out of 7737 submissions and 1591 accepted papers.
- **NTU Research Scholarship**, Nanyang Technological University — 2017 – 2021
- **Zhang Zhiwei Scholarship**, Southeast University — 2016
- **Guosheng Scholarship**, Southeast University — 2015

CONFERENCE PROCEEDINGS

(α-β): Alphabetical order

C1. **Fair Allocation of Divisible Goods under Non-Linear Valuations**.
(α-β) Haris Aziz, Zixu He, Xinhang Lu, and Kaiyang Zhou.
In *Proceedings of the 24th International Conference on Autonomous Agents and Multiagent Systems (AAMAS)*, May 2025. Forthcoming

C2. **Best-of-Both-Worlds Fair Allocation of Indivisible and Mixed Goods**.
(α-β) Xiaolin Bu, Zihao Li, Shengxin Liu, Xinhang Lu, and Biaoshuai Tao.
In *Proceedings of the 20th Conference on Web and Internet Economics (WINE)*, December 2024. Forthcoming

C3. **Welfare Loss in Connected Resource Allocation**.
(α-β) Xiaohui Bei, Alexander Lam, Xinhang Lu, and Warut Suksompong.
In *Proceedings of the 33rd International Joint Conference on Artificial Intelligence (IJCAI)*, pages 2660–2668, August 2024. doi:10.24963/ijcai.2024/294

C4. **A Complete Landscape for the Price of Envy-Freeness**.
(α-β) Zihao Li, Shengxin Liu, Xinhang Lu, Biaoshuai Tao, and Yichen Tao.
In *Proceedings of the 23rd International Conference on Autonomous Agents and Multiagent Systems (AAMAS)*, pages 1183–1191, May 2024. URL https://dl.acm.org/doi/10.5555/3635637.3662975

C5. **Fair Lotteries for Participatory Budgeting**.
(α-β) Haris Aziz, Xinhang Lu, Mashbat Suzuki, Jeremy Vollen, and Toby Walsh.
In *Proceedings of the 38th AAAI Conference on Artificial Intelligence (AAAI)*, pages 9469–9476, February 2024. doi:10.1609/aaai.v38i9.28801

C6. **Mixed Fair Division: A Survey**.
(α-β) Shengxin Liu, Xinhang Lu, Mashbat Suzuki, and Toby Walsh.

In *Proceedings of the 38th AAAI Conference on Artificial Intelligence (AAAI)*, pages 22641–22649, February 2024. doi:10.1609/aaai.v38i20.30274. Senior Member Presentation Track. Journal version in *Journal of Artificial Intelligence Research (JAIR)* (J3)

C7. **Best-of-Both-Worlds Fairness in Committee Voting**.
(α-β) Haris Aziz, Xinhang Lu, Mashbat Suzuki, Jeremy Vollen, and Toby Walsh.
In *Proceedings of the 19th Conference on Web and Internet Economics (WINE)*, page 676, December 2023. The paper was accepted to the conference as a full paper but published as an abstract.

C8. **Fair Division with Subjective Divisibility**.
(α-β) Xiaohui Bei, Shengxin Liu, and Xinhang Lu.
In *Proceedings of the 19th Conference on Web and Internet Economics (WINE)*, page 677, December 2023. The paper was accepted to the conference as a full paper but published as an abstract. Journal version in *Games and Economic Behavior (GEB)* (J1)

C9. **Truthful Fair Mechanisms for Allocating Mixed Divisible and Indivisible Goods**.
(α-β) Zihao Li, Shengxin Liu, Xinhang Lu, and Biaoshuai Tao.
In *Proceedings of the 32nd International Joint Conference on Artificial Intelligence (IJCAI)*, pages 2808–2816, August 2023. doi:10.24963/ijcai.2023/313

