

CONTACT
INFORMATION

Georgia Institute of Technology
 H. Milton Stewart School of Industrial & Systems Engineering
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RESEARCH
INTERESTS

High-Dimensional Estimation & Inference
 Graphical Models & Semiparametric Models
 Large-Scale Stochastic Optimization
 Uncertainty Quantification
 Sequential Decision-Making & Optimal Control & Networks
 AI for Science: applications in biology, neuroscience, physics, and engineering

ACADEMIC
APPOINTMENT

Georgia Institute of Technology, Atlanta, Georgia USA August 2024 - present
 H. Milton Stewart School of Industrial and Systems Engineering
 Assistant Professor

University of California, Berkeley, Berkeley, California USA September 2021 - July 2024
 Department of Statistics and International Computer Science Institute
 Postdoctoral Scholar
 Advisor: Prof. [Michael W. Mahoney](#)

EDUCATION

University of Chicago, Chicago, Illinois USA August 2016 - July 2021
 Ph.D. in Statistics (GPA 4.0/4.0)
 Thesis: Towards Solving Long-Horizon Nonlinear Dynamic Programs: Scalability and Robustness
 Advisors: Prof. [Mihai Anitescu](#) and Prof. [Mladen Kolar](#)
 Committee members: Prof. [Lek-Heng Lim](#) and Prof. [Tengyuan Liang](#)

Nanjing University, Nanjing, Jiangsu China September 2012 - June 2016
 B.S. in Mathematics (GPA 3.9/4.0, rank 1/120)
 Thesis: A Stochastic Semi-Proximal-Based Peaceman-Rachford Splitting Method

University of California, Davis, Davis, California USA March 2015 - September 2015
 Department of Statistics, exchange student (GPA 4.0/4.0)

RESEARCH
EXPERIENCE

Argonne National Laboratory, Lemont, Illinois USA June - Sept., 2018, 2019, 2020
 Mathematics and Computer Science Division
 Givens Associate in 2018, 2019, and W.J. Cody Associate in 2020
Projects: sensitivity analysis of nonlinear dynamic programs, convergence analysis of online model predictive control, convergence analysis of offline temporal decomposition procedure, applications on power grids and energy systems, implementation of Julia/JuMP, IPOPT, etc.

TEACHING
EXPERIENCE

University of Chicago, Department of Statistics

Teaching Assistant

- STAT376 Machine Learning and Large-Scale Data Analysis Spring 2020
- STAT315 Stochastic Simulation Spring 2019
- STAT245 Statistical Theory and Methods (II) Winter 2021
- STAT244 Statistical Theory and Methods (I) Autumn 2017
- STAT234 Statistical Models and Methods Spring 2017, Winter 2017, Winter 2018

HONORS AND
AWARDS

- MAPR Meritorious Service Award**, Mathematical Optimization Society 2023
- ORIE Young Researcher**, Cornell University 2023
- SDSS Student & Early Career Award**, ASA 2023
- Harper Dissertation Fellowship**, University of Chicago 2020
(one of the highest honors at UChicago in recognition of Ph.D. candidates' record of achievement and professional promise.)
- Bao-steel Scholarship**, Nanjing University 2016
(one of the highest national honors given to undergraduate students for academic performance.)
- Outstanding Graduate**, Nanjing University 2016
- Exchange Program Scholarship**, University of California, Davis 2015
- Electronics Technology Scholarship**, Nanjing University 2014
- Aolei Scholarship**, Nanjing University 2013

PUBLICATIONS
(CHRONOLOGICAL
ORDER)

