

# Harshal D. Kaushik

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## Education

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<b>Ph.D. in Industrial Engineering &amp; Management</b> (Fall 2021) Oklahoma State University Advisor: Dr. Farzad Yousefian Dissertation: On Distributed Optimization Problems with Variational Inequality Constraints: Algorithms, Complexity Analysis, and Applications.	Spring 2017 – Present
<b>M.Tech. in Applied Mechanics</b> Indian Institute of Technology (IIT), Madras, India.	2013 – 2015
<b>B.E. in Mechanical Engineering</b> University of Pune, India.	2008 – 2012

## Awards and Scholarships

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• Robberson Summer Research and Creative Activity Grant.	2021
• <i>Roy</i> and <i>Virginia Dorrough</i> Distinguished Graduate Fellowship.	2020 – 2021
• Member of the Society for Industrial and Applied Mathematics (SIAM).	2020 – Present
• Member of the Institute of Operations Research and Management Science (INFORMS).	2018 – Present
• Member of an honor society for Industrial and Systems Engineering students: Alpha Pi Mu.	2018 – Present
• M.Tech. scholarship from the Ministry of Human Resource and Development, Government of India.	2013 – 2015

## Research Interest

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- Multi-agent distributed optimization
- Variational inequalities
- Large-scale optimization
- Nonlinear programming
- Applications: noncooperative Nash games, traffic equilibrium problems, image processing, and machine learning.

## Publications

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- [1] H. D. Kaushik and F. Yousefian, “A method with convergence rates for optimization problems with variational inequality constraints”, accepted for publication in **SIAM Journal on Optimization**, June 2021. arXiv: 2007.15845 [math.OC].
- [2] H. D. Kaushik and F. Yousefian, “An incremental gradient method for large-scale distributed nonlinearly constrained optimization”, accepted for **2021 American Control Conference (ACC)**, Jan. 2021. arXiv: 2006.07956 [math.OC].
- [3] H. D. Kaushik and F. Yousefian, “Distributed optimization for problems with variational inequality constraints”, submitted to **IEEE Transactions on Automatic Control**, May 2021. arXiv: 2105.14205 [math.OC].

- [4] P. Ramu and H. Kaushik, “A log-third order polynomial normal transformation approach for high-reliability estimation with scarce samples”, **International Journal of Reliability and Safety**, vol. 14, no. 1, pp. 14–38, 2020. [Link].
- [5] H. Kaushik and F. Yousefian, “A randomized block coordinate iterative regularized subgradient method for high-dimensional ill-posed convex optimization”, in **2019 American Control Conference (ACC)**, Philadelphia, PA, USA, 2019, pp. 3420–3425. [Link].
- [6] H. Kaushik, R. Mohan, and K. A. Prakash, “Utilization of wind shear for powering unmanned aerial vehicles in surveillance application: A numerical optimization study”, in **5<sup>th</sup> International Conference on Advances in Energy Research, ICAER 2015**, Mumbai, India, Energy Procedia, vol. 90, 2016, pp. 349–359. [Link].

## Conference Presentations

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- “An incremental gradient method for large-scale distributed nonlinearly constrained optimization”, **ACC 2021** (May 25<sup>th</sup>, 2021).
- “An incremental gradient method for large-scale distributed nonlinearly constrained optimization”, **INFORMS Online 2020** (Nov. 13<sup>th</sup>, 2020).
- “First-order methods for optimization over the solution set of variational inequality problems”, **INFORMS Annual Meeting 2019**, Seattle, WA (Oct. 22<sup>nd</sup>, 2019).
- “A randomized block coordinate iterative regularized subgradient method for high-dimensional ill-posed convex optimization”, **2019 American Control Conference**, Philadelphia, PA (Jul. 11<sup>th</sup>, 2019).
- “A first order method for high-dimensional ill-posed optimization problems”, **INFORMS Annual Meeting 2018**, Phoenix, AZ (Nov. 5<sup>th</sup>, 2018).
- “Utilization of wind shear for powering unmanned aerial vehicles in surveillance application: A numerical optimization study”, **5<sup>th</sup> International Conference on Advances in Energy Research, ICAER 2015**, Mumbai, India (Dec. 16<sup>th</sup>, 2015).

## Academic Service

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- Reviewed two articles for the **60<sup>th</sup> IEEE conference on decision and control (CDC)**, 2021.

## Teaching Experience

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- TA for **Engineering and Economic Analysis** (IEM 3503): Spring 2019, 2020. Fall 2017, 2018.
- TA for **Production Planning and Control Systems** (IEM 4613): Fall 2018, 2019.
- TA for a graduate level course, **Introduction to Optimization** (IEM 5013): Fall 2019.

## Coursework and Programming Skills

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- **Doctoral coursework:** Distributed and Parallel Optimization (IEM 6990), Stochastic Processes (IEM 5133), Network Optimization (IEM 5063), Convex Optimization (IEM 6990), Integer and Combinatorial Optimization (IEM 6053), Nonlinear Optimization (IEM 6043), Optimization Under Uncertainty (IEM 6063).
- **Programming:** Python 3 (NumPy, SciPy, pandas), SQL.
- **Optimization solvers:** docplex, Gurobi, CVX.
- **Engineering analysis software:** CATIA v5, ANSYS Fluent, OpenFOAM.