C10. **Approval-Based Voting with Mixed Goods**.
Xinhang Lu, Jannik Peters, Haris Aziz, Xiaohui Bei, and Warut Suksompong.
In *Proceedings of the 37th AAAI Conference on Artificial Intelligence (AAAI)*, pages 5781–5788, February 2023. doi:10.1609/aaai.v37i5.25717. Journal version in *Social Choice and Welfare (SCW)* (J4)

C11. **Truthful Cake Sharing**.
(α-β) Xiaohui Bei, Xinhang Lu, and Warut Suksompong.
In *Proceedings of the 36th AAAI Conference on Artificial Intelligence (AAAI)*, pages 4809–4817, February–March 2022. doi:10.1609/aaai.v36i5.20408. Journal version in *Social Choice and Welfare (SCW)* (J2)

C12. **The Price of Connectivity in Fair Division**.
(α-β) Xiaohui Bei, Ayumi Igarashi, Xinhang Lu, and Warut Suksompong.
In *Proceedings of the 35th AAAI Conference on Artificial Intelligence (AAAI)*, pages 5151–5158, February 2021. doi:10.1609/aaai.v35i6.16651. Journal version in *SIAM Journal on Discrete Mathematics (SIDMA)* (J5)

C13. **Maximin Fairness with Mixed Divisible and Indivisible Goods**.
(α-β) Xiaohui Bei, Shengxin Liu, Xinhang Lu, and Hongao Wang.
In *Proceedings of the 35th AAAI Conference on Artificial Intelligence (AAAI)*, pages 5167–5175, February 2021. doi:10.1609/aaai.v35i6.16653. Journal version in *Autonomous Agents and Multi-Agent Systems (JAAMAS)* (J8)

C14. **Fair Division of Mixed Divisible and Indivisible Goods**.
(α-β) Xiaohui Bei, Zihao Li, Jinyan Liu, Shengxin Liu, and Xinhang Lu.
In *Proceedings of the 34th AAAI Conference on Artificial Intelligence (AAAI)*, pages 1814–1821, February 2020. doi:10.1609/aaai.v34i02.5548. Invited for publication in *Artificial Intelligence (AIJ)* through the fast track scheme (J9)
AAAI-20 Outstanding Student Paper Award

C15. **The Price of Fairness for Indivisible Goods**.
(α-β) Xiaohui Bei, Xinhang Lu, Pasin Manurangsi, and Warut Suksompong.
In *Proceedings of the 28th International Joint Conference on Artificial Intelligence (IJCAI)*, pages 81–87, August 2019. doi:10.24963/ijcai.2019/12. Journal version in *Theory of Computing Systems (TOCS)* (J7)

Journal Articles

(α-β): Alphabetical order

J1. **Fair Division with Subjective Divisibility**.
(α-β) Xiaohui Bei, Shengxin Liu, and Xinhang Lu.
Games and Economic Behavior (GEB), 151:127–147, May 2025. doi:10.1016/j.geb.2025.03.004. Preliminary version in WINE-23 (C8)

J2. **Truthful Cake Sharing**.
(α-β) Xiaohui Bei, Xinhang Lu, and Warut Suksompong.
Social Choice and Welfare (SCW), 64(1–2):309–343, February 2025. doi:10.1007/s00355-023-01503-0.

Special Issue on Fair Public Decision Making: Allocating Budgets, Seats, and Probability. Preliminary version in AAAI-22 (C11)

J3. **Mixed Fair Division: A Survey**.
(α-β) Shengxin Liu, Xinhang Lu, Mashbat Suzuki, and Toby Walsh.
Journal of Artificial Intelligence Research (JAIR), 80:1373–1406, August 2024. doi:10.1613/jair.1.15800. Preliminary version in AAAI-24 (C6)

J4. **Approval-Based Voting with Mixed Goods**.
Xinhang Lu, Jannik Peters, Haris Aziz, Xiaohui Bei, and Warut Suksompong.
Social Choice and Welfare (SCW), 62(4):643–677, June 2024. doi:10.1007/s00355-024-01511-8. Preliminary version in AAAI-23 (C10)

