

Balabhaskar Balasundaram | CV

322 Engineering North – Stillwater, OK 74078 – USA

✉ baski@okstate.edu • 🌐 baski.me • in baski363 • 📷 baski363

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Appointments

School of Industrial Engineering & Management

Professor

Wilson Bentley Professorship

Associate Professor

Graduate Program Director

Assistant Professor

Oklahoma State University

June 2020–Present

July 2018–Present

July 2013–June 2020

July 2016–June 2019

August 2007–June 2013

Education

Texas A&M University

Ph.D., Industrial Engineering

2002–2007

Indian Institute of Technology–Madras

B.Tech., Mechanical Engineering

1998–2002

Research Interests

Combinatorial optimization in graphs and networks: Graph signatures; Graph-theoretic clique relaxations; Fault-tolerant cluster detection; Design of survivable (multi-path, disruption-tolerant) network topologies; Network interdiction

Optimization applications: Computational biology; Agricultural analytics; Social network analysis; Graph-based data mining; Transportation logistics; Production planning

Publications

Student coauthors are starred*

Working Papers

[1] Pouya Ahadi*, Balabhaskar Balasundaram, Juan S. Borrero, and Charles Chen. Optimizing expected cross value for genetic introgression.

Under Review

[2] Niloufar Daemi*, Juan S. Borrero, and Balabhaskar Balasundaram. First passage time interdiction in Markov chains. *Under Review*, 2023.

[3] Hao Pan*, Balabhaskar Balasundaram, and Juan S. Borrero. Finding conserved low-diameter subgraphs in social and biological networks. *Under First Revision*, 2023.

Journal Articles.....

[4] Yajun Lu, Zhuqi Miao, Parisa Sahraeian*, and Balabhaskar Balasundaram. On atomic cliques in temporal graphs. *Optimization Letters*, 17(4):813–828, April 2023.

[5] Yajun Lu*, Hosseinali Salemi*, Balabhaskar Balasundaram, and Austin Buchanan. On fault-tolerant low-diameter clusters in graphs. *INFORMS Journal on Computing*, 34(6):3181–3199, November-December 2022.

[6] Niloufar Daemi*, Juan S. Borrero, and Balabhaskar Balasundaram. Interdicting low-diameter cohesive subgroups in large-scale social networks. *INFORMS Journal on Optimization*, 4(3):304–325, September 2022.

[7] Balabhaskar Balasundaram, Juan S. Borrero, and Hao Pan*. Graph signatures: Identification and optimization. *European Journal of Operational Research*, 296(3):764–775, February 2022.

[8] Babak Farmanesh*, Arash Pourhabib, Balabhaskar Balasundaram, and Austin Buchanan. A Bayesian framework for functional calibration of expensive computational models through non-isometric matching. *IIE Transactions*, 53(3):352–364, March 2021.

[9] Zhuqi Miao* and Balabhaskar Balasundaram. An ellipsoidal bounding scheme for the quasi-clique number of a graph. *INFORMS Journal on Computing*, 32(3):763–778, August 2020.

[10] Farzaneh Nasirian*, Foad Mahdavi Pajouh, and Balabhaskar Balasundaram. Detecting a most closeness-central clique in complex networks. *European Journal of Operational Research*, 283(2):461–475, June 2020.

[11] Juan Ma* and Balabhaskar Balasundaram. On the chance-constrained minimum spanning k -core problem. *Journal of Global Optimization*, 74(4):783–801, August 2019.

[12] Shuzhen Sun*, Zhuqi Miao*, Blaise Ratcliffe, Polly Campbell, Bret Pasch, Yousry A. El-Kassaby, Balabhaskar Balasundaram, and Charles Chen. SNP variable selection by generalized graph domination. *PLoS ONE*, 14(1):1–18, January 2019.

[13] Yajun Lu*, Esmaeel Moradi*, and Balabhaskar Balasundaram. Correction to: Finding a maximum k -club using the k -clique formulation and canonical hypercube cuts. *Optimization Letters*, 12(8):1959–1969, November 2018.

[14] Esmaeel Moradi* and Balabhaskar Balasundaram. Finding a maximum k -club using the k -clique formulation and canonical hypercube cuts. *Optimization Letters*, 12(8):1947–1957, November 2018.

[15] Zhuqi Miao* and Balabhaskar Balasundaram. Approaches for finding cohesive subgroups in large-scale social networks via maximum k -plex detection. *Networks*, 69(4):388–407, July 2017.

[16] Foad Mahdavi Pajouh*, Esmaeel Moradi*, and Balabhaskar Balasundaram. Detecting large risk-averse 2-clubs in graphs with random edge failures. *Annals of Operations Research*, 249(1):55–73, February 2017.

