CURRICULUM VITAE

Anthony Man-Cho So
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EDUCATION

09/2002 – 07/2007: Stanford University, Stanford, CA, USA.
Ph.D. in Computer Science, with Ph.D. Minor in Mathematics.
Dissertation: A Semidefinite Programming Approach to the Graph Realization Problem: Theory, Applications and Extensions (Principal Co-Advisors: Yinyu Ye, Rajeev Motwani).

ACADEMIC APPOINTMENTS

1. 08/2022 – Present: Dean, Graduate School, The Chinese University of Hong Kong (CUHK).
2. 08/2018 – Present: Professor, Department of Systems Engineering and Engineering Management (SEEM), CUHK.
3. 07/2013 – 07/2018: Associate Professor, Department of SEEM, CUHK.
4. 07/2007 – 07/2013: Assistant Professor, Department of SEEM, CUHK.

HONORS AND AWARDS (award date in parentheses)

Research-related

1. **IEEE Fellow** (Class of 2023). IEEE (11/2022).
2. **2018 IEEE Signal Processing Society Best Paper Award** (with K.-Y. Wang, T.-H. Chang, W.-K. Ma, C.-Y. Chi). IEEE Signal Processing Society (05/2019).
3. **Research Excellence Award 2016-17**. CUHK (03/2018).
4. **2015 IEEE Signal Processing Magazine Best Paper Award** (with Z.-Q. Luo, W.-K. Ma, Y. Ye, S. Zhang). IEEE Signal Processing Society (04/2016).
5. **2014 IEEE Communications Society Asia-Pacific Outstanding Paper Award** (with Y. J. Zhang). IEEE Communications Society Asia-Pacific Board (12/2014).
6. **Young Researcher Award 2010**. CUHK (12/2011).
7. **2010 Optimization Prize for Young Researchers**. Optimization Society, Institute for Operations Research and the Management Sciences (INFORMS) (11/2010).

Teaching-related

1. **UGC Teaching Award 2022**. University Grants Committee, Hong Kong (09/2022).
2. **University Education Award 2022**. CUHK (06/2022).
3. **Dean's Exemplary Teaching Award 2015, 2013, 2011**. Faculty of Engineering, CUHK (02/2016, 03/2014, 03/2012).
4. **Vice-Chancellor's Exemplary Teaching Award 2013**. CUHK (11/2014).
5. **Faculty Exemplary Teaching Award 2008**. Faculty of Engineering, CUHK (03/2009).

Received by student supervisees

1. Taoli Zheng (current PhD student in SEEM): **Outstanding Presentation Award**, 8th Postgraduate Student Forum of the Mathematical Programming Branch of the Operations Research Society of China (12/2022).
2. Linglingzhi Zhu (current PhD student in SEEM): **Outstanding Presentation Award**, 7th Postgraduate Student Forum of the Mathematical Programming Branch of the Operations Research Society of China (12/2021).
3. Huikang Liu (former PhD student in SEEM): **Outstanding Output Award**, 4th Postgraduate Student Forum of the Mathematical Programming Branch of the Operations Research Society of China (09/2018).
4. Sherry Xue-Ying Ni (former PhD student in SEEM): **Best Student Paper Award**. 19th IEEE International Workshop on Signal Processing Advances in Wireless Communications (SPAWC 2018) (06/2018).

PROFESSIONAL ACTIVITIES

Journal editorial board membership

1. **Associate Editor**, Mathematics of Operations Research (05/2012 –12/2015, 01/2023 – Present).
2. **Associate Editor**, Mathematical Programming (01/2022 – Present).
3. **Associate Editor**, SIAM Journal on Optimization (11/2015 – Present).
4. **Associate Editor**, Journal of Global Optimization (01/2013 – Present).
5. **Associate Editor**, Optimization Methods and Software (04/2012 – Present).
6. **Lead Guest Editor**, IEEE Signal Processing Magazine, Special Issue on Non-Convex Optimization for Signal Processing and Machine Learning (03/2019 – 09/2020).
7. **Associate Editor**, IEEE Transactions on Signal Processing (10/2012 – 12/2016).