J5. **The Price of Connectivity in Fair Division**.
(α-β) Xiaohui Bei, Ayumi Igarashi, Xinhang Lu, and Warut Suksompong.
SIAM Journal on Discrete Mathematics (SIDMA), 36(2):1156–1186, 2022. doi:10.1137/20M1388310. Preliminary version in AAAI-21 (C12)

J6. **Throughput Maximization in Wireless Communication Systems Powered by Hybrid Energy Harvesting**.
Chenchen Fu*, Xinhang Lu*, Xiaoxing Qiu, Sujunjie Sun, Xueyong Xu, Weiwei Wu, Chun Jason Xue, and Song Han.
IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (TCAD), 41(11):3981–3992, November 2022. doi:10.1109/TCAD.2022.3197978. The asterisk (*) denotes equal contribution.

J7. **The Price of Fairness for Indivisible Goods**.
(α-β) Xiaohui Bei, Xinhang Lu, Pasin Manurangsi, and Warut Suksompong.
Theory of Computing Systems (TOCS), 65(7):1069–1093, October 2021. doi:10.1007/s00224-021-10039-8. Preliminary version in IJCAI-19 (C15)

J8. **Maximin Fairness with Mixed Divisible and Indivisible Goods**.
(α-β) Xiaohui Bei, Shengxin Liu, Xinhang Lu, and Hongao Wang.
Autonomous Agents and Multi-Agent Systems (JAAMAS), 35(2):34, October 2021. doi:10.1007/s10458-021-09517-7. Special Issue on Fair Division. Preliminary version in AAAI-21 (C13)

J9. **Fair Division of Mixed Divisible and Indivisible Goods**.
(α-β) Xiaohui Bei, Zihao Li, Jinyan Liu, Shengxin Liu, and Xinhang Lu.
Artificial Intelligence (AIJ), 293:103436, April 2021. doi:10.1016/j.artint.2020.103436. Preliminary version in AAAI-20 (C14)

J10. **The Anatomy of the Global Football Player Transfer Network: Club Functionalities versus Network Properties**.
Xiaofan Liu, Yuliang Liu, Xinhang Lu, Qixuan Wang, and Tongxing Wang.
PLOS ONE, 11(6):e0156504, June 2016. doi:10.1371/journal.pone.0156504

Newsletter

(α-β): Alphabetical order

N1. **M-PREF 2023: 14th Multidisciplinary Workshop on Advances in Preference Handling – A Vivid Workshop Held in Macao, S.A.R., Between Two Former Islands**.
(α-β) Haris Aziz, Ulrich Junker, Xinhang Lu, Nicholas Mattei, and Andrea Passerini.
IFORS Newsletter, 18(4):33–34, Dec. 2023. URL ifors.org/newsletter/ifors-news-dec-2023

Working Papers

(α-β): Alphabetical order

W1. **Sequential Payment Rules: Approximately Fair Budget Divisions via Simple Spending Dynamics**.
(α-β) Haris Aziz, Patrick Lederer, Xinhang Lu, Mashbat Suzuki, and Jeremy Vollen.
Manuscript, 2024. URL https://arxiv.org/abs/2412.02435

Supervision Experiences

- 1 UNSW undergraduate Taste of Research project co-supervised with Haris Aziz 2024
- 1 UNSW Honours Thesis co-supervised with Haris Aziz 2022 – 2023
- 1 NUS Undergraduate Research Programme Project co-mentored with Warut Suksompong 2021

Teaching Experiences

Guest Lecturer

- UNSW COMP4920: Professional Issues and Ethics in Information Technology — March 2024
- NUS CS 6235: Topics in Computational Social Choice — February 2021 & March 2023

Lecturer, Tutorial Tracks at AAMAS-24, WINE-23, and AJCAI-22

- Recent Developments in Mixed Fair Division — December 2023 & May 2024
- Developments in Fair Resource Allocation — December 2022