- [17] Foad Mahdavi Pajouh*, Balabhaskar Balasundaram, and Illya V. Hicks. On the 2-club polytope of graphs. *Operations Research*, 64(6):1466–1481, November-December 2016.
- [18] Juan Ma*, Foad Mahdavi Pajouh*, Balabhaskar Balasundaram, and Vladimir Boginski. The minimum spanning k -core problem with bounded CVaR under probabilistic edge failures. *INFORMS Journal on Computing*, 28(2):295–307, April 2016.
- [19] Zhuqi Miao*, Balabhaskar Balasundaram, and Eduardo L. Pasiliao. An exact algorithm for the maximum probabilistic clique problem. *Journal of Combinatorial Optimization*, 28(1):105–120, July 2014.
- [20] Foad Mahdavi Pajouh*, Zhuqi Miao*, and Balabhaskar Balasundaram. A branch-and-bound approach for maximum quasi-cliques. *Annals of Operations Research*, 216(1):145–161, May 2014.
- [21] Svyatoslav Trukhanov, Chitra Balasubramaniam, Balabhaskar Balasundaram, and Sergiy Butenko. Algorithms for detecting optimal hereditary structures in graphs, with application to clique relaxations. *Computational Optimization and Applications*, 56(1):113–130, September 2013.
- [22] Sergiy Butenko, Oleksandra Yezerska, and Balabhaskar Balasundaram. Variable objective search. *Journal of Heuristics*, 19(4):697–709, August 2013.
- [23] Foad Mahdavi Pajouh*, Balabhaskar Balasundaram, and Oleg A. Prokopyev. On characterization of maximal independent sets via quadratic optimization. *Journal of Heuristics*, 19(4):629–644, August 2013.
- [24] Marco Carvalho, Alexey Sorokin, Vladimir Boginski, and Balabhaskar Balasundaram. Topology design for on-demand dual-path routing in wireless networks. *Optimization Letters*, 7(4):695–707, April 2013.
- [25] Foad Mahdavi Pajouh*, Dahai Xing*, Yingjue Zhou*, Sharethram Hariharan*, Balabhaskar Balasundaram, Tieming Liu, and Ramesh Sharda. A specialty steel bar company uses analytics to determine available-to-promise dates. *INFORMS Journal on Applied Analytics*, 43(6):503–517, 2013.
- [26] Foad Mahdavi Pajouh* and Balabhaskar Balasundaram. On inclusionwise maximal and maximum cardinality k -clubs in graphs. *Discrete Optimization*, 9(2):84–97, May 2012.
- [27] Trevor Grout*, Yang Hong, Jeffrey Basara, Balabhaskar Balasundaram, Zhenyu Kong, and Satish T. S. Bukkapatnam. Significant winter weather events and associated socioeconomic impacts (federal aid expenditures) across Oklahoma: 2000-2010. *Weather, Climate, and Society*, 4(1):48–58, January 2012.
- [28] Balabhaskar Balasundaram, Sergiy Butenko, and Illya V. Hicks. Clique relaxations in social network analysis: The maximum k -plex problem. *Operations Research*, 59(1):133–142, January-February 2011.
- [29] Balabhaskar Balasundaram, Shyam S. Chandramouli*, and Svyatoslav Trukhanov. Approximation algorithms for finding and partitioning unit-disk graphs into co- k -plexes. *Optimization Letters*, 4(3):311–320, August 2010.

- [30] Balabhaskar Balasundaram and Sergiy Butenko. On a polynomial fractional formulation for independence number of a graph. *Journal of Global Optimization*, 35(3):405–421, July 2006.
- [31] Balabhaskar Balasundaram and Sergiy Butenko. Constructing test functions for global optimization using continuous formulations of graph problems. *Journal of Optimization Methods and Software*, 20(4-5):439–452, August-October 2005.
- [32] Balabhaskar Balasundaram, Sergiy Butenko, and Svyatoslav Trukhanov. Novel approaches for analyzing biological networks. *Journal of Combinatorial Optimization*, 10(1):23–39, August 2005.

Book Chapters.....