Selected services

1. **Area Chair**, International Conference on Machine Learning (ICML 2023)
2. **Area Chair**, Conference on Neural Information Processing Systems (NeurIPS 2021, NeurIPS 2022, NeurIPS 2023).
3. **Member**, Senior Program Committee, AAAI Conference on Artificial Intelligence (AAAI-22, AAAI-18, AAAI-17).
4. **Member**, Organizing Committee, SIAM Conference on Optimization (SIAM OP17).

HIGHLIGHTS OF CONTRIBUTIONS

(* denotes post-doc/PhD/MPhil advisee)

[H1] P. Wang*, H. Liu*, **A. M.-C. So**. *Linear Convergence of a Proximal Alternating Minimization Method with Extrapolation for ℓ_1-Norm Principal Component Analysis*. arXiv:2107:07107, accepted for publication in SIAM J. Optim.

[H2] L. Tian*, K. Zhou, **A. M.-C. So**. *On the Finite-Time Complexity and Practical Computation of Approximate Stationarity Concepts of Lipschitz Functions*. Proc. 39th ICML, pp. 21360–21379, 2022.

[H3] X. Wang*, P. Wang*, **A. M.-C. So**. *Exact Community Recovery over Signed Graphs*. Proc. 25th AISTATS, pp. 9686–9710, 2022.

[H4] P. Wang*, Z. Zhou*, **A. M.-C. So**. *Non-Convex Exact Community Recovery in Stochastic Block Model*. Math. Program. 195(1–2): 793–829, 2022.

[H5] X. Li, S. Chen*, Z. Deng*, Q. Qu, Z. Zhu, **A. M.-C. So**. *Weakly Convex Optimization over Stiefel Manifold Using Riemannian Subgradient-Type Methods*. SIAM J. Optim. 31(3): 1605–1634, 2021.

[H6] P. Wang*, H. Liu*, Z. Zhou*, **A. M.-C. So**. *Optimal Non-Convex Exact Recovery in Stochastic Block Model via Projected Power Method*. Proc. 38th ICML, pp. 10828–10838, 2021.

[H7] J. Li*, **A. M.-C. So**, W.-K. Ma. *Understanding Notions of Stationarity in Non-Smooth Optimization*. IEEE Signal Process. Mag. 37(5): 18–31, 2020.

[H8] J. Li*, C. Chen, **A. M.-C. So**. *Fast Epigraphical Projection-Based Incremental Algorithms for Wasserstein Distributionally Robust Support Vector Machine*. Proc. 33rd NeurIPS, pp. 4029–4039, 2020.

[H9] H. Liu*, **A. M.-C. So**, W. Wu*. *Quadratic Optimization with Orthogonality Constraint: Explicit Łojasiewicz Exponent and Linear Convergence of Retraction-Based Line-Search and Stochastic Variance-Reduced Gradient Methods.* Math. Program. 178(1–2): 215–262, 2019.

[H10] M.-C. Yue*, Z. Zhou*, **A. M.-C. So**. *A Family of Inexact SQA Methods for Non-Smooth Convex Minimization with Provable Convergence Guarantees Based on the Luo-Tseng Error Bound Property*. Math. Program. 174(1–2): 327–358, 2019.

[H11] M.-C. Yue*, Z. Zhou*, **A. M.-C. So**. *On the Quadratic Convergence of the Cubic Regularization Method under a Local Error Bound Condition.* SIAM J. Optim. 29(1): 904–932, 2019.

[H12] J. Li*, S. Huang*, **A. M.-C. So**. *A First-Order Algorithmic Framework for Wasserstein Distributionally Robust Logistic Regression.* Proc. 32nd NeurIPS, pp. 3939–3949, 2019.

[H13] H. Liu*, M.-C. Yue*, **A. M.-C. So**. *On the Estimation Performance and Convergence Rate of the Generalized Power Method for Phase Synchronization.* SIAM J. Optim. 27(4): 2426–2446, 2017.

