Dabeen Lee

Contact Information

Discrete Mathematics Group
Institute for Basic Science (IBS)
55 Expo-ro, Yuseong-gu,
Daejeon 34126, Republic of Korea

Office: B213 (Theory Building)
Tel: +82-42-878-9213
dabeenl@ibs.re.kr
https://dimag.ibs.re.kr/home/dabeen/

Positions

KAIST, Daejeon, South Korea

Assistant Professor, Dept. of Industrial and Systems Engineering 07/2022 -

Institute for Basic Science (IBS), Daejeon, South Korea

Young scientist fellow, 01/2021 - 06/2022

Research fellow, 06/2019 - 12/2020

Discrete Mathematics Group (alternate military service)

IBM T.J. Watson Research Center, Yorktown, NY, USA

Research intern, Mathematical Sciences Department, 07/2017 - 09/2017

Education

Tepper School of Business, Carnegie Mellon University, Pittsburgh, PA, USA

Ph.D. in Algorithms, Combinatorics and Optimization (ACO), 08/2014 - 05/2019

- Concentration: Operations Research and Optimization
- Advisor: Prof. Gérard P. Cornuéjols

POSTECH, Pohang, South Korea

B.S. in Industrial and Management Engineering, 03/2010 - 06/2014

University of Waterloo, Waterloo, ON, Canada

Undergraduate exchange program, 09/2012 - 12/2012

Gyeonggi Science High School, Suwon, South Korea 03/2008 - 02/2010

Honors and Awards

Young Scientist Fellowship, "Combinatorial Optimization for Data-Driven Decision Making", 150,000,000 KRW (132,000 USD) for 3 years, awarded by the Institute for Basic Science (IBS), 2021-2023.

Second-place in the **INFORMS Optimization Society Student Paper Prize** competition, 2019

Gerald L. Thompson Doctoral Dissertation Award, awarded by the Tepper School of Business, Carnegie Mellon University for the best doctoral dissertation in management science, 2019.

Henry J. Gailliot Presidential Fellowship, Carnegie Mellon University, 2016-2017.

Egon Balas Award, awarded by the Tepper School of Business, Carnegie Mellon University for the best student paper in the area of operations research, 2016.

William Larimer Mellon Fellowship, Tepper School of Business, 2014-2018.

Submitted Papers

1. Test score algorithms for budgeted stochastic utility maximization.
   Revision at INFORMS Journal on Optimization
   Joint work with Milan Vojnovic and Se-Young Yun.

2. Conic mixed-binary sets: convex hull characterizations and applications.
   Major revision at Operations Research
   Joint work with Fatma Kılınç-Karzan and Simge Küçükyavuz.

3. Strong formulations for distributionally robust chance-constrained programs with left-hand side uncertainty under Wasserstein ambiguity.
   Revision at INFORMS Journal on Optimization
   Joint work with Nam Ho-Nguyen, Fatma Kılınç-Karzan and Simge Küçükyavuz.

Publications

1. Scheduling jobs with stochastic holding costs.
   Joint work with Milan Vojnovic.
   NeurIPS 2021.
   Journal version in preparation for submission to *Operations Research*.

2. On a generalization of the Chvátal-Gomory closure.
   Mathematical Programming, published online.
   Joint work with Sanjeeb Dash and Oktay Günlük.
   Conference version: **IPCO 2020**, LNCS 12125 (2020) 117-129.

3. Joint chance-constrained programs and the intersection of mixing sets through a submodularity lens.
   Mathematical Programming, published online.
   Joint work with Fatma Kılınç-Karzan and Simge Küçükyavuz.

4. Distributionally robust chance-constrained programs with right-hand side uncertainty under Wasserstein ambiguity.
   Mathematical Programming, published online.
   Joint work with Nam Ho-Nguyen, Fatma Kılınç-Karzan, and Simge Küçükyavuz.