- [33] Balabhaskar Balasundaram and Foad Mahdavi Pajouh*. Graph theoretic clique relaxations and applications. In P. M. Pardalos, D.-Z. Du, and R. Graham, editors, *Handbook of Combinatorial Optimization*, pages 1559–1598. Springer, New York, 2nd edition, 2013.
- [34] Foad Mahdavi Pajouh* and Balabhaskar Balasundaram. Gradient-type methods. In J. J. Cochran, L. A. Cox, P. Keskinocak, J. P. Kharoufeh, and J. C. Smith, editors, *Wiley Encyclopedia of Operations Research and Management Science*, volume 3, pages 2092–2099. John Wiley & Sons, Inc., 2011.
- [35] Balabhaskar Balasundaram and Sergiy Butenko. Optimization problems in unit-disk graphs. In C. A. Floudas and P. M. Pardalos, editors, *Encyclopedia of Optimization*, pages 2832–2844. Springer Science + Business Media, New York, 2nd edition, 2009.
- [36] Balabhaskar Balasundaram and Sergiy Butenko. Network clustering. In B. H. Junker and F. Schreiber, editors, *Analysis of Biological Networks*, pages 113–138. Wiley, New York, 2008.
- [37] Balabhaskar Balasundaram and Sergiy Butenko. Graph domination, coloring and cliques in telecommunications. In M. G. C. Resende and P. M. Pardalos, editors, *Handbook of Optimization in Telecommunications*, pages 865–890. Springer Science + Business Media, New York, 2006.

Conference Proceedings.....

- [38] Hao Pan*, Balabhaskar Balasundaram, and Juan S. Borrero. A decomposition branch-and-cut algorithm for the maximum cross-graph k -club problem. In *Proceedings of the 10th International Network Optimization Conference (INOC)*, pages 17–22. Open Proceedings, 2022.
- [39] Juan Ma* and Balabhaskar Balasundaram. Solving chance-constrained spanning k -core problem via decomposition and integer programming. In *Proceedings of the 2013 Industrial and Systems Engineering Research Conference (ISERC 2013)*, pages 2774–2783, Norcross, GA, 2013. Institute of Industrial Engineers.
- [40] Zhuqi Miao* and Balabhaskar Balasundaram. Cluster detection in large-scale social networks using k -plexes. In *Proceedings of the 2012 Industrial and Systems Engineering Research Conference (ISERC 2012)*, pages 1–10, Norcross, GA, 2012. Institute of Industrial Engineers.
- [41] Peerapol Sittivijan*, Manjunath Kamath, and Balabhaskar Balasundaram. Models for clustering commodities into logistical families. In *Proceedings of the 2009 International Conference on Value Chain Sustainability (ICOVACS 2009)*, pages 32–37, 2009.

- [42] Balabhaskar Balasundaram. Cohesive subgroup model for graph-based text mining. In *Proceedings of the 2008 IEEE International Conference on Automation Science and Engineering (CASE 2008)*, pages 989–994. IEEE, August 2008.
- [43] G. Srinivasan, B. Balasundaram, and V. Karthik. Minimizing squared deviation of completion times about a common due date - algorithms and heuristics. In P. Radhakrishnan, S. Palaniswami, P. V. Mohanram, and J. Kanchana, editors, *Proceedings of the 1st International Conference on Logistics and Supply Chain Management*, pages 234–239, Mumbai, August 2001. Allied Publishers.

Awards & Honors

- *Regents Distinguished Teaching Award*, Oklahoma State University, September 2022.
- *Phoenix Award for Outstanding Faculty*, Graduate and Professional Student Government Association, Oklahoma State University, April 2019.
- *Regents Distinguished Research Award*, Oklahoma State University, November 2016.
- *Research Excellence Award*, College of Engineering Architecture and Technology, Oklahoma State University, April 2016.
- *IIE Award for Excellence in the Teaching of Operations Research*, Operations Research Division, Institute of Industrial and Systems Engineers, May 2015.
- *Research Excellence Award*, College of Engineering Architecture and Technology, Oklahoma State University, April 2014.
- *President's Cup for Creative Interdisciplinarity, First Place*, member of iCREST Center for Bioinformatics and Computational Biology (team leader Dr. Rakesh Kaundal), Oklahoma State University, December 2013.
- *OSU Award of Excellence for Advising*, Oklahoma State University, December 2013.
- *IEM Faculty Award*, School of Industrial Engineering & Management, Oklahoma State University, November 2013.
- *ISERC Best Paper Award (Operations Research Track)* from the IIE Operations Research Division for the paper titled "Solving chance-constrained spanning k -core problem via decomposition and integer programming," coauthored with doctoral advisee Juan Ma, May 2013.
- *Outstanding Young Faculty Award*, Halliburton Foundation, Inc., College of Engineering Architecture and Technology, Oklahoma State University, March 2013.
- *CEAT Outstanding Advisor Award*, College of Engineering Architecture and Technology, Oklahoma State University, December 2012.
- *IIE South Central Region Outstanding Advisor Award*, Institute of Industrial Engineers, May 2011.
- *Pritsker Doctoral Dissertation Award, 2nd Place*, Institute of Industrial Engineers, May 2008.
- *George Kunze Prize*, Texas A&M University, April 2007.
- *U.S. Senator Phil Gramm Doctoral Fellowship*, Texas A&M University, April 2007.

