

**CURRICULUM VITAE FOR PROMOTION AND TENURE**

JU SUN

[jusun@umn.edu](mailto:jusun@umn.edu)ORCID iD: [0000-0002-2017-5903](https://orcid.org/0000-0002-2017-5903)<https://sunju.org/>**IDENTIFYING INFORMATION****McKnight Land-Grant Professorship (2025–2027)**

Assistant Professor Computer Science and Engineering  
 Graduate Faculty Computer Science and Engineering; Electrical and Computer Engineering; Institute for Health Informatics; UMN Data Science Program  
 Other Affiliations UMN Data Science Initiative (core member); UMN CSE Data Science Initiative (CS&E Ambassador); Institute for Engineering in Medicine; UMN Center for Learning Health System Sciences (CLHSS); Program for Clinical AI of CLHSS (core member; group lead); Program for Innovative Methods & Data Science of CLHSS (core member); Masonic Cancer Center; AI-CLIMATE (National AI Research Institute for Climate-Land Interactions, Mitigation, Adaptation, Tradeoffs and Economy)

**Education**

<b>Degree</b>	<b>Institution</b>	<b>Date Degree Granted</b>
B.Eng. Computer Engineering [Minor in Mathematics]	National University of Singapore	Jun 2008
M.S. Electrical Engineering	Columbia University	Feb 2013
Ph.D. Electrical Engineering [Advisor: John N Wright]	Columbia University	Jun 2016

**Positions/Employment**

PureBioX, Inc R&D Director of Artificial Intelligence	2023–Present Sep 2023–Present
University of Minnesota, Twin Cities Assistant Professor	2019–Present Jul 2019–Present
Stanford University Postdoctoral scholar [Advisor: Emmanuel Candès]	2016–2019 Jul 2016–Jun 2019
National Univesity of Singapore Research Engineer, Institute of Interactive & Digital Media	2008–2011 Jul 2008–Aug 2011

## Current Membership in Professional Organizations

Member of Association for the Advancement of Artificial Intelligence (AAAI)/Association for Computing Machinery (ACM)/Institute for Operations Research and the Management Sciences (INFORMS)/The Optical Society/Society for Industrial and Applied Mathematics (SIAM)/Institute of Electrical and Electronics Engineers (IEEE)

## HONORS AND AWARDS FOR RESEARCH/CREATIVE WORK, TEACHING, PUBLIC ENGAGEMENT, AND SERVICE

### University of Minnesota

McKnight Land-Grant Professorship 2025-2027

### External Sources

Frontiers of Science Award in Mathematics, International Congress of Basic Science (ICBS)	2024
AAAI New Faculty Highlights Program	2021
Honorable Mention of Doctoral Thesis for New World Mathematics Awards	2018
Best Student Paper Award, SPARS15	2015

### Visiting Professorships or Visiting Scholar Positions

Name of university/college/institute; department; dates; focus

## RESEARCH

### Grants and Contracts

#### *External Sources*

#### *Received at the University of Minnesota:*

#### Active

- 1) **PI Status:** PI  
**PI:** Self  
**From:** ZSCALER, INC  
**Title and Dates:** Efficient, and Safe Multi-Agent Cross-Domain Text-to-SQL System (Jan 2025–May 2025)  
**Direct costs:** ~\$37.3K (Personal share: ~\$37.3K)
- 2) **PI Status:** PI  
**PI:** Self  
**From:** NIH NATIONAL CANCER INSTITUTE  
**Title and Dates:** SCH: A New Computational Framework for Learning from Imbalanced Biomedical Data (Aug 2023–Jul 2027)  
**Direct costs:** ~\$800K (Personal share: ~\$270K)
- 3) **PI Status:** Co-PI  
**PI:** Conelea, Christine A.

**From:** NIH NAT INST OF NEURO DISORDERS & STROKE

**Title and Dates:** Quantification of Tics in Tourette Syndrome (May 2023–Apr 2028)

**Direct costs:** ~\$2.13M (Personal share: ~\$500K)

4) **PI Status:** Co-PI

**PI:** Sun, Xiaoran

**From:** NATIONAL INSTITUTES OF HEALTH (NIH)

**Title and Dates:** Adolescents' Social Media Management Strategies: Bidirectional Links to Objective Social Media Use and Mental Health Outcomes (Sep 2024–Aug 2028)

**Direct costs:** ~\$1.85M (Personal share: ~\$210K)

5) **PI Status:** Co-PI

**PI:** Shekhar, Shashi

**From:** USDA Nat'l Inst. of Food & Agriculture

**Title and Dates:** AI-CLIMATE (Artificial Intelligence Institute for Climate-Land Interactions, Mitigations, Adaption, Trade-Offs and Economy) (Jun 2023–May 2026)

**Direct costs:** ~\$13.3M (Personal share: ~\$100K)

### Pending

1) **PI Status:** PI

**PI:** Self

**From:** THE NATIONAL SCIENCE FOUNDATION

**Title and Dates:** ACED: Accelerating Materials Discovery by Learning with Physics-Informed Constraints (Submitted: Jun 2024)

**Direct costs:** ~\$333K (Personal share: ~\$140K)

2) **PI Status:** Co-PI

**PI:**

**From:** THE NATIONAL ACADEMIES

**Title and Dates:** Revolutionizing 3D Dental Caries Mapping Through AI-Driven Multimodal Imaging (Submitted: Nov 2024)

**Direct costs:** ~\$100K (Personal share: ~\$15K)

### Completed

1) **PI Status:** PI

**PI:** Self

**From:** THE NATIONAL SCIENCE FOUNDATION

**Title and Dates:** Travel Grant: MIDWEST MACHINE LEARNING SYMPOSIUM 2024 (Jun 2024–Nov 2024)

**Direct costs:** ~\$25K (Personal share: ~\$25K)

2) **PI Status:** Co-PI

**PI:** Rajamani, Rajesh

**From:** THE NATIONAL SCIENCE FOUNDATION

**Title and Dates:** CPS: Medium: Smart Tracking Systems for Safe and Smooth Interactions Between Scooters and Road Vehicles (Jan 2021–Dec 2024)

