

CV

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Research Interests

My main research area include Algorithmic Randomness and Computability Theory. I apply tools from algorithmic randomness to study the (local) structure of Turing degrees. I am also interested in studying different notions of algorithmic randomness to see their interplay with classic recursion theory.

Employment

Sept. 2019– Present	Assistant researcher, State Key Laboratory of Computer Science, Institute of Software, Chinese Academy of Sciences, China
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Education

Oct. 2015– Aug. 2019	Ph.D in Computer Science (magna cum laude), Heidelberg University, Germany <i>Thesis:</i> Restricted Coding and Betting <i>Supervisors:</i> Wolfgang Merkle, Institut für Informatik, Universität Heidelberg
Sept. 2012– Jul. 2015	M.Phil in Logic, Peking University, China <i>Thesis:</i> Solovay Functions and Algorithmic Randomness <i>Supervisors:</i> Taotao Xing, Department of Philosophy, Peking University
Sept. 2008– Jun. 2012	B.Sc in Mathematics, Nanjing University, China <i>Thesis:</i> Computable Analysis of Differentiation and Integration <i>Supervisor:</i> Hong Lu, Department of Mathematics, Nanjing University

Services

1. *Committee Member* of The Mathematical Logic Chapter of Chinese Mathematical Society
2. *Young Associate Editor* of Frontiers of Computer Science

3. *Referee* of the following journal: Theoretical Computer Science , Studies in Logic
4. *Teaching Assistant* for the following courses:
Universität Heidelberg, Computability and Complexity 1 , Computability and Complexity 2 ,
Mar. 2016 – Sept. 2019 Randomized Algorithms , Formal Languages and Automata Theory

Peking University, Introduction to Modal Logic
Sept. 2012– Feb. 2013

Publication

1. *Speedability of computably approximable reals and their approximations*, George Barmpalias, Nan Fang, Wolfgang Merkle, Ivan Titov, *Information and Computation* 311 (2026) p. 105451.
2. *Integer-valued martingales and cl-Turing reductions*, Nan Fang, Lu Liu and Liang Yu, *Theoretical Computer Science* 1040 (2025) p. 115202.
3. *Extending CL-reducibility on array noncomputable degrees*, Nan Fang and Wolfgang Merkle, *Information and Computation* 303 (2025) p. 105258.
4. *Granularity of wagers in games and the possibility of saving*, George Barmpalias and Nan Fang, *Information and Computation* 275 (2020) p. 104600.
5. *Monotonous betting strategies in warped casinos*, George Barmpalias, Nan Fang and Andy Lewis-Pye, *Information and Computation* 271 (2020) p. 104480.
6. *Equivalences between learning of data and probability distributions, and their applications*, George Barmpalias, Nan Fang and Frank Stephan, *Information and Computation* 262 (2018) 123–140.
7. *Optimal asymptotic bounds on the oracle use in computations from Chaitin’s Omega*, George Barmpalias, Nan Fang and Andy Lewis-Pye, *Journal of Computer and System Sciences* 82 (2016) 1283–1299.

Funding

1. *Speedability of computably approximable reals*, BJNSF 1262022, 2026–2028.
2. *Algorithmic Randomness and unpredictability*, NSFC 12001519, 2021–2023.

Talks

1. *A Brief History of Algorithmic Randomness*, Seminar at Tsinghua University, Beijing, Nov. 2025.
2. *Speedability of computably approximable reals and their approximations*, Conference on Computability, Complexity and Analysis (CCA 2025), Kyoto, Sept. 2025.
3. *Speedability of computably approximable reals and their approximations*, Tianyuan Workshop on Computability Theory and Descriptive Set Theory, Kunming, Jun. 2025.
4. *Chaitin’s constant and its properties*, BNU Logic Seminar, Beijing, May. 2025.
5. *Extending CL-Reducibility on Array Noncomputable Degrees*, Nankai Logic Seminar, Tianjin, Feb. 2025.

6. *Array Noncomputability: A Modular Approach*, Fudan Logic Seminar, Shanghai, Sep. 2024.
7. *Integer-valued martingales and cl-reductions*, Delta 19 Workshop on Logic, Wuhan, Feb. 2023.
8. *Integer-valued martingales and cl-reductions*, invited talk, Chinese Annual Conference on Mathematical Logic, Online, Nov. 2022.
9. *Equivalences between learning of data and probability distributions*, NJU Logic Seminar, Nanjing, May 2021.
10. *Convergence rates of computably approximable reals*, Logic Workshop, Nanjing, Oct. 2020.
11. *On the converging speed of d.c.e. approximations*, Delta 12 Logic Workshop, Beijing, Jan. 2020.
12. *A study on granular martingales*, Chinese Annual Conference on Mathematical Logic, Chongqing, Nov. 2019.
13. *Betting with preference on outcomes*, Conference on Computability, Complexity and Randomness (CCR 2019), Nur-Sultan, Jun. 23 - 25, 2019.
14. *Granularity of wagers in games and the (im)possibility of savings*, Asian Logic Conference, Jun. 17 - 21, 2019.
15. *Granularity and timidness of betting strategies*, Randomness, Information, Complexity, Moscow, Jun. 12 - 14, 2019.
16. *Generalizing cl-reducibility on left-c.e. reals*, Delta 11 Workshop on Logic, Nanjing, Apr. 18, 2019.
17. *Monotonous betting strategies in warped casinos*, Journées du GT Calculabilités du GdR Informatique Mathématique, Paris, Jul. 2 - 3, 2018.
18. *A left-c.e. real not computable by any Omega number with low redundancy*, Conference on Computability, Complexity and Randomness (CCR 2017), Mysore, Jul. 3 - 7, 2017.
19. *Computing left-c.e. reals from Ω -numbers*, Montpellier - Heidelberg Workshop on Computability and Randomness, Maison de Heidelberg, Montpellier, Jun. 16 - 17, 2016.
20. *Solovay Functions and No-Gap Phenomena*, Conference on Computability, Complexity and Randomness (CCR 2015), Institut für Informatik, Universität Heidelberg, Heidelberg, Jun. 22 - 26, 2015.

Skills

Language: Chinese (native) , English (fluent) , German (medium)