- *Distinguished Graduate Student Award for Excellence in Teaching*, Association of Former Students of Texas A&M University, March 2007.
- *Best Poster Award* for “Constructing test functions for global optimization using continuous formulations of optimization problems on graphs” in the *Workshop on Multiscale Optimization Methods and Applications*, February 26-28, 2004, University of Florida, Gainesville, FL.
- *Best Paper Award* for “A backtracking heuristic for solving U-shaped assembly line balancing problem” in *Shaastra TechFest 2002*, Indian Institute of Technology–Madras, India. (With P. Devarajan).

Grants

Principal Investigator/Institutional Lead.....

- *FLAT: Freight Lane Assignment Tool*, PI: Balasundaram, Co-PIs: Buchanan, Heragu, 1/13/2020–8/16/2020, \$163,730. *TreeHouse Foods, Inc.*
- *Optimization-based Aggregate Master Planning Tools for Bay Valley Foods, LLC*, PI: Balasundaram, Co-PIs: Buchanan, Heragu, 10/1/2017–1/31/2020, \$250,599. *Bay Valley Foods, LLC.*
- *Collaborative Research: Risk-Averse Cluster Detection in Network Models of Big Data Under Measurement Uncertainty*, OSU PI: Balasundaram, Collaborator: Hicks (Rice University), 4/15/2014–3/31/2018, \$271,649. *National Science Foundation.*
- *Clique Relaxations in Biological and Social Network Analysis: Foundations and Algorithms*, PI: Butenko (Texas A&M), Co-PIs: Balasundaram, Boginski (University of Florida), 7/1/2012–6/30/2015, \$452,942. *Air Force Office of Scientific Research.*
- *Robust Optimization for Connectivity and Flows in Dynamic Complex Networks*, PI: Balasundaram, Co-PIs: Butenko (Texas A&M), Boginski, Uryasev (University of Florida), 9/15/2009–9/14/2013, \$589,092. *Department of Energy.*
- *Data Reduction by Generalized Graph Domination*, PI: Balasundaram, 2/1/2010–7/31/2010, \$35,558. *Entero Technologies LLC.*
- *Proactive Approach To Transportation Resource Allocation Under Severe Winter Weather Emergencies*, PI: Balasundaram, Co-PIs: Bukkapatnam, Kong, Hong (University of Oklahoma), 7/1/2009–6/30/2011, \$261,194. *Oklahoma Transportation Center.*

Co-Principal Investigator.....

- *MRI: Acquisition of Shared High Performance Compute Cluster for Multidisciplinary Computational and Data-Intensive Research*, PI: Brunson, Co-PIs: Balasundaram, Borunda, Fennell, Hoyt, 10/1/2015–9/30/2018, \$951,570. *National Science Foundation.*
- *Feasibility Study: Hazardous Material Movement Model for HazMat Transportation in Oklahoma*, PI: Pourhabib, Co-PIs: Balasundaram, Kamath, Zhao, 7/1/2015–9/30/2015, \$44,534. *Oklahoma Emergency Management.*
- *Algorithms for Order-Picking (Project 12), RFID Technology Center at the University of Louisville*, PI: Heragu, Co-PIs: Balasundaram, Kamath, Liu, 1/1/2014–3/28/2014, \$235,270. *Defense Logis-*

tics Agency.

- *Oklahoma Center for Transportation and Logistics Research, Education and Outreach*, PI: Ingalls, Co-PIs: Balasundaram, Kamath, Liu, 7/1/2011–6/30/2013, \$150,000. *Oklahoma Transportation Center*.
- *Collaborative: CELDi (Center for Engineering Logistics and Distribution) Research Experience for Teachers Supplement*, PI: Kamath, Co-PIs: Balasundaram, Ingalls, 12/18/08–7/31/13, \$58,000. *National Science Foundation*.
- *Collaborative: CELDi (Center for Engineering Logistics and Distribution) Renewal*, PI: Kamath, Co-PIs: Balasundaram, Ingalls, 8/1/07–7/31/13, \$125,000. *National Science Foundation*.
- *Developing Cutting-Edge Educational, Outreach and Diversity Programs in Transportation and Logistics for Oklahoma*, PI: Kamath, Co-PIs: Balasundaram, Ingalls, Liu, 10/1/2011–12/31/2012, \$87,465. *Oklahoma Transportation Center*.
- *ECLIPSE: Environment for Contextualized Learning and Insightful Problem Solving Experiences*, PI: Antonenko, Co-PIs: Balasundaram, Gelder, Greenwood, Nichols, 9/1/2011–8/31/2012, \$49,281. *Oklahoma State University Planning Grants*.
- *Development of an Available-To-Promise Decision Support System for Webco Industries*, PI: Liu, Co-PI: Balasundaram, 4/1/2010–6/30/2012, \$137,995. *Webco Industries Inc.*
- *A Design Optimization Tool for Supply Chains (DOTS)*, PI: Ingalls, Co-PIs: Kamath, Balasundaram, 6/1/2010–12/31/2011, \$21,666. *Center for Excellence in Logistics and Distribution (NSF I/UCRC)*.
- *Acquisition of LIDAR Laser Scanner for Bridge Inspection*, PI: Kong, Co-PIs: Ley, Emerson, Balasundaram, Collins, Liu, 8/1/2010–10/31/2011, \$200,000. *Oklahoma Transportation Center*.

