2025 Mixed Integer Programming Workshop

University of Minnesota, Twin Cities
Minneapolis, Minnesota, USA
https://mixedinteger.org/2025

Summer School: June 2, 2025
Workshop: June 3–6, 2025

Program Committee
Sophie Huiberts
(Clermont Auvergne University)
Aleksandr Kazachkov
(University of Florida)
Sebastian Perez-Salazar
(Rice University)
Christian Tjandraatmadja
(Google)
Yiling Zhang
(University of Minnesota)

Local Committee
Jean-Philippe Richard
(University of Minnesota)
Saumya Sinha
(University of Minnesota)
Yiling Zhang
(University of Minnesota)

Competition Committee
Timo Berthold
(FICO)
Chen Chen
(Ohio State University)
Aleksandr Kazachkov
(University of Florida)
Jan Kronqvist
(KTH Royal Institute of Technology)
Dimitri Papageorgiou
(ExxonMobil)
Domenico Salvagnin
(University of Padova)
Christian Tjandraatmadja
(Google)
Calvin Tsay
(Imperial College London)

Logo design by © Julia Silbermann

Table of Contents

Gold "Facet-Defining Cut" Tier Sponsors

INDUSTRIAL AND SYSTEMS ENGINEERING
UNIVERSITY OF MINNESOTA

Georgia Tech College of Engineering
H. Milton Stewart School of Industrial and Systems Engineering

Silver "Supporting Cut" Tier Sponsor

Google

Bronze "Valid Cut" Tier Sponsors

mosek

GUROBI OPTIMIZATION

FICO®

COPT Cardinal Optimizer

LEHIGH UNIVERSITY

UF Herbert Wertheim College of Engineering
Department of Industrial & Systems Engineering
UNIVERSITY *of* FLORIDA

Northwestern | McCORMICK SCHOOL OF ENGINEERING
Industrial Engineering and Management Sciences

TEXAS A&M UNIVERSITY
Wm Michael Barnes '64 Department of Industrial & Systems Engineering

THE OPTIMIZATION FIRM

Federal and Local Sponsors

AIR FORCE OFFICE OF SCIENTIFIC RESEARCH
UNITED STATES AIR FORCE

NSF

ENTOURAGE EVENTS GROUP

Welcome to MIP 2025

We are delighted to welcome the global community of researchers, practitioners, and students for the 2025 Mixed Integer Programming (MIP) Workshop at the University of Minnesota, Twin Cities from June 2 to 6, 2025. This is the 22nd edition of the MIP workshop series, returning to Minneapolis twenty years after the second MIP workshop.

This year's workshop continues the essential traditions that have made the MIP workshop a primary annual gathering place for the community, and especially its emphasis on highlighting and supporting young researchers. We hope you enjoy:

- a **summer school** with three invited speakers on Monday, June 2;
- a **single track of 19 invited experts** across theoretical, computational, and applied aspects of integer programming and discrete optimization;
- a **poster session**, including a competition among selected student finalists for the best poster award, held jointly with a welcome reception on Tuesday, June 3;
- results from the **computational competition** on "*MIP Quadratic Primal Heuristics*", with the winner presenting in the last slot on Wednesday, June 4;
- and (a new initiative) **contributed "flash" talks** throughout the week, designed to offer an additional opportunity for actively participating in the workshop.

Thank you to everyone who has made MIP 2025 possible. The workshop is made more affordable by the generous support of federal, academic, industrial, and local sponsors, listed on the previous page, who subsidize travel expenses for poster presenters and offset logistical costs. The local team, with special appreciation for Emily Rice (Marketing, Communications, and Event Coordinator), has organized a wonderful week, including choosing great venues for the talks, welcome reception, and workshop dinner. The program committee has strived to highlight a broad range of MIP-relevant topics through the invited speakers, selected flash talks, and accepted poster session presenters. The computational competition committee challenged the community on primal heuristics for mixed-integer quadratic problems and carefully reviewed a set of submissions, selecting a winner that will be announced on Day 2 of the workshop.

Last, but not least, thank you to all the participants in the various MIP workshop events: the invited summer school and workshop speakers, flash talk speakers, poster presenters, computational competition entrants, and of course all the attendees.

May everyone learn something new and reach someone new.

Aleksandr Kazachkov (University of Florida), Chair of MIP 2025

Brief History of MIP Workshops

Adapted from the MIPS Bylaws

The MIP workshop is a flagship annual meeting in North America for integer programming and discrete optimization, to communicate the latest research, facilitate existing and new collaborations, and increase the visibility of young researchers. Since 2023, the MIP workshop has been organized by the Mixed Integer Programming Society (MIPS), a technical section of the Mathematical Optimization Society (MOS).