[H14] Z. Zhou*, **A. M.-C. So**. *A Unified Approach to Error Bounds for Structured Convex Optimization Problems*. Math. Program. 165(2): 689–728, 2017.

[H15] W.-K. Ma, J. Pan, **A. M.-C. So**, T.-H. Chang. *Unraveling the Rank-One Solution Mystery of Robust MISO Downlink Transmit Optimization: A Verifiable Sufficient Condition via a New Duality Result*. IEEE Trans. Signal Process. 65(7): 1909–1924, 2017.

[H16] H. Liu*, M.-C. Yue*, **A. M.-C. So**, W.-K. Ma. *A Discrete First-Order Method for Large-Scale MIMO Detection with Provable Guarantees*. Proc. 18th IEEE SPAWC, 2017.

[H17] S. X. Wu*, M.-C. Yue*, **A. M.-C. So**, W.-K. Ma. *SDR Approximation Bounds for the Robust Multicast Beamforming Problem with Interference Temperature Constraints*. Proc. IEEE ICASSP, pp. 4054–4058, 2017.

[H18] Z. Zhou*, Q. Zhang*, **A. M.-C. So**. *$\ell_{1,p}$-Norm Regularization: Error Bounds and Convergence Rate Analysis of First-Order Methods*. Proc. 32nd ICML, pp. 1501–1510, 2015.

[H19] K.-Y. Wang, **A. M.-C. So**, T.-H. Chang, W.-K. Ma, C.-Y. Chi. *Outage Constrained Robust Transmit Optimization for Multiuser MISO Downlinks: Tractable Approximations by Conic Optimization*. IEEE Trans. Signal Process. 62(21): 5690–5705, 2014.

[H20] K. Hou*, **A. M.-C. So**. *Hardness and Approximation Results for L_p-Ball Constrained Homogeneous Polynomial Optimization Problems*. Math. Oper. Res. 39(4): 1084–1108, 2014.

[H21] S.-S. Cheung*, **A. M.-C. So**, K. Wang*. *Linear Matrix Inequalities with Stochastically Dependent Perturbations and Applications to Chance-Constrained Semidefinite Optimization*. SIAM J. Optim. 22(4):1398–1430, 2012.

[H22] **A. M.-C. So**. *Moment Inequalities for Sums of Random Matrices and Their Applications in Optimization*. Math. Program. 130(1): 125–151, 2011.

[H23] **A. M.-C. So**. *Deterministic Approximation Algorithms for Sphere Constrained Homogeneous Polynomial Optimization Problems*. Math. Program. 129(2): 357–382, 2011.

[H24] Y. J. Zhang, **A. M.-C. So**. *Optimal Spectrum Sharing in MIMO Cognitive Radio Networks via Semidefinite Programming*. IEEE J. Sel. Areas Commun. 29(2): 362–373, 2011.

[H25] Z. Zhu, **A. M.-C. So**, Y. Ye. *Universal Rigidity and Edge Sparsification for Sensor Network Localization*. SIAM J. Optim. 20(6): 3059–3081, 2010.

[H26] Z.-Q. Luo, W.-K. Ma, **A. M.-C. So**, Y. Ye, S. Zhang. *Semidefinite Relaxation of Quadratic Optimization Problems*. IEEE Signal Process. Mag. 27(3): 20–34, 2010.

[H27] **A. M.-C. So**, Y. Ye, J. Zhang. *A Unified Theorem on SDP Rank Reduction*. Math. Oper. Res. 33(4): 910–920, 2008.

[H28] **A. M.-C. So**, J. Zhang, Y. Ye. *On Approximating Complex Quadratic Optimization Problems via Semidefinite Programming Relaxations*. Math. Program. 110(1): 93–110, 2007.

[H29]**A. M.-C. So**, Y. Ye. *Theory of Semidefinite Programming for Sensor Network Localization*. Math. Program. 109(2–3): 367–384, 2007.

