Austin Buchanan

331 Engineering North
Industrial Engineering & Management
Oklahoma State University
Stillwater, OK 74078

phone: (405) 744-6055
fax: (405) 744-4654
email: buchanan@okstate.edu
blog: https://farkasdilemma.wordpress.com/

AFFILIATION

2021–Present Associate Professor, Industrial Engineering & Management
Oklahoma State University, Stillwater, OK

2015–2021 Assistant Professor, Industrial Engineering & Management
Oklahoma State University, Stillwater, OK

EDUCATION

2011–2015 Doctor of Philosophy, Industrial and Systems Engineering
Texas A&M University, College Station, TX

2007–2011 Bachelor of Science, Industrial Engineering & Management
Oklahoma State University, Stillwater, OK

PUBLICATIONS

Refereed Journal Articles

1. H. Validi, A. Buchanan, E. Lykhovyd. Imposing contiguity constraints in political districting models. To appear, *Operations Research*.
2. V. Stozhkov, A. Buchanan, S. Butenko, V. Boginski. Continuous cubic formulations for cluster detection problems in networks. To appear, *Mathematical Programming*.
3. B. Farmanesh, A. Pourhabib, B. Balasundaram, A. Buchanan. A Bayesian framework for local calibration of expensive computational models through non-isometric matching. *IISE Transactions*, 53(3): 352–364, 2021.
4. H. Validi, A. Buchanan. The optimal design of low-latency virtual backbones. *INFORMS Journal on Computing*, 32(4): 952–967, 2020.
5. J.L. Walteros, A. Buchanan. Why is maximum clique often easy in practice? *Operations Research*, 68(6): 1866–1895, 2020.
6. H. Salemi, A. Buchanan. Parsimonious formulations for low-diameter clusters. *Mathematical Programming Computation*, 12(3): 493–528, 2020.
7. H. Validi, A. Buchanan. A Note on "A linear-size zero-one programming model for the minimum spanning tree problem in planar graphs". *Networks*, 73(1): 135–142, 2019.
8. A. Buchanan, Y. Wang, S. Butenko. Algorithms for node-weighted Steiner tree and maximum-weight connected subgraph. *Networks*, 72(2): 238–248, 2018.
9. Y. Wang, A. Buchanan, S. Butenko. On imposing connectivity constraints in integer programs. *Mathematical Programming*, 166(1): 241–271, 2017.
10. A. Buchanan. Extended formulations for vertex cover. *Operations Research Letters*, 44(3): 374–378, 2016.
11. S. Kahruman-Anderoglu, A. Buchanan, S. Butenko, O.A. Prokopyev. On provably best construction heuristics for hard combinatorial optimization problems. *Networks*, 67(3): 238–245, 2016.
12. A. Buchanan, J.S. Sung, S. Butenko, E.L. Pasiliao. An integer programming approach for fault-tolerant connected dominating sets. *INFORMS Journal on Computing*, 27(1):178-188, 2015.

13. A. Verma, A. Buchanan, S. Butenko. Solving the maximum clique and vertex coloring problems on very large sparse networks. *INFORMS Journal on Computing*, 27(1):164-177, 2015.
14. A. Buchanan, J.S. Sung, V. Boginski, S. Butenko. On connected dominating sets of restricted diameter. *European Journal of Operational Research*, 236(2):410-418, 2014.
15. A. Buchanan, J.L. Walteros, S. Butenko, P.M. Pardalos. Solving maximum clique in sparse graphs: an $O(nm + n2^{d/4})$ algorithm for d-degenerate graphs. *Optimization Letters*, 8(5):1611-1617, 2014.

SUBMITTED PAPERS

16. H. Salemi, A. Buchanan. Solving the distance-based critical node problem. Revision submitted to *INFORMS Journal on Computing*, June 2021.
17. M.J. Naderi, A. Buchanan, J.L. Walteros. Worst-case analysis of clique MIPs. Revision submitted to *Mathematical Programming*, June 2021.
18. H. Validi, A. Buchanan. Political districting to minimize cut edges. Submitted, April 2021.

OTHER

19. A. Buchanan, S. Butenko. Tight extended formulations for independent set. Unpublished, 2015.
20. A. Buchanan, N. Chen, X. Ma. Using GRASP for the cover by s-defective independent sets problem. In *Examining Robustness and Vulnerability of Critical Infrastructure Networks*. Ed. by S. Butenko, E.L. Pasiliao, and V. Shylo. Amsterdam: IOS Press, 2014, pp. 17–25.

GRANTS (Total: $1.17 million)

- A. Buchanan (PI). "CAREER: Parsimonious Models for Redistricting," *National Science Foundation* (CMMI-1942065), $508,000, 6/1/2020–5/31/2025.
- B. Balasundaram (PI), A. Buchanan (coPI), and S. Heragu (coPI). "FLAT: Freight Lane Assignment Tool," *TreeHouse Foods Inc*, $163,730, 1/13/2020–1/16/2021.
- A. Buchanan (PI). "Imposing Connectivity Constraints in Large-Scale Network Problems," *National Science Foundation* (CMMI-1662757), $258,586, 6/15/2017–5/31/2021.
- B. Balasundaram (PI), A. Buchanan (coPI), and S. Heragu (coPI). "Optimization-Based Aggregate Master Planning Tools for Bay Valley Foods, LLC," *Bay Valley Foods, LLC*, $250,599, 10/1/2017–1/31/2020.

