

# SHAONING HAN

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## RESEARCH INTERESTS

Mixed-integer programming, Nonsmooth optimization, Sparse learning, Conic programming, Machine learning, Large-scale optimization

## ACADEMIC EMPLOYMENT

**Postdoctoral researcher**, University of Southern California, 2023  
• Advisor: Jong-Shi Pang

## EDUCATION

**Ph.D in Industrial and Systems Engineering**, University of Southern California, 2022  
• Advisor: Andrés Gómez  
**B.S. in Mathematics**, University of Science and Technology of China, 2017

## PUBLICATIONS

1. Han, S., Gómez, A., and Atamtürk, A. (2023a).  $2 \times 2$ -convexifications for convex quadratic optimization with indicator variables. *Mathematical Programming*
2. He, Z., Han, S., Gómez, A., Cui, Y., and Pang, J.-S. (2023). Comparing solution paths of sparse quadratic minimization with a Stieltjes matrix. *Mathematical Programming*
3. Pang, J.-S. and Han, S. (2023). Some strongly polynomially solvable convex quadratic programs with bounded variables. *SIAM Journal on Optimization*, 33(2):899–920
4. Han, S., Gómez, A., and Atamtürk, A. (2022a). The equivalence of optimal perspective formulation and Shor’s SDP for quadratic programs with indicator variables. *Operations Research Letters*, 50(2):195–198
5. Han, S., Gómez, A., and Prokopyev, O. A. (2022c). Fractional 0-1 programming and submodularity. *Journal of Global Optimization*
6. Atamtürk, A., Gómez, A., and Han, S. (2021). Sparse and smooth signal estimation: Convexification of  $\ell_0$ -formulations. *Journal of Machine Learning Research*, 22(52):1–43

## PREPRINTS

1. Han, S. and Pang, J.-S. (2022). Continuous selections of solutions to parametric variational inequalities. *Minor Revision at SIAM Journal on Optimization*

2. Han, S. and Gómez, A. (2021a). Compact extended formulations for low-rank functions with indicator variables. *Major Revision at Mathematics of Operations Research*
3. Han, S., Zhang, X., and Pang, J.-S. (2023b). On the number of pivots of Dantzig's simplex methods for linear and convex quadratic programs. *Major Revision at Operations Research Letters*
4. Han, S., Gómez, A., and Pang, J.-S. (2022b). On polynomial-time solvability of combinatorial Markov random fields. *Submitted*
5. Han, S. and Gómez, A. (2021b). Single-neuron convexifications for binarized neural networks. *Technical Report*

## TEACHING EXPERIENCE

- **ISE 599 (PhD) Mixed-Integer Programming**  
Teaching assistant, University of Southern California, 2021 Spring
- **ISE 530 (MS) Optimization Methods for Analytics**  
Teaching assistant, University of Southern California, 2019 Fall
- **ENGR 0020 (BS) Probability and Statistics for Engineers**  
Teaching assistant, University of Southern California, 2019 Spring
- **ENGR 0020 (BS) Probability and Statistics for Engineers**  
Teaching assistant, University of Pittsburgh, 2018 Fall
- **ENGR 0020 (BS) Probability and Statistics for Engineers**  
Teaching assistant, University of Pittsburgh, 2018 Spring
- **IE 2086 (MS) Decision Models**  
Teaching assistant, University of Pittsburgh, 2017 Fall

## INVITED TALKS

- *On the convex hull of mixed-integer nonlinear submodular minimization.* INFORMS Annual Meeting, Phoenix, AZ, October 2023
- *Mixed-binary convex quadratic optimization and its applications in inference with sparsity.* The Academy of Mathematics and Systems Science (AMSS) of the Chinese Academy of Sciences, March 2023
- *On polynomial-time solvability of combinatorial Markov random fields.* INFORMS Annual Meeting, Indianapolis, IN, October 2022
- *Convexification for low-rank functions with indicator variables.* International Conference on Continuous Optimization, Bethlehem, PA, July 2022
- *Strongly polynomial algorithm for box-constrained quadratic programs with  $H_0$ -matrix.* INFORMS Optimization Society Conference, Greenville, SC, March 2022
- *Fractional 0-1 programming and submodularity.* INFORMS Annual Meeting, Anaheim, CA, October 2021

- *On SDP formulations for quadratic optimization with indicator variables.* INFORMS Annual Meeting, virtual, November 2020

**PROFESSIONAL Journal/Conference Reviewer  
ACTIVITIES**

- Mathematical Programming, SIAM Journal on Optimization, Mathematics of Operations Research, Journal of Global Optimization, Optimization Letters, IPCO 2023

**Invited Session Chair**

- Recent advances in nonsmooth optimization, 2023 INFORMS Annual Meeting, Phoenix, AZ, October 2023
- Recent advances in mixed-integer nonlinear programming, 2023 INFORMS Annual Meeting, Phoenix, AZ, October 2023
- Algorithms for discrete optimization problems, 2022 INFORMS Optimization Society Conference, Greenville, SC, March 2022

**Member**

- INFORMS 2018 - Present
- INFORMS Optimization Society 2018 - Present

**VOLUNTEER  
EXPERIENCE**

**Virtual volunteer at INFORMS Annual Meeting**, Anaheim, CA, October 2021. Responsible for five rooms during one shift day to ensure the smooth progress of meetings.

**SKILLS**

Python, Matlab, Julia, PyTorch, Gurobi, Mosek