Graduate Advising

Doctoral Students.....

- Parisa V. Mohebbi (in progress)
- Hao Pan (December 2021)
 - Dissertation: *Mining Low-Diameter Clusters Conserved in Graph Collections*
 - Optimization Data Scientist at U.S. Xpress, Inc.
- Yajun Lu (July 2019)
 - Dissertation: *Finding Second-order Clubs*.
 - Assistant Professor of Operations Management, Department of Management & Marketing, College of Business & Industry, Jacksonville State University.
- Babak Farmanesh (Co-advisor, August 2018)
 - Dissertation: *Efficient Techniques for Statistical Modeling of Calibration and Spatio-temporal Systems Using Gaussian Processes*.
 - Senior Data Scientist at Microsoft.
- Zhuqi Miao (May 2016)

- Dissertation: *Combinatorial and Global Optimization Approaches to the Maximum Quasi-clique Problem*.
- Assistant Professor of Business Analytics, School of Business, State University of New York at New Paltz.
- Esmaeel Moradi (May 2016)
 - Dissertation: *Decomposition Algorithms for Detecting Low-diameter Clusters in Graphs*.
 - Director of Global Supply Chain Strategy at Wesco
- Juan Ma (Co-advisor, December 2015)
 - Dissertation: *Proactive Approaches for System Design Under Uncertainty Applied to Network Synthesis and Capacity Planning*.
 - Technical Manager, Data Science, iHeartMedia, Inc.
- Foad Mahdavi Pajouh (August 2012)
 - Dissertation: *Polyhedral Combinatorics, Complexity & Algorithms for k -Clubs in Graphs*.
 - Jack Howe Fellow and Associate Professor, School of Business, Stevens Institute of Technology

Masters Students.....

- Parisa Sahraeian (Summer 2022)
- Pouya Ahadi (Spring 2021), Thesis: *Optimizing Expected Cross Value for Genetic Introgression*
- Tyler Davis (Fall 2017), Thesis: *Parallelization of the Clark, Colbourn, and Johnson Maximum Clique Algorithm for Unit Disk Graphs*
- Rajeev Gangwar (Spring 2017)
- Sampreet Mangalvedhe (Fall 2016), Thesis: *On a Biobjective Flow Problem in Networks*
- Arun Jayaraman (Summer 2016)
- Amit Kumar (Summer 2016)
- Prashant Kalidindi Verma (Spring 2016)
- Devaraja Radha Krishnan (Fall 2015), Thesis: *Decomposition Algorithms for the Elementary Shortest Path Problem in Networks Containing Negative Cycles*
- Komal Revankar (Fall 2015), Independent Study: *Autonomous Mobility-on-demand: Operations Research Focused Literature Review*
- Justin Zawoiski (Spring 2015)
- Surender Singireddy (Spring 2014), Independent Study: *Implementing Shortest Path, Maximum Flow and Minimum Spanning Tree Algorithms With Boost Graph Libraries*
- Zhuqi Miao (Spring 2012), Independent Study: *Cluster Detection in Large-scale Social Networks Using k -Plexes*
- Juliana Bright (Fall 2011), Thesis: *Robust Shortest Paths Under Uncertainty Using Conditional Value-At-Risk*

- Ninad Joshi (Summer 2011)
- Pranav Dharmadhikari (Summer 2011)
- Vidyasagar Kodukula (Summer 2011)
- Amol Bhawe (Fall 2010), Thesis: *Greedy Randomized Adaptive Search Procedure for the Maximum Co-k-Plex Problem*
- Ameya Dhaygude (Fall 2010), Thesis: *A Heuristic Approach to the Chance Constrained Minimum Spanning k-Core Problem*
- Sameer Mangalvedhe (Fall 2010), Thesis: *Greedy Randomized Adaptive Search Procedure for the Maximum 2-Club Problem*
- Rahul Banda (Fall 2009)
- Krishna Chaitanya Gunturu (Summer 2009)

Undergraduate Advising

Senior Design Projects.....

