

# XINHANG LU

## CONTACT INFORMATION

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

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🌐 <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 (ADT) 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

( $\alpha$ - $\beta$ ): Alphabetical order

- C1. **Fair Allocation of Divisible Goods under Non-Linear Valuations.**  
( $\alpha$ - $\beta$ ) 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.**  
( $\alpha$ - $\beta$ ) 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.**  
( $\alpha$ - $\beta$ ) 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](https://doi.org/10.24963/ijcai.2024/294)
- C4. **A Complete Landscape for the Price of Envy-Freeness.**  
( $\alpha$ - $\beta$ ) 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.**  
( $\alpha$ - $\beta$ ) 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](https://doi.org/10.1609/aaai.v38i9.28801)
- C6. **Mixed Fair Division: A Survey.**  
( $\alpha$ - $\beta$ ) 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](https://doi.org/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.**  
 $(\alpha\text{-}\beta)$  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.**  
 $(\alpha\text{-}\beta)$  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.**  
 $(\alpha\text{-}\beta)$  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](https://doi.org/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](https://doi.org/10.1609/aaai.v37i5.25717). Journal version in *Social Choice and Welfare (SCW)* (J4)
- C11. **Truthful Cake Sharing.**  
 $(\alpha\text{-}\beta)$  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](https://doi.org/10.1609/aaai.v36i5.20408). Journal version in *Social Choice and Welfare (SCW)* (J2)
- C12. **The Price of Connectivity in Fair Division.**  
 $(\alpha\text{-}\beta)$  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](https://doi.org/10.1609/aaai.v35i6.16651). Journal version in *SIAM Journal on Discrete Mathematics (SIDMA)* (J5)
- C13. **Maximin Fairness with Mixed Divisible and Indivisible Goods.**  
 $(\alpha\text{-}\beta)$  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](https://doi.org/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.**  
 $(\alpha\text{-}\beta)$  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](https://doi.org/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.**  
 $(\alpha\text{-}\beta)$  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](https://doi.org/10.24963/ijcai.2019/12). Journal version in *Theory of Computing Systems (TOCS)* (J7)

- JOURNAL ARTICLES    J1. **Fair Division with Subjective Divisibility.**  
 $(\alpha\text{-}\beta)$  Xiaohui Bei, Shengxin Liu, and Xinhang Lu.  
*Games and Economic Behavior (GEB)*, Forthcoming. Preliminary version in WINE-23 (C8)
- J2. **Truthful Cake Sharing.**  
 $(\alpha\text{-}\beta)$  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](https://doi.org/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.**  
 ( $\alpha$ - $\beta$ ) 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](https://doi.org/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](https://doi.org/10.1007/s00355-024-01511-8). Preliminary version in AAAI-23 (C10)
- J5. **The Price of Connectivity in Fair Division.**  
 ( $\alpha$ - $\beta$ ) Xiaohui Bei, Ayumi Igarashi, Xinhang Lu, and Warut Suksompong.  
*SIAM Journal on Discrete Mathematics (SIDMA)*, 36(2):1156–1186, 2022. doi:[10.1137/20M1388310](https://doi.org/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](https://doi.org/10.1109/TCAD.2022.3197978). The asterisk (\*) denotes equal contribution.
- J7. **The Price of Fairness for Indivisible Goods.**  
 ( $\alpha$ - $\beta$ ) 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](https://doi.org/10.1007/s00224-021-10039-8). Preliminary version in IJCAI-19 (C15)
- J8. **Maximin Fairness with Mixed Divisible and Indivisible Goods.**  
 ( $\alpha$ - $\beta$ ) 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](https://doi.org/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.**  
 ( $\alpha$ - $\beta$ ) 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](https://doi.org/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](https://doi.org/10.1371/journal.pone.0156504)

#### NEWSLETTER

( $\alpha$ - $\beta$ ): 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.**  
 ( $\alpha$ - $\beta$ ) 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](https://ifors.org/newsletter/ifors-news-dec-2023)

#### WORKING PAPERS

( $\alpha$ - $\beta$ ): Alphabetical order

- W1. **Sequential Payment Rules: Approximately Fair Budget Divisions via Simple Spending Dynamics.**  
 ( $\alpha$ - $\beta$ ) 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
- Developments in Fair Resource Allocation

December 2023 & May 2024

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

**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

\*Awarded the [University Teaching for Teaching Assistant Certificate](#) in 2018.

**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