Curriculum Vitae

NAME   Zaiwen Wen

INSTITUTE   Peking University

POSITION   Professor

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EDUCATION

Degree	Year	Major	Institution
Ph. D	2009/09	Operations Research	Columbia University, Advisor: Prof. Donald Goldfarb Thesis: First-order methods for semidefinite programming
M. S.	2004/07	Computational Mathematics	Chinese Academy of Sciences, Advisor: Prof. Yaxiang Yuan Thesis: Least squares and their applications
B. S.	2001/07	Mathematics	Shanghai Jiaotong University

PROFESSIONAL APPOINTMENTS

Year	Position	Institution
2024/05- 2021/08- 2018/02-2021/07 2013/08-2018/01	**Boya Distinguished Professor** Professor with tenure Associate Professor with tenure Associate Professor	Beijing International Center for Mathematical Research, Peking University
2021/12-	Department Chair	Department of Industrial Engineering and Management, College of Engineering, Peking University
2010/08-2013/07	Associate Professor	Department of Mathematics and Institute of Natural Sciences, Shanghai Jiaotong University
2012/08-2013/07	Humboldt Research Fellowship for Experienced Researcher	Department of Mathematics, Technische Universität München
2009/10-2011/02	NSF Math Institutes' Postdoc	Institute for Pure and Applied Mathematics UCLA and Rice University

RESEARCH INTERESTS

Optimization Theory and Algorithms

1. Convex optimization and nonlinear programming

2. Matrix optimization, semidefinite programming, Manifold optimization

3. AI for Mathematics

4. Machine learning

HONORS AND AWARDS

Year	Honors and awards
2024	**Changjiang Distinguished Professor** by the Ministry of Education
2020	Beijing Science and Technology Prize-Outstanding Youth Scholar Zhongguan Village Prize
2020	Leading talents in science and technology innovation of the National Ten Thousand Talents Program
2016	The 14th National Award for Youth in Science and Technology
2015	National program for support of top-notch young professionals
2015	The Charles Broyden Prize, the Journal of Optimization Methods & Software
2013	Excellent Young Scientist Grant, NSFC, China

INVITED LECTURES

Year	Lectures
2024/10	Plenary Lecture, The 17th Annual Conference of the Operations Research Society of China
2024/07	Keynote speaker, XXIII International Conference Mathematical Optimization Theory and Operations Research
2022	Semi-Plenary Lecture, International Conference on Continuous Optimization, USA (cancelled due to Covid-19)
2017	Plenary Lecture, The 11th National Meeting on Mathematical Programming, Guilin, China
2016	Plenary Lecture, The 10th National Meeting of Computational Mathematics, Guangzhou, China

PROFESSIONAL SERVICE

Year	Society affiliations
2024/07-	Associate Editor, CSIAM Transactions on Applied Mathematics
2023/01-2025/12	Associate Editor, Journal of Scientific Computing
2023/09-	Associate Editor, Optimization and Engineering
2021/10-	Associate Editor, Communications in Mathematics and Statistics
2015-	Technical Editor, Mathematical Programming Computation
2014-	Associate Editor, Journal of Computational Mathematics
2016-	Associate Editor, Journal of the Operations Research Society of China
2016-	Executive member, Council of Operations Research Society of China
2019-	Vice President, Council of the Mathematical Programming Branch of OR Society of China

Publication: Books

1. Liu Haoyang, Hu Jiang, Li Yongfeng, **Wen Zaiwen**, Optimization: Model, Algorithm and Theory (in Chinese), 650 pages, http://bicmr.pku.edu.cn/~wenzw/optbook/opt2.pdf

2. Liu Haoyang, Hu Jiang, Li Yongfeng, **Wen Zaiwen**, Computational Methods for Optimization (in Chinese), http://bicmr.pku.edu.cn/~wenzw/optbook/opt1-short.pdf, 338 pages

Selected Papers

1. Wang Rui, Zhang Chuwen, Pu Shanwen, Gao Jianjun, **Wen Zaiwen**; A Customized Augmented Lagrangian Method for Block-Structured Integer Programming; **IEEE Transactions on Pattern Analysis and Machine Intelligence**; 2024