- Jason Abernathy, Mason Feddersen, Kendel Hart, Sam Koscelny (Spring 2022), *Estimating Lumber Requirements and Minimizing Lumber Wastage in Zeeco Crating Operation*
- Cade Phelan, Victoria Richardson, Kaustuvi Thapa (Spring 2021), *Cost-effective Freight Carrier Selection for ArcBest*
 - Top-5 finalist for the 2021 Outstanding ISE Capstone Senior Design Project Award given by the Institute of Industrial and Systems Engineers
- Jennifer Fallon, Brittany Grubert, Rylee Hunter, Charlie Robson (Spring 2020), *Increasing Air Fleet Availability at the OSU Flight Center*
- Ahmed Almuhanha, Andrew Browning, Erica Crain, Michael Moylan (Spring 2019), *Enhancement of Inventory Simulator for Engine Parts at American Airlines Maintenance Facility*
- Ronnie Comeau, Jazmin Wilson, Qidong Zhai (Fall 2017), *An Optimized Scheduling Methodology for Air Traffic Controllers at the Federal Aviation Administration*
- Connor Mojo, Hao Pan, Carly Reeves (Spring 2016), *Improving Customer Experiences at Nebu Café*
- Andrea Lewis, Katey Luster, Weikao Wu (Spring 2014), *An Investigation into Routing Efficiency at the Regional Food Bank in Oklahoma City, Oklahoma*
- Erin Lee, Steven Miklosko, Amy Zeckser (Spring 2013), *Process Improvement in Stillwater Medical Center's Same Day Surgery Department in Stillwater, Oklahoma*
- Marco Borunda, Nadia Brigita, Bailey Layman (Fall 2009), *An Investigation of High Patient Waiting Time at the Baptist Community Clinic*
- Marcus Concienne, Mitchel McCowan, Doann Nguyen (Fall 2008), *An Investigation into the Development of a Method to Identify RFQ Similarity at Webco Industries, Inc.*

Undergraduate Technical Papers & Presentations.....

- Kaustuvi Thapa, Torie Richardson, and Cade Phelan, *Integer Programming Approach to Solving a Carrier Selection Problem*
 - First Place, IISE South-Central Regional Undergraduate Student Paper Competition, February 2022
- Aarushi Singh, *Comorbidity Network Analysis Using Atomic Cliques*, OSU Undergraduate Research Symposium Poster Presentation, April 2022
 - Recipient of CEAT Undergraduate Research Scholarship for AY2020–2021 and AY2021–2022.
- Bailey Whitman, *Determining an Optimal Inventory Mix for NABco Industries*, (Project Mentor: Dr. Liu)
 - First Place, IISE South-Central Regional Undergraduate Student Paper Competition, March 2018
 - Finalist, IISE International Undergraduate Student Paper Competition, May 2018
- Andrea Lewis, Katey Luster, Weikao Wu, *Delivery Vehicle Routing at the Regional Food Bank of Oklahoma*
 - First Place, IIE South-Central Regional Undergraduate Student Paper Competition, Feb 2015
 - Finalist, IIE International Undergraduate Student Paper Competition, June 2015
 - Participant, INFORMS Undergraduate Poster Competition, Nov 2014
- Ian Giese, *Michelin Recyclable Material Planning Tool*
 - First Place, 2014 IIE Process Industry Division Student Paper Competition
- Erin Lee, *Process Improvement in Stillwater Medical Center's Same Day Surgery Department in Stillwater, Oklahoma*
 - First Place, IIE South-Central Regional Undergraduate Student Paper Competition, Feb 2014
 - Finalist, IIE International Undergraduate Student Paper Competition, June 2014
- Justin Whisenant, *Webco Industries, Inc. Steel Coil Optimization*, (Project Mentor: Dr. Ingalls)
 - Second Place, IIE South-Central Regional Undergraduate Student Paper Competition, Feb 2013
- Ajay Reddy, Ryan Sullivan, *An Analysis of Process Documentation at a Software Providing Organization*, (Project Mentor: Dr. Collins)
 - Participant, IIE South-Central Regional Undergraduate Student Paper Competition, Feb 2013
- Austin Buchanan, Adrian Smith, *An Investigation into Instructor Staffing at Oklahoma State University Fire Service Training*, (Project Mentor: Dr. Liu)
 - First Place, IIE South-Central Regional Undergraduate Student Paper Competition, March 2012
 - First Place, IIE International Undergraduate Student Paper Competition, May 2012
 - Participant, INFORMS Undergraduate Paper Competition, Nov 2011
- Thomas Hong, Julianna Bright, Carrie Walker, *An Investigation into the Current Distribution System at Ditch Witch in Perry, Oklahoma*, (Project Mentor: Dr. Ingalls)
 - First Place, IIE South-Central Regional Undergraduate Student Paper Competition, Feb 2010
 - First Place, IIE International Undergraduate Student Paper Competition, May 2010
- Marcus Conciencie, Mitchel McCowan, *An Investigation into the Development of a Method to Identify RFQ Similarity at Webco Industries, Inc.*