**Direct costs:** ~\$800K (Personal share: ~\$270K)

- 3) **PI Status:** Co-PI  
**PI:** Rusack, Roger W.  
**From:** U.S. DEPARTMENT OF ENERGY (USDOE)  
**Title and Dates:** FAIR Framework for Physics-Inspired AI in High Energy Physics (Sep 2020–May 2024)  
**Direct costs:** ~\$500K (Personal share: ~\$100K)
- 4) **PI Status:** PI  
**PI:** Self  
**From:** THE NATIONAL SCIENCE FOUNDATION  
**Title and Dates:** Federated and imbalanced learning for medical NLP (Dec 2022–Dec 2023)  
**Direct costs:** ~\$25K (Personal share: ~\$25K)
- 5) **PI Status:** PI  
**PI:** Self  
**From:** CISCO SYSTEMS, INC  
**Title and Dates:** Collaborative AI Models for Fracture Detection in Trauma and Critical Care (May 2021–Dec 2022)  
**Direct costs:** ~\$13.3K (Personal share: ~\$8K)
- 6) **PI Status:** Co-PI  
**PI:** Safo, Sandra  
**From:** NIH NIGMS NATL INST OF GENERAL  
**Title and Dates:** Statistical and Machine Learning Methods to Address Biomedical Challenges for Integrating Multi-view Data (Supplement) (Jul 2023–Jun 2024)  
**Direct costs:** ~\$230.6K (Personal share: ~\$60K)
- 7) **PI Status:** Co-PI  
**PI:** Choi, Janet  
**From:** UNIVERSITY OF SOUTHERN CALIFORNIA  
**Title and Dates:** Big Data to Personalized Hearing Health: Developing an Open Database for Hearing Devices and a Matching System (Sep 2023–Jun 2024)  
**Direct costs:** ~\$180K (Personal share: ~\$32K)
- 8) **PI Status:** Co-PI  
**PI:** Chiang, Yao-Yi  
**From:** INFERLINK CORPORATION  
**Title and Dates:** AI for Map Geolocation and Extraction to Find Critical Minerals (Sep 2023–Sep 2024)  
**Direct costs:** ~\$500K (Personal share: ~\$80K)

*Received at the University of Minnesota – Student Grants*

Student Name, Principal Investigator (Candidate, Research Sponsor).

Grant title and external or internal agency  
Dates

### ***University Sources (Selected)***

#### Active

- 1) [Student Grants] Gaoxiang Luo, DSI-MnDRIVE PhD Graduate Assistantship, 2025–2026
- 2) Accelerating Materials Discovery and Engineering Designs by Learning with Physics-Informed Constraints (PI, \$75K, DSI Faculty Fellowship, 2025)
- 3) Atomic-level In-situ and Ex-situ STEM Study of Quantum Devices for Quantum Computing—Phase II (Co-PI, \$90K, CSE InterS&Ections Seed Grant, 2024–2025)

#### Completed

- 1) Data Science Methods to Enable Real-world Evidence to Support Stroke Care (DRESS) (Co-PI, \$120K, DSI Seed Grant—Large, 2023–2024)
- 2) Stochastic Optimization for Constrained Deep Learning (PI, \$50K, DSI Seed Grant—Medium, 2023–2024)
- 3) Constrained deep learning for the efficient discovery of stable solid-state materials (PI, \$50K, CSE DSI PhD Fellowship, 2023–2024)
- 4) Sharp Analysis of Atomic-Resolution STEM Data via Deep Learning (PI, \$50K, CSE DSI PhD Fellowship, 2023–2024)
- 5) DeepLifting: Complex Engineering Design and Operation with Discrete Decisions Made Easy (PI, \$100K, Research Computing Seed Grant—Large, 2023–2024)
- 6) Atomic-level In-situ and Ex-situ STEM Study of Quantum Devices for Quantum Computing (Co-PI, \$90K, CSE InterS&Ections Seed Grant, 2023–2024)

### **Publications**

Underline - indicates student/postdoc authors advised by the candidate

Total citations: **7147**, H-index: **23**, H10-index: **36**, according to Google Scholar as of Mar 6, 2025 .  
Please refer to my [Google Scholar page](#) for an updated publication list and citation figures.

### ***Refereed Journal Articles***

- 1) Wang, H., Lu, H., **Sun, J.**, & Safo, S. (2024). Interpretable Deep Learning Methods for Multiview Learning. *BMC Bioinformatics*, 25(1), 1–30. [doi: 10.1186/s12859-024-05679-9](https://doi.org/10.1186/s12859-024-05679-9)
- 2) Zhou, S., Blaes, A., Shenoy, C., **Sun, J.**, & Zhang, R. (2024). Risk Prediction of Heart Diseases in Breast Cancer Patients: A Deep Learning Approach with Longitudinal Electronic Health Records Data. *iScience*, 27(7), 110329. [doi: 10.1016/j.isci.2024.110329](https://doi.org/10.1016/j.isci.2024.110329)
- 3) Yew, P. Y., Devera, R., Liang, Y., El Khaifa, R. A., **Sun, J.**, Chi, N.-C., . . . Chi, C.-L. (2024). Unraveling the Multiple Chronic Conditions Patterns Among People with Alzheimer’s Disease and Related Dementia—A Machine Learning Approach to Incorporate Synergistic Interactions. *Alzheimer’s & Dementia: The Journal of the Alzheimer’s Association*, 20(7), 4818–4827. [doi: 10.1002/alz.13923](https://doi.org/10.1002/alz.13923)
- 4) Peng, L., Luo, G., Zhou, S., Chen, J., Xu, Z., Zhang, R., & **Sun, J.** (2024). An In-Depth