2. Ke Zhifa, Zhang Junyu, **Wen Zaiwen**; An Improved Finite-time Analysis of Temporal Difference Learning with Deep Neural Networks; **Forty-first International Conference on Machine Learning (ICML)**; 2024

3. Wu Jiayuan, Hu Jiang, Hongchao Zhang, **Wen Zaiwen**; Convergence Analysis of An Adaptively Regularized Natural Gradient Method; **IEEE Transactions on Signal Processing**; 2024

4. Hu Jiang, Ao Ruicheng, Anthony Man-Cho So, Yang Minghang, **Wen Zaiwen**; Riemannian Natural Gradient Methods; **SIAM Journal on Scientific Computing**; Vol. 46, No. 1, 2024, pp. A204-A231, **Google citation: 5**

5. Wang Yifei, Deng Kangkang, Liu Haoyang, **Wen Zaiwen**; A Decomposition Augmented Lagrangian Method for Low-rank Semidefinite Programming; **SIAM Journal on Optimization**; Vol. 33, No. 3, 2023, pp. 1361-1390, **Google citation: 9**

6. Li Yongfeng, Zhao Mingming, Chen Weijie, **Wen Zaiwen**; A Stochastic Composite Augmented Lagrangian Method for Reinforcement Learning; **SIAM Journal on Optimization**; Vol. 33, No.2, 2023, pp.921-949, **Google citation: 2**

7. Jiang Bo, Meng Xiang, **Wen Zaiwen**, Chen Xiaojun; An Exact Penalty Approach for Optimization with Nonnegative Orthogonality Constraints; **Mathematical Programming**; Vol. 198, No. 1, 2023, pp. 855-897, **Google citation: 20**

8. Yang Minghan, Xu Dong, Cui Qiwen, **Wen Zaiwen**, Xu Pengxiang; An Efficient Fisher Matrix Approximation Method for Large-Scale Neural Network Optimization; **IEEE Transactions on Pattern Analysis and Machine Intelligence**; Vol. 45, No. 5, 2022, pp. 5391-5403, **Google citation: 7**

9. Chen Fan, Zhang Junyu, **Wen Zaiwen**; A Near-Optimal Primal-Dual Method for Off-Policy Learning in CMDP; **Advances in Neural Information Processing Systems (NeurIPS)**; Vol. 35, 2022, pp.10521-10532, **Google citation: 6**

10. Zhang Haixiang, Andre Milzarek, **Wen Zaiwen**, Yin Wotao; On the Geometric Analysis of A Quartic-quadratic Optimization Problem under A Spherical Constraint; **Mathematical Programming**; Vol. 195, No.1, 2022, pp. 421-473, **Google citation: 8**

11. Yang Minghan, Andre Milzarek, **Wen Zaiwen**, Zhang Tong; A Stochastic Extra-Step Quasi-Newton Method for Nonsmooth Nonconvex Optimization; **Mathematical Programming**; Vol. 194, 2022, pp. 257-303, **Google citation: 22**

12. Wang Yifei, Jia Zeyu, **Wen Zaiwen**; Search Direction Correction with Normalized Gradient Makes First-Order Methods Faster; **SIAM Journal on Scientific Computing**; Vol. 43, No. 5, 2021, pp. A3184-A3211, **Google citation: 2**

13. Yang Minghan, Xu Dong, Chen Hongyu, **Wen Zaiwen**, Chen Mengyun; Enhance Curvature Information by Structured Stochastic Quasi-Newton Method; **2021 IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)**, 2021, pp. 10654-10663, **Google citation: 10**

14. Li Yongfeng, Liu Haoyang, **Wen Zaiwen**, and Yuan Yaxiang; Low-rank Matrix Iteration Using Polynomial-filtered Subspace Extraction; **SIAM Journal on Scientific Computing**; Vol 42, No. 3, 2020, pp. A1686-A1713, **Google citation: 3**

15. Pang Tongyao, Li Qingna, **Wen Zaiwen**, Shen Zuowei, Phase Retrieval; A Data-Driven Wavelet Frame Based Approach; **Applied and Computational Harmonic Analysis**; Vol. 49, No. 3, 2020, pp. 971-1000, **Google citation: 9**

16. Tian Tonghua, Cai Yongyong, Wu Xinming, **Wen Zaiwen**; Ground States of Spin-F Bose–Einstein Condensates; **SIAM Journal on Scientific Computing**; Vol. 42, No. 4, 2020, pp. B983–B1013, **Google citation: 11**