The MIP workshop series began in June 2003 at the initiative of Daniel Bienstock, as a two-day, single-track meeting at the Computational Optimization Research Center of Columbia University. Its focus was to bring together young researchers, students, and practitioners in mixed integer programming.

The next meeting was called the “IMA Special Workshop on Mixed-Integer Programming” and was held at the Institute for Mathematics and its Applications in Minneapolis, MN from July 25 to 29, 2005. The publicly stated aim was “to bring together both researchers and practitioners in this rapidly developing field, and to foster future collaborations.” This conference attracted approximately 100 participants from over 10 countries, included 22 invited talks, 8 presented posters, and a round table discussion on the future of the field.

Since then, the MIP Workshop has become a premier conference serving the integer programming and discrete optimization community. The workshop has kept the primary format of a single track of invited speakers combined with a poster session that has grown in popularity, and it remains committed to fostering collaboration, highlighting the work of early career scholars, and offering professional development for junior researchers, to support the continued impact of the field of mixed integer programming.

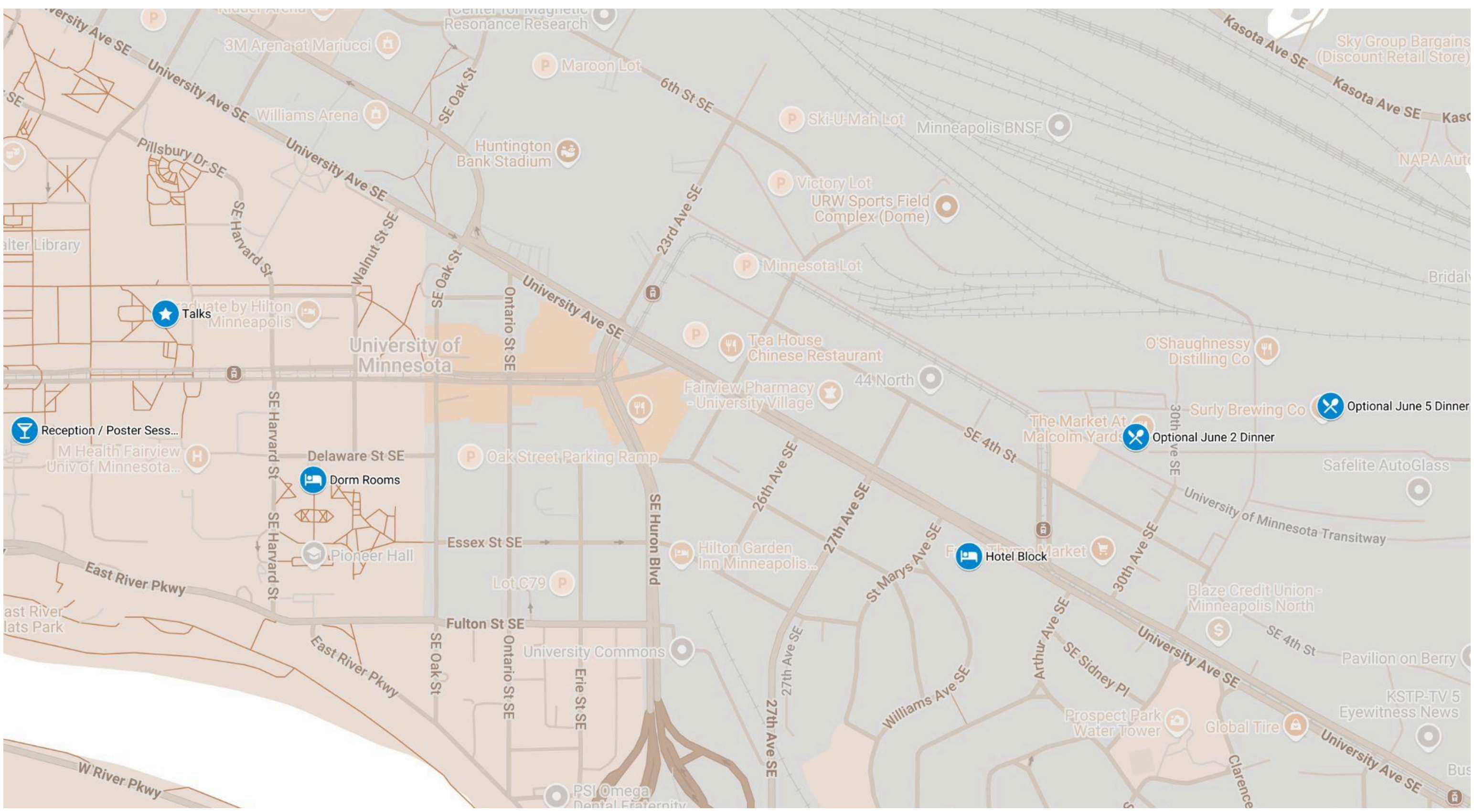
Venue

The workshop and summer school will be held at the University of Minnesota, Twin Cities, with the main venue being Kenneth H. Keller Hall, 200 Union Street SE, Minneapolis, MN 55455. Talks will be held in room **Keller 3-180**, while tea/coffee breaks (supplied by Lunds and Byerlys, a Minnesota-based grocery store) will be in the adjacent room **Keller 3-176**. Please, no food or uncovered drinks in 3-180.