- Evaluation of Federated Learning on Biomedical Natural Language Processing. *npj Digital Medicine*, 7, 127. [doi: 10.1038/s41746-024-01126-4](https://doi.org/10.1038/s41746-024-01126-4)
- 5) He, C., Peng, L., & Sun, J. (2024). Federated Learning with Convex Global and Local Constraints. *Transactions on Machine Learning Research (TMLR)*. <https://openreview.net/forum?id=qItxVbWyfe>
  - 6) Liang, H., Peng, L., & Sun, J. (2024). Selective Classification Under Distribution Shifts. *Transactions on Machine Learning Research (TMLR)*. <https://openreview.net/forum?id=dmxMGW6J7N>
  - 7) Travadi, Y., Peng, L., Bi, X., Sun, J., & Yang, M. (2024). Welfare and Fairness Dynamics in Federated Learning: A Client Selection Perspective. *Statistics and Its Interface*, 17(3), 383–395. [doi: 10.4310/23-SII779](https://doi.org/10.4310/23-SII779)
  - 8) Li, S., Chen, C., Zou, F., Jie, Z., Sun, J., & Liu, W. (2024). A Unified Analysis of AdaGrad with Weighted Aggregation and Momentum Acceleration. *IEEE Transactions on Neural Networks and Learning Systems*, 35(10), 14482–14490. [doi: 10.1109/TNNLS.2023.3279381](https://doi.org/10.1109/TNNLS.2023.3279381)
  - 9) Conelea, C., Liang, H., DuBois, M., Raab, B., Kellman, M., Wellen, B., . . . Lim, K. (2024). Automated Quantification of Eye Tics using Computer Vision and Deep Learning Techniques. *Movement Disorders*, 39(1):183–191. [doi: 10.1002/mds.29593](https://doi.org/10.1002/mds.29593)
  - 10) Zhuang, Z., Li, T., Wang, H., & Sun, J. (2024) Blind Image Deblurring with Unknown Kernel Size and Substantial Noise. *International Journal of Computer Vision (IJCV)*, 132(2):319–348. [doi: 10.1007/s11263-023-01883-x](https://doi.org/10.1007/s11263-023-01883-x)
  - 11) Zhou, S., Wang, N., Wang, L., Sun, J., Blaes, A., Liu, H., & Zhang, R. (2023). A Cross-institutional Evaluation on Breast Cancer Phenotyping NLP Algorithms on Electronic Health Records. *Computational and Structural Biotechnology Journal*, 22:32–40. [doi: 10.1016/j.csbj.2023.08.018](https://doi.org/10.1016/j.csbj.2023.08.018)
  - 12) Z., Ryu, S., Zhou, W., Adams, K., Hassan, M., Zhang, R., . . . Sun, J. (2023). Effects of Personalized Exercise Prescriptions and Social Media through m-Health on Cancer Survivors' Physical Activity and Quality of Life. *Journal of Sport and Health Science*, 12(6):705–714. [doi: 10.1016/j.jshs.2023.07.002](https://doi.org/10.1016/j.jshs.2023.07.002)
  - 13) Wang, H., Li, T., Zhuang, Z., Chen, T., Liang, H., & Sun, J. (2023). Early Stopping for Deep Image Prior. *Transactions on Machine Learning Research*. <https://openreview.net/forum?id=231ZzrLC8X>
  - 14) Peng, L., Luo, G., Walker, A., Zaiman, Z., Jones, E., Gupta, H., . . . Tignanelli, C. (2022). Evaluation of Federated Learning Variations for COVID-19 Diagnosis using Chest Radiographs from 42 US and European Hospitals. *Journal of the American Medical Informatics Association*, 30(1), 54–63. [doi: 10.1093/jamia/ocac188](https://doi.org/10.1093/jamia/ocac188)
  - 15) Sun, J., Peng, L., Li, T., Adila, D., Zaiman, Z., Melton, G. B., . . . Tignanelli, C. (2022). A Prospective Observational Study to Investigate Performance of a Chest X-ray Artificial Intelligence Diagnostic Support Tool Across 12 U.S. Hospitals. *Radiology: Artificial Intelligence*, 4(4). [doi: 10.1148/ryai.210217](https://doi.org/10.1148/ryai.210217)
  - 16) Barmherzig, D. A., & Sun, J. (2022). Towards Practical Holographic Coherent Diffraction Imaging via Maximum Likelihood Estimation. *Optics Express*, 30(5), 6886–6906. [doi: 10.1364/OE.445015](https://doi.org/10.1364/OE.445015)
  - 17) Taha, B., Boley, D., Sun, J., & Chen, C. (2021). Potential and limitations of radiomics in neuro-oncology. *Journal of Clinical Neuroscience*, 90, 206–211. [doi: 10.1016/j.jocn.2021.05.015](https://doi.org/10.1016/j.jocn.2021.05.015)
  - 18) Taha, B., Li, T., Boley, D., Chen, C. C., & Sun, J. (2021). Detection of Isocitrate Dehydrogenase Mutated Glioblastomas Through Anomaly Detection Analytics. *Neurosurgery*, 89(2), 323–328. [doi: 10.1093/neuros/nyab130](https://doi.org/10.1093/neuros/nyab130)
  - 19) Taha, B., Boley, D., Sun, J., & Chen, C. C. (2021). State of Radiomics in Glioblastoma.

