

# Curriculum Vitae

## PERSONAL INFORMATION

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### Yukuan Hu

Ph.D. Candidate

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## RESEARCH INTERESTS

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My recent interests focus on developing efficient optimization methods with theoretical guarantee for scientific and engineering problems, especially those arising in computational materials science.

## EDUCATION

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09/2019–Present **Ph.D. Candidate, Computational Mathematics**

Advisor: Professor Xin Liu

Academy of Mathematics and Systems Science, CAS - Beijing, China

09/2015–07/2019 **B.Sc., Mathematics and Applied Mathematics**

School of Mathematical Sciences, Tongji University - Shanghai, China

## PUBLICATIONS

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1. **Yukuan Hu**, Xingyu Gao\*, Yafan Zhao, Xin Liu\*, and Haifeng Song\*. Force-based gradient descent method for *ab initio* atomic structure relaxation. *Physical Review B*, 2022, 106(10): 104101. ([link](#))
2. **Yukuan Hu** and Xin Liu\*. The exactness of the  $\ell_1$  penalty function for a class of mathematical programs with generalized complementarity constraints. *Fundamental Research*, doi: 10.1016/j.fmre.2023.04.006. ([link](#))
3. **Yukuan Hu** and Xin Liu\*. The convergence properties of infeasible inexact proximal alternating linearized minimization. *Science China Mathematics*, doi: 10.1007/s11425-022-2074-7. ([link](#))
4. **Yukuan Hu**, Huajie Chen, and Xin Liu\*. A global optimization approach for multimarginal optimal transport problems with Coulomb cost. *SIAM Journal on Scientific Computing*, 2023, 45(3): A1214–A1238. ([link](#))

## PREPRINTS

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1. **Yukuan Hu**, Mengyu Li, Xin Liu, and Cheng Meng. Sampling-based approaches for multimarginal optimal transport problems with Coulomb cost. arXiv preprint arXiv:2306.16763, Jun. 2023. ([link](#))

## PATENTS OF THE PRC

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1. Xingyu Gao, Xin Liu, Haifeng Song, **Yukuan Hu**, Jun Fang, Zhen Yang, Yafan Zhao, Lifang Wang, and Haifeng Liu. Nonmonotone line search methods and device for atomic structure relaxation. ZL 202111534901.5, 12/2022.

2. Xingyu Gao, Xin Liu, Haifeng Song, **Yukuan Hu**, Xin Chen, Yuechao Wang, Jun Fang, Lifang Wang, and Le Zhang. Computational methods and device for crystal structure relaxation with fixed lattice volume. ZL 202211210741.3, 07/2023.

## PRESENTATIONS

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1. A global optimization approach for multi-marginal optimal transport problems with Coulomb cost
  - The 7th Graduate Forum of the Mathematical Programming (MP) Branch of Operations Research Society of China (ORSC) 12/2021
2. On the convergence properties of infeasible inexact proximal alternating linearized minimization
  - Seminar at CAS SIAM Student Chapter 11/2022
  - The 8th Graduate Forum of the Mathematical Programming (MP) Branch of Operations Research Society of China (ORSC) 12/2022
3. Sampling-based approaches for multimarginal optimal transport problems with Coulomb cost
  - Applied Math Ph.D. Seminar at Fudan University 06/2023
  - The 14th International Conference on Numerical Optimization and Numerical Linear Algebra (IC-NONLA) 08/2023
  - The 10th International Congress on Industrial and Applied Mathematics (ICIAM) 08/2023

## ACADEMIC MEMBERSHIPS

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- Student members: SIAM, CAS SIAM Student Chapter, China Society for Industrial and Applied Mathematics (CSIAM)

## SELECTED HONORS, AWARDS & SCHOLARSHIPS

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04/2023	Financial Support Program, ICIAM 2023
09/2022	Loo-Keng Hua Scholarship (100,000 RMB), AMSS, CAS
12/2021	Outstanding Student Paper, the 7th Graduate Forum of the MP Branch of ORSC
09/2021	Loo-Keng Hua Scholarship (100,000 RMB), AMSS, CAS
09/2020	Schlumberger Scholarship, AMSS, CAS
07/2019	Excellent Graduation Thesis, Tongji University
05/2019	Excellent Graduates in Shanghai, Shanghai Municipal Education Commission
11/2018	SAS China Data Mining Champion (team leader), SAS