17. Duan Yaqi, Wang Mengdi, **Wen Zaiwen**, Yuan Yaxiang; Adaptive Low-Nonnegative-Rank Approximation for State Aggregation of Markov Chains; **SIAM Journal on Matrix Analysis and Applications**; Vol. 41, No. 1, 2020, pp. 244-278, **Google citation: 9**

18. Hu Jiang, Liu Xin, **Wen Zaiwen,** Yuan Yaxiang; A Brief Introduction to Manifold Optimization; **Journal of the Operations Research Society of China**; Vol. 8, 2020, pp. 199-248, **Google citation: 182**

19. Andre Milzarek, Xiao Xiantao, Cen Sicong, **Wen Zaiwen**, Michael Ulbrich; A Stochastic Semismooth Newton Method for Nonsmooth Nonconvex Optimization; **SIAM Journal on Optimization**; Vol. 29, No. 4, 2019, pp. 2916-2948, **Google citation: 38**

20. Hu Jiang, Jiang Bo, Lin Lin, **Wen Zaiwen**, Yuan Yaxiang; Structured Quasi-Newton Methods for Optimization with Orthogonality Constraints; **SIAM Journal on Scientific Computing**; Vol. 41, No. 4, 2019, pp. A2239-A2269, **Google citation: 36**

21. Ma Chao, Liu Xin, **Wen Zaiwen**; Globally Convergent Levenberg-Marquardt Method for Phase Retrieval; **IEEE Transactions on Information Theory**; Vol. 65, No. 4, 2019, pp.2343-2359, **Google citation: 27**

22. Li Yongfeng, **Wen Zaiwen**, Yang Chao, Yuan Yaxiang; A Semi-smooth Newton Method For semidefinite programs and its applications in electronic structure calculations; **SIAM Journal on Scientific Computing**; Vol. 40, No. 6, 2018, pp. A4131-A4157, **Google citation: 11**

23. Zhang Junyu, Liu Haoyang, **Wen Zaiwen**, Zhang Shuzhong; A Sparse Completely Positive Relaxation of the Modularity Maximization for Community Detection; **SIAM Journal on Scientific Computing**; Vol. 40, No. 5, 2018, pp. A3091–A3120, **Google citation: 14**

24. Hu Jiang, **Wen Zaiwen**, Andre Milzarek, Yuan Yaxiang; Adaptive Quadratically Regularized Newton Method for Riemannian Optimization; **SIAM Journal on Matrix Analysis and Applications**; Vol.39, No. 3, 2018, pp.1181-1207, **Google citation: 62**

25. Xiao Xiantao, Li Yongfeng, **Wen Zaiwen**, Zhang Liwei; A Regularized Semi-Smooth Newton Method with Projection Steps for Composite Convex Programs; **Journal of Scientific Computing**; Vol. 76, No. 1, 2018, pp 364-389, **Google citation: 77**

26. **Wen Zaiwen,** Zhang Yin; Accelerating Convergence by Augmented Rayleigh-Ritz Projections For Large-Scale Eigenpair Computation; **SIAM Journal on Matrix Analysis and Applications**; Vol. 38, No. 2, 2017, pp. 273-296, **Google citation: 9**

27. Wu Xinming, **Wen Zaiwen**, Bao Weizhu; A Regularized Newton Method for Computing Ground States of Bose-Einstein condensates; **Journal of Scientific Computing**; Vol. 73, No. 1, 2017, pp. 303-329, **Google citation: 50**

28. Jiang Bo, Liu Yafeng, **Wen Zaiwen**; L_p-norm Regularization Algorithms for Optimization Over Permutation Matrices; **SIAM Journal on Optimization**; Vol 26, No. 4, 2016, pp. 2284-2313, **Google citation: 38**

29. **Wen Zaiwen**, Yang Chao, Liu Xin, Zhang Yin; Trace-Penalty Minimization for Large-scale Eigenspace Computation; **Journal of Scientfic Computing**; Vol. 66, No. 3, 2016, pp. 1175-1203, **Google citation: 56**

