

# Yue Xie, PhD

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**Research interests: optimization algorithm design and analysis, optimal transport**

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## Work Experience

HKU Musketeers Foundation Institute of Data Science (HKU-IDS) and Department of Mathematics,  
The University of Hong Kong  
Research Assistant Professor  
HONG KONG, CHINA  
11/01/2021 – present

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## Education & Training

Wisconsin Institute for Discovery, University of Wisconsin-Madison  
Postdoctoral Associate  
Supervisor: Stephen J. Wright  
MADISON, WI, USA  
10/22/2018 – 08/31/2021

Pennsylvania State University  
PhD in Industrial Engineering  
Dual Title Degree for Operations Research  
Thesis advisor: Uday V. Shanbhag  
STATE COLLEGE, PA, USA  
08/25/2013 – 08/11/2018

Tsinghua University  
Pure & Applied Mathematics  
BEIJING, CHINA  
09/01/2009 – 07/11/2013

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## Publications

Journal Paper Published:

- Yue Xie and Stephen J. Wright, *Complexity of proximal augmented Lagrangian for nonconvex optimization with nonlinear equality constraints*, **Journal of Scientific Computing**, 2021.  
<https://link.springer.com/article/10.1007/s10915-021-01409-y>.
- Yue Xie and Uday V. Shanbhag, *Tractable ADMM schemes for computing KKT points and local minimizers for  $\ell_0$ -minimization problems*, **Computational Optimization and Application**, 2020.  
<http://link.springer.com/article/10.1007/s10589-020-00227-6>.
- Yue Xie and Uday V. Shanbhag, *SI-ADMM: A stochastic inexact ADMM framework for stochastic convex programs*, **IEEE Transactions on Automatic Control**, vol. 65, no. 6, pp. 2355-2370.  
<https://doi.org/10.1109/TAC.2019.2953209>.
- Yue Xie and Uday V. Shanbhag, *On robust solutions to uncertain linear complementarity problems and their variants*, **SIAM Journal on Optimization**, 26(4), pp. 2020-2159. <https://doi.org/10.1137/15M1010427>.

Workshop Proceedings:

- Yue Xie and Stephen J. Wright, *Complexity of projected Newton methods for bound-constrained optimization*. **Thirty-seventh International Conference on Machine Learning (ICML) workshop: Beyond first order methods in machine learning systems**, Virtual, 2020. [Link to the article](#).

Electronic Preprint:

- Yue Xie, Zhongjian Wang and Zhiwen Zhang, *Random block coordinate descent methods for optimal transport and convergence analysis*, **arXiv preprint**, arXiv: 2212.07046.
- Yue Xie and Stephen J. Wright, *Complexity of a Projected Newton-CG Method for Optimization with Bounds*, **arXiv preprint**, arXiv: 2103.15989, to appear in **Mathematical Programming series A**.

Work In Progress:

- Yue Xie, Complexity of a linearized augmented Lagrangian method for equality constrained nonconvex optimization.
- Yue Xie and Hongcheng Liu, Dimension-insensitive variance reduction methods for nonconvex stochastic optimization.

Conference Paper Published :

- Yue Xie and Uday V. Shanbhag, *SI-ADMM: A stochastic inexact ADMM framework for resolving structured stochastic convex programs*. **2016 Winter Simulation Conference (WSC)**, Washington, DC, 2016, pp. 714-725.  
<https://doi.org/10.1109/WSC.2016.7822135>.

- Yue Xie and Uday V. Shanbhag, *On robust solutions to uncertain monotone linear complementarity problems (LCPs) and their variants*. **53rd IEEE Annual Conference on Decision and Control (CDC)**, Los Angeles, CA, 2014, pp. 2834-2839. <https://doi.org/10.1109/CDC.2014.7039824>.

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## Grant

1. Co-PI of Guangdong Province fundamental and applied fundamental research regional joint fund: optimization modeling method and large-scale application demonstration in automatic analysis and auxiliary diagnosis of medical endoscope images, Project number: 2022B1515130009, 2 million RMB.
2. HKU-IDS start-up fund.

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## Student/Postdoc/RA

1. Research assistant: Farshad Golnary (Graduated with PhD degree at HKUST, working on semi-discrete optimal transport and Wasserstein barycenter.)
2. Undergraduate thesis advisee: Hanju Wu (Undergraduate student in Math at Sun Yat-sen University (Zhuhai), working on complexity of two-metric projection method to solve problems with simple constraints.)