- Neurosurgery*, 89(2), 177–184. [doi: 10.1093/neuros/nyab124](https://doi.org/10.1093/neuros/nyab124)
- 20) Cheung, S. C., Shin, J. Y., Lau, Y., Chen, Z., **Sun, J.**, Zhang, Y., . . . Pasupathy, A. N. (2020). Dictionary learning in Fourier-transform scanning tunneling spectroscopy. *Nature Communications*, 11(1). [doi: 10.1038/s41467-020-14633-1](https://doi.org/10.1038/s41467-020-14633-1)
- 21) A Barmherzig, D., **Sun, J.**, Li, P.-N., Lane, T. J., & Emmanuel J Candès (2019). Holographic phase retrieval and reference design. *Inverse Problems*, 35(9), 094001. [doi: 10.1088/1361-6420/ab23d1](https://doi.org/10.1088/1361-6420/ab23d1)
- 22) Lu, T., **Sun, J.**, Wu, K., & Yang, Z. (2018). High-Speed Channel Modeling With Machine Learning Methods for Signal Integrity Analysis. *IEEE Transactions on Electromagnetic Compatibility*, 60(6), 1957–1964. [doi: 10.1109/temc.2017.2784833](https://doi.org/10.1109/temc.2017.2784833)
- 23) **Sun, J.**, Qu, Q., & Wright, J. (2017). A Geometric Analysis of Phase Retrieval. *Foundations of Computational Mathematics*, 18(5), 1131–1198. [doi: 10.1007/s10208-017-9365-9](https://doi.org/10.1007/s10208-017-9365-9)
- 24) **Sun, J.**, Qu, Q., & Wright, J. (2017). Complete Dictionary Recovery Over the Sphere I: Overview and the Geometric Picture. *IEEE Transactions on Information Theory*, 63(2), 853–884. [doi: 10.1109/tit.2016.2632162](https://doi.org/10.1109/tit.2016.2632162)
- 25) Qu, Q., **Sun, J.**, & Wright, J. (2016). Finding a Sparse Vector in a Subspace: Linear Sparsity Using Alternating Directions. *IEEE Transactions on Information Theory*, 62(10), 5855–5880. [doi: 10.1109/tit.2016.2601599](https://doi.org/10.1109/tit.2016.2601599)
- 26) **Sun, J.**, Zhang, Y., & Wright, J. (2014). Efficient Point-to-Subspace Query in L1 with Application to Robust Object Instance Recognition. *SIAM Journal on Imaging Sciences*, 7(4), 2105–2138. [doi: 10.1137/130936166](https://doi.org/10.1137/130936166)
- 27) Liu, G., Lin, Z., Yan, S., **Sun, J.**, Yu, Y., & Ma, Y. (2013). Robust Recovery of Subspace Structures by Low-Rank Representation. *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 35(1), 171–184. [doi: 10.1109/tpami.2012.88](https://doi.org/10.1109/tpami.2012.88)

### Refereed Conference Proceedings

- 28) Wang, H., Zhang, X., Li, T., Wan, Y., Chen, T., & **Sun, J.** (2024). DMPlug: A Plug-in Method for Solving Inverse Problems with Diffusion Models. *Conference on Neural Information Processing Systems (NeurIPS)*. <https://openreview.net/forum?id=81IFFsfQUj>
- 29) Zhang, W., Wan, Y., Zhong, Z., & **Sun, J.** (2024). What’s Wrong with End-to-End Learning for Phase Retrieval? *Machine Learning for Scientific Imaging at Electronic Imaging*. [doi: 10.2352/EI.2024.36.5.MLSI-309](https://doi.org/10.2352/EI.2024.36.5.MLSI-309)
- 30) Peng, L., Zhou, S., Chen, J., Zhang, R., Xu, Z., & **Sun, J.** (2023). A Systematic Evaluation of Federated Learning on Biomedical Natural Language Processing. *International Workshop on Federated Learning for Distributed Data Mining (in KDD 2023)*. <https://openreview.net/pdf?id=pLEQFXACNA>
- 31) Zhong, Z., Li, T., Wang, H., & **Sun, J.** (2023). Blind Image Deblurring with Unknown Kernel Size and Substantial Noise. *NeurIPS’23 Workshop on Deep Learning and Inverse Problems*. <https://arxiv.org/abs/2208.09483>
- 32) Li, T., Wang, H., Zhuang, Z., & **Sun, J.** (2023). Deep Random Projector: Accelerated Deep Image Prior. *Computer Vision and Pattern Recognition (CVPR)*. [doi: 10.1109/CVPR52729.2023.01743](https://doi.org/10.1109/CVPR52729.2023.01743)
- 33) He, C., Peng, L., & **Sun, J.** (2023). Federated Learning with Convex Global and Local Constraints. *NeurIPS’23 Workshop on Optimization for Machine Learning*. <https://openreview.net/forum?id=JprHZqWE4M>
- 34) Liang, H., Liang, B., Peng, L., Cui, Y., Mitchell, T., & **Sun, J.** (2023). Implications of Solution Patterns on Adversarial Robustness. *The 3rd Workshop of Adversarial Machine Learning on*