30. Michael Ulbrich, **Wen Zaiwen,** Yang Chao, Dennis Klockner, Lu Zhaosong; A Proximal Gradient Method for Ensemble Density Functional Theory; **SIAM Journal on Scientific Computing**; Vol. 37, No. 4, 2015, pp. A1975-A2002, **Google citation: 24**

31. Liu Xin, **Wen Zaiwen**, Wang Xiao, Michael Ulbrich, Yuan Yaxiang; On the Analysis of the Discretized Kohn-Sham Density Functional Theory; **SIAM Journal on Numerical Analysis**; Vol. 53, No. 4, 2015, pp. 1758-1785, **Google citation: 42**

32. Liu Xin, **Wen Zaiwen**, Zhang Yin; An Efficient Gauss-Newton Algorithm for Symmetric Low-Rank Product Matrix Approximations; **SIAM Journal on Optimization**; Vol. 25, No. 3, 2015, pp. 1571-1608, **Google citation: 45**

33. Liu Xin, Wang Xiao, **Wen Zaiwen**, Yuan Yaxiang; On the Convergence of the Self-Consistent Field Iteration in Kohn-Sham Density Functional Theory; **SIAM Journal on Matrix Analysis and Applications**; Vol. 35, No. 2, 2014, pp. 546-558, **Google citation: 64**

34. Zhang Xin, Zhu Jinwei, **Wen Zaiwen**, Zhou Aihui; Gradient-type Optimization Methods for Electronic Structure Calculation; SIAM Journal on Scientific Computing; Vol. 36, No. 3, 2014, pp. C265-C289, **Google citation: 56**

35. Lai Rongjie, **Wen Zaiwen**, Yin Wotao, Gu Xianfeng, Lui Lok Ming; Folding-Free Global Conformal Mapping for Genus-0 Surfaces by Harmonic Energy Minimization; **Journal of Scientific Computing**; Vol. 58, 2014, pp. 705-725, **Google citation: 50**

36. Shen Yuan, **Wen Zaiwen**, Zhang Yin; Augmented Lagrangian Alternating Direction Method for Matrix Separation Based on Low-rank Factorization; **Optimization methods and Software**; Vol. 29, No. 2, 2014, pp. 239-263, **Google citation: 344**

37. Wang Lanhui, Amit Singer, **Wen Zaiwen**; Orientation Determination from Cryo-EM Images Using Least Unsquared Deviation; **SIAM Journal on Imaging Sciences**; Vol. 6, No. 4, 2013, pp. 2450-2483, **Google citation: 75**

38. **Wen Zaiwen**, Michael Ulbrich, Andre Milzarek, Zhang Hongchao; Adaptive Regularized Self-Consistent Field Iteration with Exact Hessian for Electronic Structure Calculation; **SIAM Journal on Scientific Computing**; Vol. 35, No. 3, 2013, pp. A1299-A1324, **Google citation: 21**

39. Liu Xin, **Wen Zaiwen**, Zhang Yin; Limited Memory Block Krylov Subspace Optimization for Computing Dominant Singular Value Decompositions; **SIAM Journal on Scientific Computing**; Vol. 35, 2013, pp. A1641-A1668, **Google citation: 81**

40. **Wen Zaiwen**, Yin Wotao; A Feasible method for Optimization with Orthogonality Constraints; **Mathematical Programming**; Vol. 142, No. 1, 2013, pp. 397-434, **Google citation: 1006**

41. Ling Qing, **Wen Zaiwen**, Yin Wotao; Decentralized Jointly Sparse Optimization by Reweighted lq Minimization; **IEEE Transactions on Signal Processing**; Vol. 61, No.5, 2013, pp. 1165-1170, **Google citation: 61**

42. **Wen Zaiwen**, Yang Chao, Liu Xin, Stefano Marchesini; Alternating Direction Methods for Classical and Ptychographic Phase Retrieval; **Inverse Problems**; Vol. 28, No. 11, 2012, pp. 1-18, **Google citation: 212**

43. **Wen Zaiwen**, Yin Wotao, Zhang Yin; Solving A Low-Rank Factorization Model for Matrix Completion by A Nonlinear Successive Over-Relaxation Algorithm; **Mathematical Programming Computation**; Vol. 4, No. 4, 2012, pp. 333-361, **Google citation: 851**