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## Teaching Experience

University of Hong Kong <b>ARIN 7011: Optimization in Artificial Intelligence</b> Teacher	HONG KONG, CHINA <b>Fall 2022</b>
University of Wisconsin-Madison <b>CS/ISyE 730: Nonlinear Optimization II</b> Guest Lecturer	MADISON, WI, USA <b>Spring 2020</b>
Pennsylvania State University <b>IE 425: Stochastic Models in Operations Research</b> Teaching Assistant	STATE COLLEGE, PA, USA <b>Spring 2018</b>

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## Reviewer of Journals

SIAM Journal on Optimization (3), Mathematical Programming Series B (1), Mathematical Programming Computation (1), IMA Journal of Numerical Analysis (1), IEEE Transactions on Automatic Control (2), IEEE Transactions on Signal Processing (2), Journal of the Operations Research Society of China (1), IIE Transactions (1), Optimization Letters (2), Networks and Spatial Economics (2), Journal of Optimization Theory and Applications (1), Computational Optimization and Applications (1).

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## Presentations

1. "Complexity of projected Newton-CG methods for optimization with bounds", presentation delivered at Tongji University, May 2022.
2. "On addressing nonconvex problems in machine learning", presentation delivered in the Department of Mathematics and the Department of Industrial and Manufacturing Systems Engineering at the University of Hong Kong, Apr 2021.
3. "On Complexity of Constrained Nonconvex Optimization", presentation delivered in the Department of Applied Mathematics and Statistics at the Johns Hopkins University, Jan 2021.
4. "Complexity of augmented Lagrangian for nonconvex optimization with nonlinear constraints", presentation delivered at Institute for Operations Research and the Management Sciences (INFORMS) Annual Meeting, Virtual, Nov 2020.
5. "Complexity of projected Newton methods for bound-constrained optimization", presentation delivered at Thirty-seventh International Conference on Machine Learning (ICML) workshop: Beyond first order methods in machine learning systems, Virtual, July 2020. <https://sites.google.com/view/optml-icml2020>
6. "A tractable ADMM scheme for computing KKT points and local minimizers for  $\ell_0$ -minimization problems", presentation delivered at International Conference on Continuous Optimization (ICCOPT), Berlin, Aug 2019.
7. "Stochastic ADMM frameworks for resolving structured stochastic convex programs", presentation delivered at Modeling and Optimization: Theory and Applications (MOPTA), Lehigh University, Aug 2018.

8. "Obtaining deterministic rates in stochastic ADMM schemes via a variable sample-size technique", presentation delivered at Institute for Operations Research and the Management Sciences (INFORMS) Optimization Society Conference, Denver, Mar 2018.
9. "SI-ADMM: A stochastic inexact ADMM framework for resolving structured stochastic convex programs", presentation delivered at Institute for Operations Research and the Management Sciences (INFORMS) Annual Meeting, Houston, Oct 2017.
10. "On the resolution of  $\ell_0$ -norm minimization problems via alternating Lagrangian schemes", presentation delivered at Institute for Operations Research and the Management Sciences (INFORMS) Annual Meeting, Houston, Oct 2017.
11. "On the global resolution of  $\ell_0$ -norm minimization problems via alternating Lagrangian schemes", presentation delivered at Society for Industrial and Applied Mathematics (SIAM) Conference on Optimization, Vancouver, BC, May 2017.
12. "SI-ADMM: A stochastic inexact ADMM framework for resolving structured stochastic convex programs", presentation delivered at 2016 Winter Simulation Conference (WSC), Washington, D.C., Dec 2016.
13. "On the resolution of complementarity formulations of the  $\ell_0$ -norm minimization problem via ADMM schemes", presentation delivered at International Conference on Continuous Optimization (ICCOPT), Tokyo, Japan, Aug 2016.
14. "On an ADMM framework for the resolution of complementarity formulations of the  $\ell_0$ -norm minimization problem: Preliminary work", presentation delivered at International Conference on Machine Learning (ICML) 2016 workshop on Optimization Methods for the Next Generation of Machine Learning, NY, June 2016.
15. "On robust solutions to uncertain linear complementarity problems and their variants", presentation delivered at Institute for Operations Research and the Management Sciences (INFORMS) Annual Meeting, Philadelphia, Nov 2015.
16. "On robust solutions to uncertain linear complementarity problems and their variants", presentation delivered at 22nd International Symposium on Mathematical Programming (ISMP), Pittsburgh, July 2015.
17. "On robust solutions to uncertain linear complementarity problems and their variants", presentation delivered at Modeling and Optimization: Theory and Applications (MOPTA), Lehigh University, Aug 2014.

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## Honors and Awards

1. Marcus Fellowship; Department of Industrial and Manufacturing Engineering, Penn State University, 2014
  2. Marcus Fellowship; Department of Industrial and Manufacturing Engineering, Penn State University, 2013
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