Teaching Assistant,[*] Division of Mathematical Sciences, Nanyang Technological University

- MAS 714: Algorithms and Theory of Computation — Fall 2020
- MH4320: Computational Economics — Fall 2019, 2020
- MH2500: Probability and Introduction to Statistics — Fall 2019
- MH1812: Discrete Mathematics — Fall 2019
- MH1811: Mathematics 2 — Spring 2019
- MH1810: Mathematics 1 — Fall 2018

Service and Outreach

Workshop Organization

- *14th Multidisciplinary Workshop on Advances in Preference Handling (M-PREF)* at IJCAI-23; see (N1).

Tutorial Organization

- *Recent Developments in Mixed Fair Division* at WINE-23 and AAMAS-24.
- *Developments in Fair Resource Allocation* at AJCAI-22.

Program Committee Member

- AAAI Conference on Artificial Intelligence (AAAI) — 2021 – 2024
- International Joint Conference on Artificial Intelligence (IJCAI) — 2022 – 2024
- International Conference on Autonomous Agents and Multiagent Systems (AAMAS) — 2023
- European Conference on Artificial Intelligence (ECAI) — 2024
- IJCAI Workshop on Computational Fair Division — 2023, 2024
- International Joint Conference on Theoretical Computer Science – Frontier of Algorithmic Wisdom (IJTCS-FAW) — 2023

Journal Referee

Algorithmica, Artificial Intelligence (AIJ), Autonomous Agents and Multi-Agent Systems (JAAMAS), Games and Economic Behavior (GEB), Information and Computation, Journal of Artificial Intelligence Research (JAIR), Mathematical Social Sciences

Conference Reviewer

AAMAS (2022), COCOA (2020), EAAMO (2022), ESA (2022), FSTTCS (2021), ICALP (2024), IPCO (2024), ISAAC (2019), MATCHUP (2022), NCTCS (2019), SAGT (2021, 2022), SODA (2021), WINE (2020, 2022)

Invited Talks & Selected Presentations

(excl. conference talks)

Best-of-Both-Worlds Fair Allocation of Indivisible and Mixed Goods

- Algorithmics of Fair Division & Social Choice, Inst. for Mathematical Sciences, NUS — November 2024
- Sydney Algorithms and Computing Theory Group, The University of Sydney — October 2024

Fair Division with Subjective Divisibility

- Second IJCAI Workshop on Computational Fair Division, Jeju, South Korea — August 2024
- Inst. for Theoretical Computer Science, Shanghai Uni. of Finance and Economics — November 2023

Fair Division of Mixed Goods: Envy and Truth

- Sydney Algorithms and Computing Theory Group, The University of Sydney — October 2023

Truthful Fair Mechanism for Allocating Mixed Divisible and Indivisible Goods

- Workshop on Game Theory and Fair Division, The Hong Kong Polytechnic University — May 2023

[*] Awarded the University Teaching for Teaching Assistant Certificate in 2018.

Best-of-Both-Worlds Fairness in Committee Voting

- Reading Group in the Department of Computer Science, City University of Hong Kong May 2023
- NUS CS 6235: Topics in Computational Social Choice March 2023

Approval-Based Voting with Mixed Goods

- Summer School on Algorithmic Game Theory at City University of Hong Kong, Virtual June 2023
- Centre for Mathematical Social Science, The University of Auckland December 2022

Truthful Cake Sharing

- Computational and Network Economics Track at IJTCS-FAW, Virtual August 2022
- QuACT Seminar in the Institute of Computing Technology at CAS, Virtual March 2022

Maximin Fairness with Mixed Divisible and Indivisible Goods

- Young PhD Forum at IJTCS, Virtual August 2021

Fair Division of Mixed Divisible and Indivisible Goods

- Workshop on Fair Resource Allocation: Concept, Algorithms and Complexity at EC, Virtual July 2021
- NUS CS 6235: Topics in Computational Social Choice February 2021