- First Place, IIE South-Central Regional Undergraduate Student Paper Competition, Feb 2009
- Third Place, IIE International Undergraduate Student Paper Competition, May 2009

Courses Taught

PhD

- Linear Optimization
- Nonlinear Optimization
- Integer and Combinatorial Optimization

MS

- Introduction to Optimization
- Network Optimization

BS

- Operations Research
- Engineering Economic Analysis
- Senior Design Projects

Editorial Service

Associate Editor

- *Networks*, 2012–Present
- *IIE Transactions*, 2013–2018
- *Journal of Global Optimization*, 2009–Present

Reviewer

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| ○ <i>Mathematical Programming</i> | ○ <i>Operations Research</i> |
| ○ <i>Networks</i> | ○ <i>INFORMS Journal on Computing</i> |
| ○ <i>Discrete Optimization</i> | ○ <i>SIAM Journal on Discrete Mathematics</i> |
| ○ <i>Discrete Applied Mathematics</i> | ○ <i>Journal of Graph Algorithms and Applications</i> |
| ○ <i>Optimization Letters</i> | ○ <i>Journal of Combinatorial Optimization</i> |
| ○ <i>Journal of Global Optimization</i> | ○ <i>Computational Optimization & Applications</i> |
| ○ <i>Journal of Optimization Methods & Software</i> | ○ <i>Optimization and Engineering</i> |
| ○ <i>Annals of Operations Research</i> | ○ <i>European Journal of Operational Research</i> |
| ○ <i>Computers & Operations Research</i> | ○ <i>Asia-Pacific Journal of Operations Research</i> |
| ○ <i>IIE Transactions</i> | ○ <i>Computers & Industrial Engineering</i> |
| ○ <i>Production & Operations Management</i> | ○ <i>Journal of Heuristics</i> |
| ○ <i>Discrete Event Dynamic Systems: Theory and Applications</i> | ○ <i>Omega-The International Journal of Management Science</i> |
| ○ <i>Journal of Communications & Networks</i> | ○ <i>Social Networks</i> |
| ○ <i>IEEE/ACM Transactions on Computational Biology and Bioinformatics</i> | ○ <i>IEEE Transactions on Automation Science and Engineering</i> |
| ○ <i>IEEE Transactions on NanoBioscience</i> | |

Conference Activities

Program Committee Member

- Critical Infrastructure Network Security Workshop – CINS 2021, June 14, 2021, Virtual during ACM SIGMETRICS

- World Congress on Global Optimization – WCGO 2021, July 7-10, 2021, Athens, Greece
- The 9th International Conference on Optimization and Applications – OPTIMA-2018, October 1–5, 2018, Petrovac, Montenegro
- The 14th International Workshop on Global Optimization – LeGO 2018, September 18–21, 2018, Leiden, The Netherlands
- The 4th International Conference on Machine Learning, Optimization and Data Science – LOD 2018, September 13–16, 2018, Volterra, Tuscany, Italy
- Global Optimization Conference – GOC 2017, March 30–April 1, 2017, College Station, TX
- The Second International Workshop on Machine Learning, Optimization and Big Data – MOD 2016, August 26–29, 2016, Volterra, Tuscany, Italy
- International Workshop on Machine Learning, Optimization and Big Data – MOD 2015, July 21–24, 2015, Taormina - Sicily, Italy
- World Congress on Global Optimization – WCGO 2015, Feb 22-25, 2015, Gainesville, FL
- INFORMS Optimization Society Conference, March 6-8, 2014, Houston, TX
- Yalta Conference on Resilient Networks, June 17-18, 2012, Crimea, Ukraine
- Systems and Optimization Aspects of Smart Grid Challenges, April 28-30, 2011, Gainesville, FL
- Yalta Conference on Network Science, Aug 2-4, 2010, Yalta, Ukraine
- Yalta Conference on Discrete and Global Optimization, July 31–August 2, 2008, Yalta, Ukraine

Cluster Chair.....

- Optimization/Networks, 2019 INFORMS ALIO International Conference, June 9–12, 2019, Cancún, Mexico
- Network Optimization in Big Data Analytics and Power Systems, 2014 INFORMS Optimization Society Conference, March 6-8, 2014, Houston, TX
- Optimization/Networks, 2013 INFORMS Annual Meeting, Oct 6–9, 2013, Minneapolis, MN
- Optimization/Networks, 2012 INFORMS Annual Meeting, Oct 14–17, 2012, Phoenix, AZ

Session Chair.....