5. Idealness of k-wise intersecting families,
   Mathematical Programming, published online.
   Joint work with Ahmad Abdi, Gérard Cornuéjols, and Tony Huynh.
   Conference version: **IPCO 2020**, LNCS 12125 (2020) 1-12.

6. Generalized Chvátal-Gomory closures for integer programs with bounds on variables,
   Mathematical Programming 190 (2021) 393–425.
   Joint work with Sanjeeb Dash and Oktay Günlük.

7. Resistant sets in the unit hypercube,
   Mathematics of Operations Research 46 (2021) 82–114.
   Joint work with Ahmad Abdi and Gérard Cornuéjols.

8. Intersecting restrictions in clutters,
   Combinatorica 40 (2020) 605–623.
   Joint work with Ahmad Abdi and Gérard Cornuéjols.

9. Cuboids, a class of clutters,
   Journal of Combinatorial Theory B 142 (2020) 144–209.
   Joint work with Ahmad Abdi, Gérard Cornuéjols, and Natália Guričanová.

10. On the rational polytopes with Chvátal rank 1,
    Mathematical Programming 179 (2020) 21-46.
    Joint work with Gérard Cornuéjols and Yanjun Li.

11. Identically self-blocking clutters,
    IPCO 2019, LNCS 11480 (2019) 1-12,
    Joint work with Ahmad Abdi and Gérard Cornuéjols.

12. On the NP-hardness of deciding emptiness of the split closure of a rational polytope in the 0,1 hypercube.
    Discrete Optimization 32 (2019) 11-18.

13. Deltas, extended odd holes and their blockers,
    Journal of Combinatorial Theory B 136 (2019) 193-203,
    Joint work with Ahmad Abdi.

14. On some polytopes contained in the 0,1 hypercube that have a small Chvátal rank.
    Mathematical Programming 172 (2018) 467-503.
    Joint work with Gérard Cornuéjols.
    Conference version: **IPCO 2016**, LNCS 9682 (2016) 300-311.
    Second-place in the INFORMS Optimization Society Student Paper Prize Competition, 2019

Papers in Preparation

1. Scheduling bandits, with Yunbum Kook, Will Overman, and Milan Vojnovic.

2. Scenario reduction for stochastic programming via maximum mean discrepancy, with Nam Ho-Nguyen.

3. Distributionally robust submodular maximization under Wasserstein ambiguity, with Duksang Lee and Nam Ho-Nguyen.

Invited Presentations at Academic Institutions

SME Seminar, Department of Systems Management Engineering, Sungkyunkwan University, Suwon, South Korea, September 2021, "Recent progress on chance-constrained optimization".

IBS Discrete Math Seminar, IBS, Daejeon, South Korea, September 2021, "Mixing sets, submodularity, and chance-constrained optimization".

Business Analytics Seminar, The University of Sydney Business School, Sydney, Australia (online), August 2021, "Data-driven decision making for combinatorial optimization".

ISysE Seminar, Department of Industrial and Systems Engineering, KAIST, Daejeon, South Korea, July 2021, "Modern discrete optimization: algorithms and learning frameworks".

ISysE Seminar, Department of Industrial and Systems Engineering, KAIST, Daejeon, South Korea, April 2021, "Data-driven chance-constrained optimization under Wasserstein ambiguity".

BK Colloquium, Department of Mathematical Sciences, Seoul National University, Seoul, South Korea, April 2021, "Data-driven chance-constrained optimization under Wasserstein ambiguity".

Special Seminar, Department of Applied Mathematics and Statistics, Johns Hopkins University, Baltimore, MD, USA (online), January 2021, "Data-driven optimization: test score algorithms and distributionally robust approach".

Séminaire virtuel de théorie des graphes et combinatoire en Rhône-Alpes et Auvergne, France (online), December 2020, "Multipartite clutters and the $\tau = 2$ conjecture".

CS Colloquium, Department of Computer Science, SUNY Korea, Incheon, South Korea (online), October 2020, "Test score based algorithms for budgeted stochastic submodular maximization".