- Computer Vision: Art of Robustness (in conjunction with CVPR 2023)*. [doi: 10.1109/CVPRW59228.2023.00237](https://doi.org/10.1109/CVPRW59228.2023.00237)
- 35) [Liang, H.](#), [Liang, B.](#), Cui, Y., Mitchell, T., & [Sun, J.](#) (2023). Optimization for Robustness Evaluation beyond Lp Metrics. *International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*. [doi: 10.1109/ICASSP49357.2023.10095871](https://doi.org/10.1109/ICASSP49357.2023.10095871)
  - 36) [Zhong, Z.](#), Yang, D., Hofmann, F., Barmherzig, D., & [Sun, J.](#) (2023). Phase Retrieval Using Double Deep Image Priors. *NeurIPS'23 Workshop on Deep Learning and Inverse Problems*. <https://openreview.net/forum?id=7q3i7nLdeF>
  - 37) [Zhuang, Z.](#), Yang, D., Hofmann, F., Barmherzig, D., & [Sun, J.](#) (2023). Practical Phase Retrieval Using Double Deep Image Priors. *Computational Imaging XXI at Electronic Imaging*. <https://library.imaging.org/ei/articles/35/14/COIMG-153>
  - 38) [Li, T.](#), [Zhuang, Z.](#), [Wang, H.](#), & [Sun, J.](#) (2023). Random Projector: Efficient Deep Image Prior. *International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*. [doi: 10.1109/ICASSP49357.2023.10097088](https://doi.org/10.1109/ICASSP49357.2023.10097088)
  - 39) [Li, T.](#), [Wang, H.](#), [Peng, L.](#), [Tang, X.](#), & [Sun, J.](#) (2023). Robust Autoencoders for Collective Corruption Removal. *International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*. [doi: 10.1109/ICASSP49357.2023.10095099](https://doi.org/10.1109/ICASSP49357.2023.10095099)
  - 40) [Peng, L.](#), [Liang, H.](#), [Luo, G.](#), [Li, T.](#), & [Sun, J.](#) (2023). Rethink Transfer Learning in Medical Image Classification. *British Machine Vision Conference (BMVC)*. <https://proceedings.bmvc2023.org/881/>
  - 41) [Liang, B.](#), Mitchell, T., & [Sun, J.](#) (2022). NCVX: A General-Purpose Optimization Solver for Constrained Machine and Deep Learning. *NeurIPS Workshop on Optimization for Machine Learning*. <https://arxiv.org/abs/2210.00973>
  - 42) [Peng, L.](#), [Travadi, Y.](#), Zhang, R., Cui, Y., & [Sun, J.](#) (2022). Imbalanced Classification in Medical Imaging via Regrouping. *NeurIPS Workshop on Medical Imaging Meets NeurIPS*. <https://arxiv.org/abs/2210.12234>
  - 43) [Liang, H.](#), [Liang, B.](#), Cui, Y., Mitchell, T., & [Sun, J.](#) (2022). Optimization for Robustness Evaluation beyond Lp Metrics. *NeurIPS Workshop on Optimization for Machine Learning*. <https://arxiv.org/abs/2210.00621>
  - 44) [Tayal, K.](#), [Manekar, R.](#), [Zhuang, Z.](#), Yang, D., Kumar, V., Hofmann, F., & [Sun, J.](#) (2021). Phase Retrieval using Single-Instance Deep Generative Prior. *OSA Optical Sensors and Sensing Congress 2021 (AIS, FTS, HISE, SENSORS, ES)*. OSA. [doi: 10.1364/ais.2021.jw2a.37](https://doi.org/10.1364/ais.2021.jw2a.37)
  - 45) [Li, T.](#), [Zhuang, Z.](#), [Liang, H.](#), [Peng, L.](#), [Wang, H.](#), & [Sun, J.](#) (2021). Self-Validation: Early Stopping for Single-Instance Deep Generative Priors. *British Machine Vision Conference (BMVC)*. <https://arxiv.org/abs/2110.12271>
  - 46) [Manekar, R.](#), [Zhuang, Z.](#), [Tayal, K.](#), Kumar, V., & [Sun, J.](#) (2020). Deep Learning Initialized Phase Retrieval. *NeurIPS 2020 Workshop on Deep Learning and Inverse Problems*. <https://sunju.org/pub/NIPS20-WS-DL4FPR.pdf>
  - 47) [Manekar, R.](#), [Tayal, K.](#), Kumar, V., & [Sun, J.](#) (2020). End-to-End Learning for Phase Retrieval. *ICML workshop on ML Interpretability for Scientific Discovery*. <https://sunju.org/pub/ICML20-WS-DL4FPR.pdf>
  - 48) Barmherzig, D. A., & [Sun, J.](#) (2020). Low-Photon Holographic Phase Retrieval. *Imaging and Applied Optics Congress*. OSA. [doi: 10.1364/cosi.2020.jtu4a.6](https://doi.org/10.1364/cosi.2020.jtu4a.6)
  - 49) [Zhuang, Z.](#), Wang, G., [Travadi, Y.](#), & [Sun, J.](#) (2020). Phase Retrieval via Second-Order Nonsmooth Optimization. *ICML workshop on Beyond First Order Methods in Machine Learning*. <https://sunju.org/pub/ICML20-WS-ALM-FPR.pdf>
  - 50) [Li, T.](#), [Mehta, R.](#), [Qian, Z.](#), & [Sun, J.](#) (2020). Rethink Autoencoders: Robust Manifold Learning. *ICML workshop on Uncertainty and Robustness in Deep Learning*.



- <https://sunju.org/pub/ICML2020-WS-RML.pdf>
- 51) Tayal, K., Lai, C.-H., Manekar, R., Zhuang, Z., Kumar, V., & Sun, J. (2020). Unlocking Inverse Problems Using Deep Learning: Breaking Symmetries in Phase Retrieval. *NeurIPS 2020 Workshop on Deep Learning and Inverse Problems*.  
<https://sunju.org/pub/NIPS20-WS-DL4INV.pdf>
- 52) Bai, Y., Jiang, Q., & Sun, J. (2019). Subgradient Descent Learns Orthogonal Dictionaries. *International Conference on Learning Representations*.  
<https://openreview.net/forum?id=HklSf3CqKm>
- 53) Barmherzig, D. A., & Sun, J. (2018). 1D Phase Retrieval and Spectral Factorization. *Imaging and Applied Optics 2018 (3D, AO, AIO, COSI, DH, IS, LACSEA, LS&C, MATH, pcAOP)*. OSA. doi: 10.1364/lacsea.2018.jth1a.4
- 54) Barmherzig, D. A., Sun, J., Lane, T.J., & Li, P.-N. (2018). On Block-Reference Coherent Diffraction Imaging. *Imaging and Applied Optics 2018 (3D, AO, AIO, COSI, DH, IS, LACSEA, LS&C, MATH, pcAOP)*. OSA. doi: 10.1364/cosi.2018.cth1b.1
- 55) Barmherzig, D., & Sun, J. (2017). A Local Analysis of Block Coordinate Descent for Gaussian Phase Retrieval. *NIPS Workshop on Optimization for Machine Learning*.  
<http://arxiv.org/abs/1712.02083>
- 56) Sun, J., Qu, Q., & Wright, J. (2016). A geometric analysis of phase retrieval. *2016 IEEE International Symposium on Information Theory (ISIT)*. IEEE. doi: 10.1109/isit.2016.7541725
- 57) Sun, J., Qu, Q., & Wright, J. (2015). When Are Nonconvex Problems Not Scary? *NIPS Workshop on Non-convex Optimization for Machine Learning: Theory and Practice*.  
<http://arxiv.org/abs/1510.06096>
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### ***Publications Submitted or in Progress***