- Network Optimization-I, 2019 INFORMS ALIO International Conference, June 9–12, 2019, Cancún, Mexico
- Optimization in Social Networks, 2018 INFORMS Annual Meeting, Nov 4–7, 2018, Phoenix, AZ
- Global Optimization in Networks, 2017 Global Optimization Conference – GOC 2017, March 30–April 1, 2017, College Station, TX
- Paths, Cycles, and Transversals, 2016 INFORMS Annual Meeting, Nov 13–16, 2016, Nashville, TN
- Stable Sets, Zero-forcing Sets, and Target Sets in Graphs, 2016 INFORMS Annual Meeting, Nov 13–16, 2016, Nashville, TN

- Network Flows and Combinatorial Optimization, 2015 INFORMS Annual Meeting, Nov 1–4, 2015, Philadelphia, PA
- Combinatorial Optimization in Social Networks, 22nd International Symposium on Mathematical Programming, July 12–17, 2015, Pittsburgh, PA
- Optimization in Graphs and Digraphs, 2014 INFORMS Annual Meeting, Nov 9–12, 2014, San Francisco, CA
- CVaR and Chance Constrained Optimization in Networks, 2012 INFORMS Annual Meeting, Oct 14–17, 2012, Phoenix, AZ
- Optimization Methodology, 2009 Industrial Engineering Research Conference (IERC), May 30–June 3, 2009, Miami, FL
- Internet Analytics and Automation, 2008 IEEE Conference on Automation Science and Engineering, Aug 23–26, 2008, Washington, DC
- Discrete Optimization, 2008 INFORMS Southwest Regional Conference, April 18–19, 2008, Texas A&M University, College Station, TX

Service & Professional Activities

- *Elected Member*, Reappointment, Promotion, and Tenure College-Wide Committee, College of Engineering, Architecture, and Technology, Oklahoma State University, 2022–2025
- *Affiliate Faculty*, Center for the Study of Disasters and Extreme Events (CSDEE), Oklahoma State University, 2016–2020
- *Member*, Coalition for Advanced Digital Research & Education (CADRE) Council, Oklahoma State University, 2017–2019
- *Member*, Food-Energy-Water (FEW) Nexus Council, Oklahoma State University, College of Engineering, Architecture, and Technology representative, 2016–2018
- *Member*, Faculty Research Council, College of Engineering, Architecture, and Technology, School of Industrial Engineering & Management representative, 2013–2015
- *Faculty Adviser*, Student Chapter of IIE at Oklahoma State University, 2007–2014
- *Panelist*, “Four Generations in Academia.” Graduate Students & Faculty Relationships Workshop, April 4–6, 2014, Texas A&M University, College Station, TX
- *Panelist*, IISE OR Teaching Excellence Award (2020), INFORMS Best Student Poster Competition (2017, 2018), INFORMS George Nicholson Prize Committee (2015, 2016), INFORMS Junior Faculty Interest Group Paper Competition (2014)
- *Proposal Review*: Department of Energy, National Science Foundation, Air Force Office of Scientific Research
- Advisory Board Member of iCREST: Interdisciplinary Center for Research Excellence in Science and Technology (Bioinformatics and Computational Biology), 2011–2014

- Elected *Vice Chair for Networks*, INFORMS Optimization Society, 2011–2013
- *Mentor*, Oklahoma Louis Stokes Alliance for Minority Participation, 2008–2009, 2017

Professional Memberships

- Institute for Operations Research and the Management Sciences (INFORMS)
- Mathematical Optimization Society (MOS)
- Institute of Industrial and Systems Engineers (IISE)
- Society for Industrial and Applied Mathematics (SIAM)

Selected Presentations

- “Club interdiction.” 2022 INFORMS Computing Society Conference, January 23–25, 2022, Tampa, FL.
- “Robust low-diameter subgraphs.” 2019 INFORMS ALIO International Conference, June 9–12, 2019, Cancún, Mexico.
- “An upper-bounding technique for the maximum quasi-clique problem.” 2018 INFORMS Optimization Society Meeting, March 23–25, 2018, Denver, CO.
- “A lazy approach to finding low-diameter clusters in graphs.” Seminar Series, Department of Industrial and Manufacturing Systems Engineering, February 7, 2018, Kansas State University, Manhattan KS.
- “The maximum quasi-clique problem.” 2017 Global Optimization Conference – GOC 2017, March 30–April 1, 2017, College Station, TX.
- “Recent developments in detecting low-diameter clusters in graphs.” Seminar Series, Department of Industrial Engineering, October 6, 2016, University of Pittsburgh, Pittsburgh, PA.
- “Cliques & clubs.” Seminar Series, Department of Industrial & Systems Engineering, September 11, 2015, Texas A&M University, College Station, TX.
- “On the 2-club polytope of graphs.” 22nd International Symposium on Mathematical Programming (ISMP), July 12–17, 2015, Pittsburgh, PA.