SELECTED AWARDS AND HONORS

- Honorable Mention, 2019 INFORMS JFIG Paper Competition, for the paper "Why is maximum clique often easy in practice?" coauthored with Jose L. Walteros.
- Santa Gift Matching Challenge, 3rd place ($1,000 prize), Kaggle, 2018.
- Pritsker Doctoral Dissertation Award, 2nd Place, Institute of Industrial and Systems Engineers, 2016.
- National Merit Scholar, National Merit Scholarship Corporation, 2007. (Accepted College-Sponsored Merit Scholarship Award from OSU, 2007–2011.)

TEACHING

- IEM 6053, Integer and Combinatorial Optimization (Spring 2020, Fall 2018, Spring 2017, Fall 2016)
- IEM 5063, Network Flows and Combinatorial Optimization (Spring 2016)
- IEM 4203, Facilities and Material Handling System Design (Fall 2020, Fall 2019, Fall 2018, Fall 2017)
- IEM 4013, Introduction to Operations Research (Spring 2021, Spring 2020, Spring 2018, Fall 2015)
- IEM 3503, Engineering Economic Analysis (Spring 2021, Spring 2019, Spring 2018)
- ISEN 302 (at TAMU), Engineering Economy (Spring 2015, Fall 2014, Spring 2014)

STUDENTS

- ◇ Hamidreza Validi, PhD student, Fall 2016 – Summer 2020. Current: Postdoc at Rice University.
- ◇ Hosseinali Salemi, PhD student, Fall 2016 – Summer 2020. Current: Postdoc at Iowa State University.
- ◇ Mohammad Javad Naderi, PhD student, Fall 2017 – present.
- ◇ Elizabeth Bunting, BS student, NSF REU (Summer 2018) & Wentz Researcher (Fall 2018 – Spring 2019).
- ◇ Ryne Garrison, BS student, NSF REU (Summer 2021).

PROFESSIONAL SERVICE

EDITORIAL SERVICE

- ◇ Associate Editor, *Networks*, 2016–present.
- ◇ Associate Editor, *Optimization Letters*, 2019–present.
- ◇ Referee (55+ articles total): *Operations Research, Mathematical Programming, INFORMS Journal on Computing, INFORMS Journal on Optimization, SIAM Journal on Optimization, Networks, IIE Transactions, European Journal of Operational Research, Discrete Optimization, Algorithmica, Naval Research Logistics, Optimization Letters, Electronic Journal of Combinatorics, Journal of Global Optimization, Journal of Combinatorial Optimization, ALENEX21, FAW 2015*.

CONFERENCES

- ◇ Cluster Chair, *Telecommunications & Network Analytics*: INFORMS (2021, 2020, 2019).
- ◇ Cluster Chair, *Network Optimization*: IOS 2018, INFORMS (2017, 2016).
- ◇ Session Chair: INFORMS (2021, 2019, 2017, 2014), IOS 2018, ISMP 2015.

PROFESSIONAL SOCIETIES

- ◇ Member of Council, INFORMS Section on Telecommunications and Network Analytics, 2018–2022.
- ◇ Representative of INFORMS Optimization Society, INFORMS Subdivisions Council, 2017–2018.
- ◇ Judge, INFORMS George Nicholson Student Paper Competition, 2017.
- ◇ Vice Chair for Network Optimization, INFORMS Optimization Society, 2015–2017.

OTHER PROFESSIONAL SERVICE

- ◇ NSF proposal review panelist.

SELECTED TALKS

- ◇ "Imposing contiguity constraints in political districting models," Discrete Optimization Talks (DOTs), organized by Aleksandr Kazachkov (U. Florida) and Elias Khalil (U. Toronto), June 23, 2020. Video recording of talk available at: `https://www.youtube.com/watch?v=aV9NLC3isUo`
- ◇ "Integer and linear programming," Voting Rights Data Institute, Boston, MA, June 27, 2019.
- ◇ "Why is maximum clique often easy in practice?" ISMP, Bordeaux, France, July 3, 2018.
- ◇ "Parsimonious integer programming formulations for low-diameter clusters (k-clubs)," MIP, Montréal, Canada, June 21, 2017.
- ◇ "Extended formulations for vertex cover," ICCOPT, Tokyo, Japan, August 11, 2016.
- ◇ "On imposing connectivity constraints in integer programs," ISMP, Pittsburgh, PA, July 15, 2015.
- ◇ "Maximum clique problem on very large scale sparse networks," ISMP, Berlin, Germany, August 19, 2012.