- 67) Ryan, D., Liang, B., He, Q., & **Sun, J.** Neural Topology Optimization with Principled Constrained Optimization. *Structural and Multidisciplinary Optimization*. Submitted.
- 68) Chen, J., Peng, L., Travadi, Y., & **Sun, J.** Imbalanced learning in biomedical research. *Journal of the American Medical Informatics Association*. Submitted.
- 69) Liang, H., Liang, B., Peng, L., Cui, Y., Mitchell, T., & **Sun, J.** Optimization and Optimizers for Adversarial Robustness. *Transactions on Machine Learning Research (TMLR)*. Submitted.
- 70) Liang, H., & Sun, J. A Strong Baseline for Removing Invisible Watermarks on Images via Deep Image Prior. *Transactions on Machine Learning Research (TMLR)*. Submitted.
- 71) Devera, R., He, C., Schweiger, S., & **Sun, J.** Deeplifting: Unconstrained Global Optimization Made Easy. In Preparation.
- 72) Zhang, W., Wan, Y., Zhuang, Z., & **Sun, J.** What's Wrong with End-to-End Learning for Phase Retrieval. *IEEE Transactions on Pattern Analysis and Machine Intelligence*. In Preparation.
- 73) He, C., Devera, R., Zhang, W., Cui, Y., Lu, Z., & **Sun, J.** Deep Learning with Constraints: Applications and Algorithms. In Preparation.
- 74) Travadi, Y., Peng, L., He, C., Cui, Y., & **Sun, J.** Imbalanced Classification via Direct Metric Optimization. *Transactions on Machine Learning Research (TMLR)*. In Preparation.
- 75) Chen, T., Wang, H., He, C., Cui, Y., & **Sun, J.** Imbalanced Regression with Multi-dimensional Targets. *Transactions on Machine Learning Research (TMLR)*. In Preparation.
- 76) Travadi, Y., Peng, L., & **Sun, J.** Imbalanced Classification via Regrouping. In Preparation.
- 77) Devera, R., Schlesinger, J., Bartel, C., **Sun, J.** Thermodynamics stability for materials discovery with constrained neural networks modeling. In Preparation.

### ***Software Development***

- 1) NCvX: a modeling framework and software package for solving deep learning problems with nontrivial constraints, targeting the wide range of constrained deep learning problems at the intersection of modern AI and science, engineering, and medicine <https://ncvx.org/>

### **Presentations**

#### ***Invited Presentations at Professional Meetings, Conferences, Universities and Industries, etc.***

- 1) “Diffusion Models for Inverse Problems Done Right,” SIAM Conference on Computational Science and Engineering. Mar, 2025. *Invited conference talk.*
- 2) “Diffusion Models for Inverse Problems Done Right,” SIAM Conference on Imaging Science. May, 2024. *Invited conference talk.*
- 3) “AI4Science: Striking the Best Data-Knowledge Tradeoff,” AI4Science Seminar Series, AWS. Apr, 2024. *Invited seminar talk.*
- 4) “Deep Learning with Nontrivial Constraints,” INFORMS Optimization Society Conference. Mar, 2024. *Invited conference talk.*
- 5) “What’s Wrong with End-to-End Learning for Phase Retrieval?” Machine Learning for Scientific Imaging Conference of Electronic Imaging 2024. Jan, 2024. *Invited conference talk.*
- 6) “Deep Learning with Nontrivial Constraints,” SIAM Conference on Optimization. 2023. *Invited conference talk.*
- 7) “Robust Deep Learning: Where Are We?,” PSU-Purdue-UMD Joint Seminar. Nov, 2023. *Invited seminar talk.*

- 8) “Deep image prior (and its cousin) for inverse problems: the untold stories,” Midwest Machine Learning Symposium (MMLS’23). May, 2023. *Invited conference talk.*
- 9) “Robust Deep Learning: Where Are We?” MnRI Robotics Colloquium. 2023. *Invited seminar talk.*
- 10) “Practical phase retrieval with double deep image priors,” Computational Imaging XXI at the Electronic Imaging Symposium 2023. Jan, 2023. *Invited conference talk.*
- 11) “Deep image prior (and its cousin) for inverse problems: the untold stories,” Imaging and Vision Seminar Series at Rice University Rice U. 2022. *Invited seminar talk.*
- 12) “Toward practical phase retrieval with deep learning,” IPAM workshop on Diffractive Imaging with Phase Retrieval IPAM, UCLA, LA. 2022. *Invited conference talk.*
- 13) “Deep image prior (and its cousin) for inverse problems: the untold stories,” Mathematics in imaging science, data science and optimization seminar at RPI RPI. 2022. *Invited seminar talk.*
- 14) “Deep image prior (and its cousin) for inverse problems: the untold stories,” UMN MnRI Seminar UMN MnRI. 2022. *Invited seminar talk.*
- 15) “Deep Learning with Constraints and Nonsmoothness,” International Conference on Continuous Optimization (ICCOPT), Lehigh, Pennsylvania, United States. May, 2022. *Invited conference talk.*
- 16) “Three Pillars of Health Data Science: Transfer Learning, Federated Learning, and Imbalanced Learning,” Annual BICB (Bioinformatics and Computational Biology) Research Symposium at UMN UMN BICB. 2022. *Invited keynote talk.*
- 17) “Three Pillars of Health Data Science: Transfer Learning, Federated Learning, and Imbalanced Learning,” Annual Retreat of the Institute for Health Informatics at UMN. 2022. *Invited keynote talk.*
- 18) “Toward practical phase retrieval: to learn or not, and how to learn?,” CDSML Seminar Series Center for data science and machine learning (CDSML), National University of Singapore, Singapore, Singapore. Oct, 2021. *Invited seminar talk.*
- 19) “Deep Learning for Robust Recognition, Inverse Problems, and Healthcare,” Wilson lecture series ECE, UMN. Sep, 2021. *Invited seminar talk.*
- 20) “Does Deep Learning Solve the Phase Retrieval Problem?,” IMA Data Science Seminar IMA, UMN. Sep, 2020. *Invited seminar talk.*
- 21) “Toward practical phase retrieval: To learn or not, and how to learn?,” Optimization Forum Operation Research Society of China. Sep, 2020. *Invited seminar talk.*
- 22) “Rapid and Robust COVID-19 Identification from Chest X-rays,” International Conference on Artificial Intelligence in Medicine, Minneapolis, Minnesota, United States. Aug, 2020. *Invited conference talk.*
- 23) “Does deep learning solve the phase retrieval problem?,” SIAM Conference on Imaging Science. Jul, 2020. *Invited conference talk.*
- 24) “When Computer Vision and Deep Learning Meet Healthcare,” Grand Rounds Department of Surgery, UMN. May, 2020. *Invited seminar talk.*
- 25) “Toward Practical Phase Retrieval,” Imaging Seminar Flatiron Institute, NYC, New York. May, 2020. *Invited seminar talk.*
- 26) “Toward Practical Phase Retrieval,” Workshop on Numerical Algebra in High-Dimensional Data Analysis Tianyuan Mathematical Center in Southeast China, China, Xiamen, China. Dec, 2019. *Invited conference talk.*
- 27) “Taming nonconvexity: from smooth to nonsmooth problems and beyond,” DTC seminar series DTC, UMN. Oct, 2019. *Invited seminar talk.*
- 28) “When Nonconvexity Meets Nonsmoothness,” INFORMS Annual Meeting 2019, Seattle, United States. Oct, 2019. *Invited conference talk.*