IME Special Seminar, Department of Industrial and Management Engineering, POSTECH, Pohang, South Korea, July 2020, "Distributionally robust chance-constrained programs under Wasserstein ambiguity".

IBS Discrete Math Seminar, IBS, Daejeon, South Korea, March 2020, "On a generalization of the Chvátal-Gomory closure".

Frontiers in Industrial & Systems Engineering, 2019 Winter ISysE Symposium, Department of Industrial and Systems Engineering, KAIST, Daejeon, South Korea, December 2019, "Linear programs with probabilistic constraints and binary mixing sets".

IBS/KAIST Joint Discrete Math Seminar, IBS, Daejeon, South Korea, July 2019, "Integrality of set covering polyhedra and clutter minors".

Operations Research Seminar, IBM Research, Yorktown, NY, June 2019, "Chvátal-Gomory cuts, rank, closure, and their generalizations for integer programming".

ISysE Seminar, Department of Industrial and Systems Engineering, KAIST, Daejeon, South Korea, December 2018, "Complexity of integer programming: geometric and combinatorial perspectives".

Operations Research Seminar, IBM Research, Yorktown, NY, July 2018, "Integrality of set covering polyhedra and clutter minors".

Optimization Seminar, Department of Combinatorics and Optimization, University of Waterloo, Waterloo, ON, Canada, March 2017, "On the rational polytopes with Chvátal rank 1".

Conference and Workshop Presentations

35^{th} Conference on Neural Information Processing Systems (NeurIPS 2021) (virtual), December 2021, "Scheduling jobs with stochastic holding costs".

INFORMS Annual Meeting, Aneheim, CA, October 2021, "Conic mixed-binary sets: convex hull characterizations and applications".

22^{nd} Conference of the International Federation of Operational Research Societies (IFORS 2021) (virtual), August 2021, "Joint chance-constrained programs and the intersection of mixing sets through a submodularity lens".

SIAM Conference on Optimization (OP21) (virtual), July 2021, "Conic mixed-binary sets: convex hull characterizations and applications".

INFORMS Annual Meeting (virtual), November 2020, "Improved formulations for distributionally robust chance-constrained programs under Wasserstein ambiguity".

21^{st} *Conference on Integer Programming and Combinatorial Optimization (IPCO 2020)*, London, UK (online), June 2020, "On a generalization of the Chvátal-Gomory closure".

KSIAM Annual Meeting, Yeosu, South Korea, November 2019, "Joint chance-constrained programs and the intersection of mixing sets through a submodularity lens".

INFORMS Annual Meeting, Seattle, WA, October 2019, "Joint chance-constrained programs and the intersection of mixing sets through a submodularity lens".

Award Seminar, INFORMS Annual Meeting, Seattle, WA, October 2019, "On some polytopes contained in the 0,1 hypercube that have a small Chvátal rank".

2019 Combinatorics Workshop (Korea), Incheon, South Korea, August 2019, "On the Chvátal rank for integer programming".

9^{th} *Cargese Workshop on Combinatorial Optimization*, Corsica, France, October 2018, "Primal and dual integrality of set covering linear programs".

International Symposium on Mathematical Programming (ISMP), Bordeaux, France, July 2018, "Deltas, extended odd holes, and their blockers".

(Poster) Mixed Integer Programming (MIP) Workshop, Clemson University, SC, June 2018, "Generalized Chvátal-Gomory closures for integer programs with bounds on variables".

INFORMS Optimization Society Conference, Denver, CO, March 2018, "Generalized Chvátal-Gomory closures for integer programs with bounds on variables".

22^{nd} *Aussois Combinatorial Optimization Workshop*, Aussois, France, January 2018, "Generalized Chvátal-Gomory closures for integer programs with bounds on variables".

(Poster) Mixed Integer Programming (MIP) Workshop, HEC Montréal, QC, Canada, June 2017, "On the rational polytopes with Chvátal rank 1".