- [18] Fully Stochastic Trust-Region Sequential Quadratic Programming for Equality-Constrained Optimization Problems
Y. Fang, **S. Na**, M. W. Mahoney, and M. Kolar
SIAM Journal on Optimization, 2024 DOI: [10.1137/22m1537862](https://doi.org/10.1137/22m1537862)
- [17] Convergence Analysis of Accelerated Stochastic Gradient Descent Under the Growth Condition
Y.-L. Chen, **S. Na**, and M. Kolar *(YLC and SN have equal contribution)
Mathematics of Operations Research, 2023 DOI: [10.1287/moor.2021.0293](https://doi.org/10.1287/moor.2021.0293)
- [16] Constrained Optimization via Exact Augmented Lagrangian and Randomized Iterative Sketching
I. Hong, **S. Na**, M. W. Mahoney, and M. Kolar *(IH and SN have equal contribution)
International Conference on Machine Learning, 2023 Preprint
- [15] A Fast Temporal Decomposition Procedure for Long-horizon Nonlinear Dynamic Programming
S. Na, M. Anitescu, and M. Kolar
Mathematics of Operations Research, 2023 DOI: [10.1287/moor.2023.1378](https://doi.org/10.1287/moor.2023.1378)
- [14] Inequality Constrained Stochastic Nonlinear Optimization via Active-Set Sequential Quadratic Programming
S. Na, M. Anitescu, and M. Kolar
Mathematical Programming, 2023 DOI: [10.1007/s10107-023-01935-7](https://doi.org/10.1007/s10107-023-01935-7)
- [13] Hessian averaging in stochastic Newton methods achieves superlinear convergence
S. Na, M. Dereziński, and M. W. Mahoney
Mathematical Programming, 2022 DOI: [10.1007/s10107-022-01913-5](https://doi.org/10.1007/s10107-022-01913-5)
- [12] An adaptive stochastic sequential quadratic programming with differentiable exact augmented lagrangians
S. Na, M. Anitescu, and M. Kolar
Mathematical Programming, 2022 DOI: [10.1007/s10107-022-01846-z](https://doi.org/10.1007/s10107-022-01846-z)
- [11] Superconvergence of Online Optimization for Model Predictive Control
S. Na and M. Anitescu

- IEEE Transactions on Automatic Control*, 2022 DOI: [10.1109/tac.2022.3223323](#)
- [10] On the Convergence of Overlapping Schwarz Decomposition for Nonlinear Optimal Control
S. Na, S. Shin, M. Anitescu, and V. M. Zavala *(SN and SS have equal contribution)
IEEE Transactions on Automatic Control, 2022 DOI: [10.1109/tac.2022.3194087](#)
- [9] SFGAE: a self-feature-based graph autoencoder model for miRNA–disease associations prediction
M. Ma, S. Na, X. Zhang, C. Chen, and J. Xu
Briefings in Bioinformatics, 2022 DOI: [10.1093/bib/bbac340](#)
- [8] Global Convergence of Online Optimization for Nonlinear Model Predictive Control
S. Na
Advances in Neural Information Processing Systems, 2021 Preprint
- [7] High-dimensional index volatility models via Stein’s identity
S. Na and M. Kolar
Bernoulli, 2021 DOI: [10.3150/20-bej1238](#)
- [6] AEGCN: An Autoencoder-Constrained Graph Convolutional Network
M. Ma, S. Na, and H. Wang
Neurocomputing, 2021 DOI: [10.1016/j.neucom.2020.12.061](#)
- [5] The graph-based behavior-aware recommendation for interactive news
M. Ma, S. Na, H. Wang, C. Chen, and J. Xu
Applied Intelligence, 2021 DOI: [10.1007/s10489-021-02497-x](#)
- [4] Estimating differential latent variable graphical models with applications to brain connectivity
S. Na, M. Kolar, and O. Koyejo
Biometrika, 2020 DOI: [10.1093/biomet/asaa066](#)
- [3] Exponential Decay in the Sensitivity Analysis of Nonlinear Dynamic Programming
S. Na and M. Anitescu
SIAM Journal on Optimization, 2020 DOI: [10.1137/19m1265065](#)
- [2] Semiparametric Nonlinear Bipartite Graph Representation Learning with Provable Guarantees
S. Na, Y. Luo, Z. Yang, Z. Wang, and M. Kolar
International Conference on Machine Learning, 2020 Preprint
- [1] High-dimensional Varying Index Coefficient Models via Stein’s Identity
S. Na, Z. Yang, Z. Wang, and M. Kolar
Journal of Machine Learning Research, 2019 Preprint
- ** Towards Solving Long-Horizon Nonlinear Dynamic Programs: Scalability and Robustness
S. Na
University of Chicago (PhD Thesis), 2021