- 29) “A couple of curious questions around deep learning,” UMN VCAI Seminar. Oct, 2019. *Invited seminar talk.*
- 30) “Taming Nonconvexity: From Smooth to Nonsmooth Problems and Beyond,” IMA Data Science Seminar IMA, UMN. Sep, 2019. *Invited seminar talk.*

### Other Key Activities and Accomplishments

- 1) Media coverage: “A Healthy Future,” UMN news, Oct 2024.  
<https://twin-cities.umn.edu/news-events/healthy-future>
- 2) Media coverage: “Ju Sun Receives \$4.5M in Funding for Medical AI Projects and Beyond,” CS&E news, Nov 2023.  
<https://cse.umn.edu/cs/news/ju-sun-receives-45m-funding-medical-ai-projects-and-beyond>  
<https://cse.umn.edu/cs/ai-changing-world>
- 3) Media coverage: “Federated Learning for Healthcare Using NVIDIA Clara,” Nvidia. Sep 2021.  
<https://developer.download.nvidia.com/CLARA/Federated-Learning-Training-for-Healthcare-Using-NVIDIA-Clara.pdf>.
- 4) Media coverage: “M Health Fairview X-ray analysis helps find COVID,” StarTribune, Oct 2020.  
<https://www.startribune.com/m-health-fairview-x-ray-analysis-helps-find-covid/572605252/> . 2020.
- 5) Media coverage: “University of Minnesota develops AI algorithm to analyze chest X-rays for COVID-19,” UMN news, Oct 2020.  
<https://twin-cities.umn.edu/news-events/university-minnesota-develops-ai-algorithm-analyze-chest-x-rays-covid-19>

## TEACHING AND CURRICULUM DEVELOPMENT

### University of Minnesota

- 1) **CSCI5527 Deep Learning**: Spring 2020, Fall 2020, Fall 2022, Fall 2023, Spring 2025
- 2) **CSCI5525 Advanced Machine Learning**: Spring 2021, Fall 2024
- 3) **CSCI2033 Elem Comput Linear Algebra**: Spring 2022, Spring 2023
- 4) **CSCI8980 Spec Adv Topics CS**: Topics in Modern Machine Learning—Theoretical Foundations of Deep Learning, Fall 2021; Topics in Modern Machine Learning—Trustworthy and Safe AI, Fall 2025
- 5) **DSCI8970 Data Science M.S. Colloquium**: Fall 2024, Spring 2025
- 6) **CSE DSI Machine Learning Seminar Series**: Chair 2020 Fall—Present

### Curriculum Development

- 1) Developed the first master/fresh PhD level deep learning course for the CS&E department and got it approved as CSCI5527: Deep Learning after teaching it twice as a special topic class
- 2) For CSCI2033, developed 3 homework sets that help the students to perform basic matrix computations in Python—which is gaining dominance in advanced courses, academic research, and industrial jobs, vs. the past iterations that used Matlab. The homework sets were adopted for later iterations of the course (e.g., F23 by Bernardo Bianco Prado)
- 3) For the DSCI8970 seminar, which is the cross-listed version of the CSE DSI Machine Learning Seminar Series, oversaw main activities such as seminar planning and speaker invitation/hosting

**Collaborative Efforts and Activities**

(co-teaching, interdisciplinary teaching, curricular planning, assessment, etc.)

**ADVISING AND MENTORING****Undergraduate Student Activities**

Undergraduate research projects (UROPS, directed research, lab participation, etc.)

- 1) Chongwei Chen, 2024–Present
- 2) Sean Schweiger, lab participation, 2023–2024
- 3) Andrew Walker, lab participation, 2021–2022
- 4) Gaoxiang Luo, 2020–2022

Undergraduate summa theses or honors projects directed

NA

**Graduate Student Activities**Master's Theses Directed

- 1) Ramin Zandvakili, NON-THESIS OPTION, 2023–2024
- 2) Wenjie Zhang, NON-THESIS OPTION, 2022–2024. Now PhD student @ the group
- 3) Andrew Walker, Adaptive Domain Generalization for Digital Pathology Images, 2021–2022
- 4) Esha Singh, Robustness in Deep Learning: Single Image Denoising using Untrained Networks, 2022–2021. Now PhD student @ UCSB
- 5) Buyun Liang, NON-THESIS OPTION, 2020–2023. Now PhD student @ U Penn
- 6) Prabhjot Singh Rai, NON-THESIS OPTION, 2020–2022
- 7) Mingqian Duan, NON-THESIS OPTION, 2020–2021
- 8) Rishab Girdhar, Body Pose Predictions in Triadic Social Interactions, 2020–2021
- 9) Rishabh Mehta, PermNet: Permuted Convolutional Neural Network, 2020–2021
- 10) Sihan Wei, NON-THESIS OPTION, 2020–2021. Now PhD student @ Johns Hopkins U.
- 11) Dyah Adila, Artificial Intelligence to Accelerate COVID-19 Identification from Chest X-rays, 2020–2021. Now PhD student @ U of Wisconsin-Madison

Master's Student Advisees (Current)

NA

Doctoral Dissertations Directed

- 1) Zhong Zhuang, Advancing Deep Learning for Scientific Inverse Problems, 2019–2023. Now postdoc @ UCLA.