[H30] **A. M.-C. So**, Y. Ye. *A Semidefinite Programming Approach to Tensegrity Theory and Realizability of Graphs*. Proc. 17th ACM-SIAM SODA, 2006.

COMPETITIVE RESEARCH GRANTS

1. **Principal Investigator**, *Towards Understanding the Hardness of Structured Non-Smooth Non-Convex Optimization Problems*. Hong Kong Research Grants Council (RGC) General Research Fund (GRF) Project CUHK 14216122. Duration: 1 Jan 2023 to 31 Dec 2025. Grant Amount: HKD 946,348.

2. **Principal Investigator**, *Towards Provably Efficient and Effective Methods for Non-Convex Group Synchronization*. Hong Kong Research Grants Council (RGC) General Research Fund (GRF) Project CUHK 14205421. Duration: 1 Jan 2022 to 31 Dec 2024. Grant Amount: HKD 815,601.
3. **Partner Investigator**, *Design of Real-Time Optimisation Methods with Guaranteed Performance*. Australian Research Council (ARC) Discovery Project (DP) DP210102454. Duration: 1 Jan 2021 to 31 Dec 2023. Grant Amount: AUD 405,000.
4. **Principal Investigator**, *Design and Analysis of First-Order Methods for Wasserstein Distributionally Robust Risk Minimization in Machine Learning*. Hong Kong Research Grants Council (RGC) General Research Fund (GRF) Project CUHK 14203920. Duration: 1 Jan 2021 to 31 Dec 2023. Grant Amount: HKD 614,675.
5. **Principal Investigator**, *Towards Understanding the Convergence Behavior of Second-Order Methods for Structured Optimization Problems: An Error Bound-Based Approach*. Hong Kong Research Grants Council (RGC) General Research Fund (GRF) Project CUHK 14203218. Duration: 1 Jan 2019 to 31 Dec 2021. Grant Amount: HKD 790,526.
6. **Co-Investigator**, *Simplex-Structured Matrix Factorization using Stochastic Maximum-Likelihood and with Applications in Signal Processing and Machine Learning*. Hong Kong Research Grants Council (RGC) General Research Fund (GRF) Project CUHK 14205717. Duration: 1 Jan 2018 to 31 Dec 2020. Grant Amount: HKD 600,000.
7. **Principal Investigator**, *Error Bounds and Convergence Rate Analysis of First-Order Methods for Matrix Norm Regularization*. Hong Kong Research Grants Council (RGC) General Research Fund (GRF) Project CUHK 14206814. Duration: 1 Jan 2015 to 31 Dec 2017. Grant Amount: HKD 692,894.
8. **Principal Investigator**, *Non-Convex Optimization Approaches to Network Localization: Polynomial-Time Computability and Rigidity-Theoretic Implications*. Hong Kong Research Grants Council (RGC) General Research Fund (GRF) Project CUHK 416413. Duration: 1 Jan 2014 to 31 Dec 2016. Grant Amount: HKD 836,450.
9. **Principal Investigator**, *Chance Constrained Conic Optimization with Polynomial Data Perturbations: Analytic Approximations and Efficient Algorithms*. Hong Kong Research Grants Council (RGC) General Research Fund (GRF) Project CUHK 416012. Duration: 1 Jan 2013 to 31 Dec 2015. Grant Amount: HKD 769,860.
10. **Principal Investigator**, *Multivariate Quartic Polynomial Optimization: Approximation Algorithms and Applications* (Co-Investigator: Shuzhong ZHANG). Hong Kong Research Grants Council (RGC) General Research Fund (GRF) Project CUHK 419409. Duration: 1 Jan 2010 to 31 Dec 2012. Grant Amount: HKD 633,600.
11. **Principal Investigator**, *Semidefinite Programming Based Approaches to the Graph Realization Problem: Theory and Applications*. Hong Kong Research Grants Council (RGC) General Research Fund (GRF) Project CUHK 416908. Duration: 1 Jan 2009 to 31 Dec 2011. Grant Amount: HKD 410,094.