TECHNICAL
REPORTS (UNDER
REVIEW)

- [4] Globally Convergent Distributed Sequential Quadratic Programming with Overlapping Decomposition and Exact Augmented Lagrangian Merit Function
R. Ni, S. Na, S. Shin, and M. Anitescu
arXiv preprint arXiv:2402.17170, 2024 Preprint
- [3] An Asymptotically Optimal Method for Constrained Stochastic Optimization
S. Na, Y. Gao, M. K. Ng, and M. W. Mahoney *(SN and YG have equal contribution)
In submission, 2024 Preprint
- [2] Near-Optimal Performance of Stochastic Predictive Control
S. Shin, S. Na, and M. Anitescu
arXiv preprint arXiv:2210.08599, 2022 Preprint
- [1] Statistical Inference of Constrained Stochastic Optimization via Sketched Sequential Quadratic Programming
S. Na and M. W. Mahoney

arXiv preprint arXiv:2205.13687, 2022 **Preprint**

WORKING PAPERS
(AVAILABLE UPON
REQUEST)

- [3] W. Kuang, **S. Na**, M. W. Mahoney, and M. Anitescu. Online Covariance Matrix Estimation in Stochastic Inexact Newton Methods. 2023+ (accepted in part in the NeurIPS workshop, 2023)
- [2] Y. Fang, **S. Na**, M. W. Mahoney, and M. Kolar. Trust-Region Sequential Quadratic Programming for Stochastic Optimization with Random Models. 2023+ (accepted in part in the NeurIPS workshop, 2022)
- [1] M. Li, **S. Na**, and M. Kolar. Exact Augmented Lagrangian on Manifold Optimization. 2023+

TALKS

- [10] UC Berkeley (biostatistics seminar) Berkeley, Apr. 2024
- [9] Stanford University (optimization seminar) Stanford, Mar. 2024
- [8] INFORMS Annual Meeting Phoenix, Oct. 2023
- [7] Cornell ORIE Young Researchers Workshop (referred) Cornell, Oct. 2023
- [6] International Conference on Machine Learning Honolulu, July 2023
- [5] SIAM Conference on Optimization Seattle, May 2023
- [4] Symposium on Data Science & Statistics (referred) St. Louis, May 2023
- [3] Advances in Neural Information Processing Systems Virtual, Dec. 2021
- [2] International Conference on Machine Learning Virtual, July 2020
- [1] Summer Student Mini-Symposium, Argonne National Laboratory Lemont, Sept. 2018-2020

PROFESSIONAL
SERVICE

Referee Service

I have served as a referee for several prestigious journals in the fields of mathematics, statistics, and optimization, including:

- Journal of Machine Learning Research
- IMA Journal of Numerical Analysis
- Mathematics of Operations Research
- Mathematical Programming
- SIAM Journal on Scientific Computing
- SIAM Journal on Optimization
- Journal of Computational and Graphical Statistics
- Electronic Journal of Statistics
- Statistics & Probability Letters

Reviewer of conferences: NeurIPS, ICML, ICLR, IJCAI, AISTats etc.

Organizer of conference sessions: SIAM Conference on Optimization, INFORMS Annual Meeting

Member of INFORMS, IISE

Mentoring Experience

I am fortunate to supervise self-motivated junior students on various research problems

- Xiaoran Chen (UChicago, Stat, MS), Yang Chu (Berkeley, Stat, PhD), Xinchun Du (UChicago, Stat, MS), Yuchen Fang (UChicago, CAM, MS), Yihang Gao (HKU, Math, PhD), Ilgee Hong (UChicago, Stat, MS), Simiao Jiao (UChicago, Stat, MS), Wei Kuang (UChicago, Stat, PhD), Miao Li (UChicago, CAM, MS), Heming Liu (UChicago, Stat, MS), Xiaoyu Niu (Berkeley, Math, PhD)

SKILLS

Programming Languages

- Matlab, Python, Julia, R, Git, Linux Shell

Languages

- Native: Mandarin, Chinese
- Fluent: English

ACTIVITIES

Professional ping pong player until ninth grade

Recreation: soccer, hiking, walking the dog, road tripping

REFERENCES

Provided upon request