21^{st} *Aussois Combinatorial Optimization Workshop*, Aussois, France, January 2017, "On the rational polytopes with Chvátal rank 1".

INFORMS Annual Meeting, Nashville, TN, November 2016, "On the rational polytopes with Chvátal rank 1".

Modeling and Optimization: Theory and Applications (MOPTA) conference, Bethlehem, PA, August 2016, "On some polytopes contained in the 0,1 hypercube that have a small Chvátal rank".

18^{th} *Conference on Integer Programming and Combinatorial Optimization (IPCO 2016)*,

Liège, Belgium, June 2016, "On some polytopes contained in the 0,1 hypercube that have a small Chvátal rank".

Teaching Experience

Instructor

- Topics in integer programming and combinatorial optimization — Spring 2019
  Tepper School of Business, Carnegie Mellon University

Teaching Assistant

- 45-951 (MBA) - Business networks — Fall 2016, 2017, 2018
  Tepper School of Business, Carnegie Mellon University
- 47-830 (Ph.D.) - Integer programming — Spring 2016, 2017, 2018
  Tepper School of Business, Carnegie Mellon University
- 47-831 (Ph.D.) - Advanced integer programming — Spring 2017
  Tepper School of Business, Carnegie Mellon University
- 47-861 (Ph.D.) - Convex polyhedra — Fall 2018
  Tepper School of Business, Carnegie Mellon University

Student Advising

- Yunbum Kook (undergraduate at KAIST Math) — 01/2021 - 07/2021
- Will Overman (Ph.D. student at UC Irvine CS) — 03/2021 - 08/2021

Service

Conference Organization

- INFORMS 2020 Annual Meeting, session chair for "Recent advances in distributionally robust optimization", online, USA, November 2020.
- KISAM 2019 Annual Meeting, two special sessions on "Combinatorial and Discrete Optimization", Yeosu, South Korea, November 2019.

Reviewer

- Operations Research,
- Mathematics of Operations Research,
- Mathematical Programming, Series A and B,
- Mathematical Programming Computation,
- SIAM Journal on Optimization,
- SIAM Journal on Discrete Mathematics,
- INFORMS Journal on Optimization,
- INFORMS Journal on Computing,
- Journal of Optimization Theory and Applications,
- Optimization and Engineering,
- Optimization Methods and Software,
- Journal of Combinatorial Theory, Series B,
- Combinatorica.
- IPCO 2020, ICALP 2021

Graduate Coursework

Optimization

- linear programming, convex optimization,
- integer programming, advanced integer programming, mixed integer nonlinear programming, convex polyhedra,
- graph theory, networks and matchings, combinatorial optimization, packing and covering.

Combinatorics

- discrete mathematics, probabilistic combinatorics.

Algorithms

- graduate algorithms, advanced algorithms, computational complexity theory,
- randomized algorithms, algorithms and analysis for large-scale cloud computing systems.

References

Dr. Gérard P. Cornuéjols
Professor of Operations Research
Tepper School of Business
Carnegie Mellon University
Phone: 412-268-2284
E-mail: gc0v@andrew.cmu.edu

Dr. Sanjeeb Dash
Research Staff Member, Manager
Foundations of Optimization and Computation Group
IBM Thomas J. Watson Research Center
Phone: 914-945-1273
E-mail: sanjeebd@us.ibm.com

Dr. Fatma Kılınç-Karzan
Associate Professor of Operations Research
Tepper School of Business
Carnegie Mellon University
Phone: 412-268-9198
E-mail: fkilinc@andrew.cmu.edu

Dr. Simge Küçükyavuz
Professor
Industrial Engineering & Management Sciences
Northwestern University
Phone: 847-491-8796
E-mail: simge@northwestern.edu

Dr. Milan Vojnovic
Professor of Data Science,
Director in Social and Economic Data Science (SEDS)
Department of Statistics
London School of Economics
Phone: +44 (0)20 7107 5146
E-mail: m.vojnovic@lse.ac.uk