44. Xu Yangyang, Yin Wotao, **Wen Zaiwen**, Zhang Yin; An Alternating Direction Algorithm for Matrix Completion with Nonnegative Factors; **Journal of Frontiers of Mathematics in China**; Vol. 7, 2012, pp. 365-384, **Google citation: 387**

45. **Wen Zaiwen**, Yin Wotao, Zhang Hongchao, Donald Goldfarb; On the Convergence of An Active Set Method for l1 Minimization; **Optimization methods and software**; Vol. 27, No. 6, 2012, pp. 1127-1146, **Google citation: 67**

46. **Wen Zaiwen**, Donald Goldfarb, Katya Scheinberg; Block Coordinate Descent Methods for Semidefinite Programming; **in: M. Anjos, J. Lasserre (Eds.) Handbook on Semidefinite, Cone and Polynomial Optimization**; 2012, pp. 533-564, **Google citation: 76**

47. Ling Qing, Xu Yangyang, Yin Wotao, **Wen Zaiwen**; Decentralized Low Rank Matrix Completion; **The 37th International Conference on Acoustics, Speech, and Signal Processing**; 2011, pp. 2925-2928, **Google citation: 71**

48. Jason N. Laska, **Wen Zaiwen**, Yin Wotao, Richard G. Baraniuk; Trust, but Verify: Fast and Accurate Signal Recovering from 1-bit Compressive Measurements; **IEEE Transactions on Signal Processing**; Vol. 59, No. 11, 2011, pp. 5289-5301, **Google citation: 219**

49. **Wen Zaiwen**, Yin Wotao, Donald Goldfarb, Zhang Yin; A Fast Algorithm for Sparse Reconstruction Based on Shrinkage, Subspace Optimization, and Continuation; **SIAM Journal on Scientific Computing**; Vol. 32, No. 4, 2010, pp. 1832-1857, **Google citation: 288**

50. **Wen Zaiwen**, Donald Goldfarb; A Line Search Multigrid Method for Large-Scale Nonlinear Optimization; **SIAM Journal on Optimization**; Vol. 20, No. 3, 2010, pp.1478-1503, **Google citation: 48**

51. **Wen Zaiwen**, Donald Goldfarb, Yin Wotao; Alternating Direction Augmented Lagrangian Methods for semidefinite programming; **Mathematical Programming Computation**; Vol. 2, No. 3, 2010, pp. 203-230, **Google citation: 454**

52. Donald Goldfarb, **Wen Zaiwen**, Yin Wotao; A Curvilinear Search Method for the p-Harmonic Flow on Spheres; **SIAM Journal on Imaging Sciences**; Vol. 2, No. 1, 2009, pp. 84-109, **Google citation: 71**

Academic Softwares

Link: https://github.com/optsuite

Name	Purposes	Collaborators	Time
Optlib	Formalization of Mathematical Programming	Li Chenyi and Wangziyu	2023
MCPG	A learning framework for solving Binary Optimization	Chen Cheng, Chen Ruitao and Li Tianyou	2023
SDPDAL	A decomposition method for semidefinite programming	Liu Haoyang and Deng Kangkang	2023
NGPlus	A multi-step matrix-product natural gradient method for deep learning	Yang Minghan and Xu Dong	2021
SSNLP	A Package for Linear Programming	Yiyang Liu	2021
SENG	Sketchy natural gradient method for deep learning	Minghan Yang and Dong Xu	2020
PFOPT	A Toolbox for solving large-scale low-rank optimization problems using polynomial-filtered subspace extraction.	Haoyang Liu	2019
SSNSDP	A Package for Semidefinite Programming	Yongfeng Li	2018
ARNT	A Package for Optimization on manifold	Jiang Hu	2018
RBR	Row by Row method for community detection	Haoyang Liu	2017
Arrabit	A Package for Eigenvalue Computation	Haoyang Liu and Yin Zhang	2015
LMSVD	A Package for Singular Value Computation	Xin Liu and Yin Zhang	2012
LMAFIT	A Package for Matrix Completion	Yin Zhang and Wotao Yin	2010
SDPAD	A Package for Semidefinite Programming	Wotao Yin	2009
FPC_AS	A Package for l_1 minimization	Wotao Yin	2008
MGLS	A Package for multilevel optimization		2008