**Doctoral Students Advised (Current)**

- 1) Sinian Zhang (2024–Present)
- 2) Guanchen Li (2024–Present)
- 3) Gaoxiang Luo (2024–Present)
- 4) Yuxiang Wan (2024–Present)
- 5) Corey Senger (2024–Present; Part-time)
- 6) Wenjie Zhang (2024–Present)
- 7) Jiandong Chen (2022–Present)
- 8) Ryan Devera (2022–Present)
- 9) Hengkang Wang (2020–Present)
- 10) Le Peng (2022–Present), working @Meta with final thesis pending
- 11) Tash Travadi (2021–Present), working @ Astrin Biosciences with final thesis pending
- 12) Hengyue Liang (2021–Present), working @AWS with final thesis pending
- 13) Tiancong Chen (2021–Present), working @Morgan Stanley with final thesis pending
- 14) Taihui Li (2019–Present), working @Meta with final thesis pending

**Professional Student Activities**

Professional students supervised

NA

**Post-doctoral fellows supervised**

- 1) Chuan He, Oct 2023–Aug 2024. Now Assistant Professor @Linköping University, Sweden

**Visiting Scholars Hosted**

Names, dates

**Other Mentoring Activities**

[including serving as a mentor or member of a mentoring committee for a faculty member, etc.]

**SERVICE AND PUBLIC ENGAGEMENT****Service To The Discipline/Profession/Interdisciplinary Area(s)*****Editorships/Journal Reviewer Experience***Associate/Section Editor or Editor, Journal, Dates

NA

Reviewer experience, Journal/Conference, Dates

- IEEE Transactions on Information Theory (2016–Present), Pattern Analysis and Machine Intelligence (2015–Present), Selected Topics in Signal Processing (2015–Present), Signal Processing (2015–Present), Circuits and Systems for Video Technology (2012–Present), Systems, Man, and Cybernetics (2012–Present), Image Processing (2011–Present)
- SIAM Journals on Scientific Computing (2020–Present), Mathematics of Data Science (2019–Present), Optimization (2017–Present), Imaging Sciences (2016–Present), Matrix Analysis and Applications (2015–Present)
- Other Machine Learning Journals: Journal of Machine Learning Research (2016–Present), Neural Computation (2014–Present)
- Other Computer Vision Journals: International Journal of Computer Vision (2015–Present), Journal of Visual Communication and Image Representation (2012–Present)
- Other Optimization Journals: Mathematical Programming (2019–Present)
- Other Applied Math Journals: Communications on Pure and Applied Mathematics (2021–Present), Applied and Computational Harmonic Analysis (2017–Present), Information and Inference (2017–Present)
- Computer Vision Conferences: International Conference on Computer Vision (2017–Present), Computer Vision and Pattern Recognition (2016–Present), European Conference on Computer Vision (2012–Present)
- Machine Learning Conferences: Neural Information Processing Systems (2012–Present), International Conference on Machine Learning (2018–Present), International Conference on Learning Representation (2020–Present), Algorithmic Learning Theory (2018–Present)
- Others: International Symposium on Information Theory (2018–Present)

***Committee memberships [indicate if the candidate served as chair]***

[include task forces, boards, etc. for professional organizations]

***Review panels for external funding agencies, foundations, etc.***

- 1) NIH Panel, NAME OF PANEL OMITTED DUE TO PRIVACY CONCERN, Mar 2025
- 2) DOE Panel, NAME OF PANEL OMITTED DUE TO PRIVACY CONCERN, Jun 2024
- 3) NSF Panel, NAME OF PANEL OMITTED DUE TO PRIVACY CONCERN, Nov 2020

***Program review experience***

[include reviews for universities, professional organizations, funding agencies, etc. with dates, places, focus, etc.]

***Organization of conferences, workshops, panels, symposia***

- 1) Co-chair, Midwest Machine Learning Symposium, Minneapolis, MN, United States, 2024
- 2) Area chair, Conference on Uncertainty in Artificial Intelligence (UAI), 2022–Present
- 3) Area chair, International Conference on Artificial Intelligence and Statistics, 2020–Present
- 4) Co-organizer, Minisymposium on Deep Learning for Imaging Science at 2024 SIAM Conference on Imaging Science, Atlanta, Georgia, United States, 2024
- 5) Local chair, SIAM International Conference on Data Mining (SDM), 2023
- 6) Co-organizer, Special session "Nonsmooth Optimization in Machine Learning" in the International Conference on Continuous Optimization (ICCOPT), 2022
- 7) Co-organizer, Mini-symposium on Exploiting Low-Complexity Structures in Data Analysis: Theory and Algorithms in SIAM Conference on Applied Linear Algebra, 2018

**Service To The University/College/Department*****University-wide service***

- 1) Core member, UMN Data Science Initiative (2023–Present)

***Collegiate Service and Intercollegiate Service***

- 1) Chair, UMN DSI Machine Learning Seminar Series, 2020–Present
- 2) Member, Faculty Search Committee of the Computational Health Sciences Division of the Department of Surgery, 2023.
- 3) Core faculty, Innovative Methods & Data Science Program, UMN Center for Learning Health System Sciences (CLHSS), 2022–Present
- 4) Co-director, Healthcare Computer Vision Program, UMN Center for Learning Health System Sciences (CLHSS), 2022–Present

***Department/Unit Service***

- 1) Member, Computing and Web Committee, 2020–Present
- 2) Member, Faculty Search Committee, 2021–2023
- 3) Member, Graduate Admission Committee, 2019–2022

**Public And Other Service**

NA