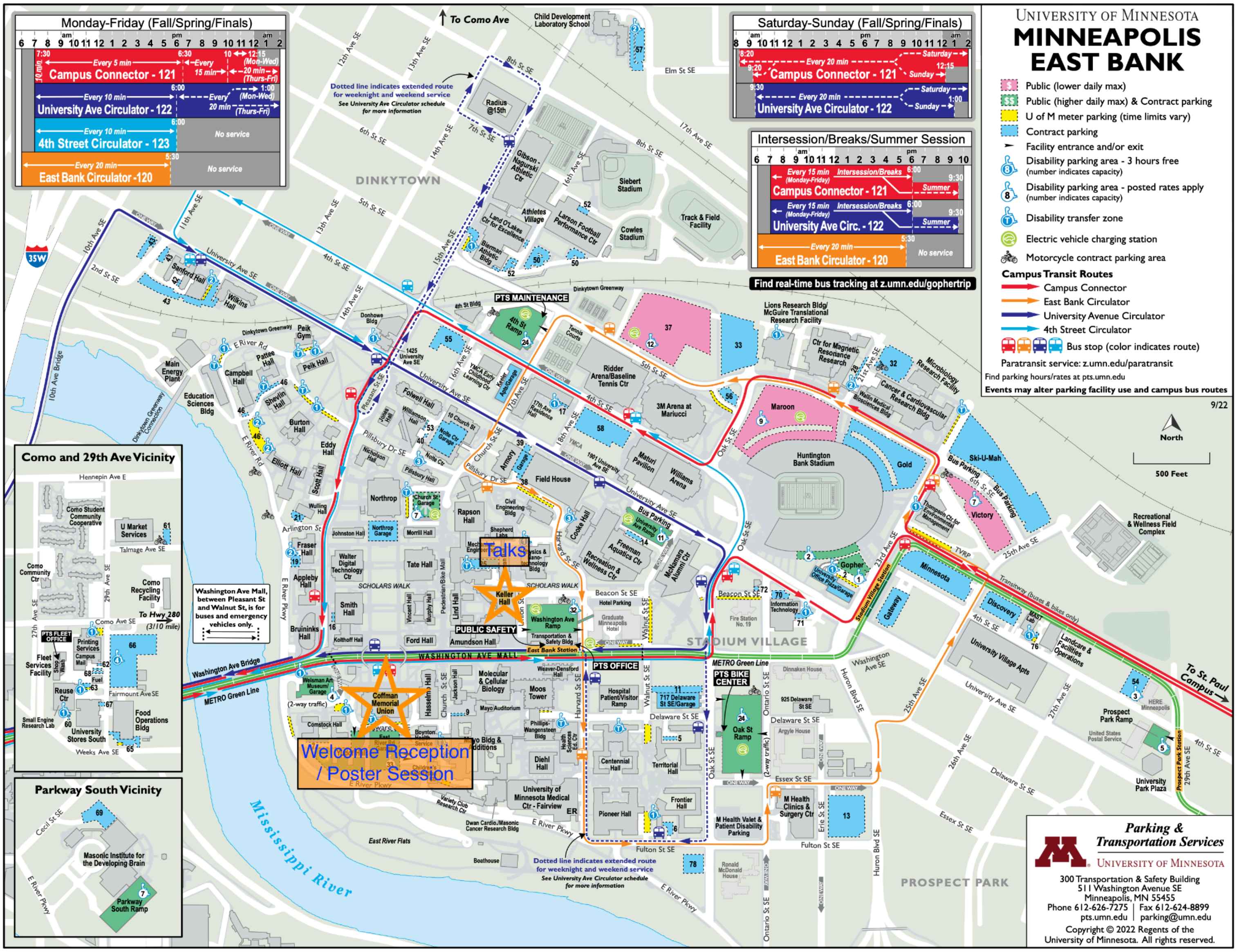
The welcome reception and poster session on Tuesday, June 3 will start at 5:30pm in the Campus Club, located on the 4th floor of Coffman Memorial Union, 300 Washington Ave SE, Minneapolis, MN 55455.

The workshop dinner, on Wednesday, June 4 at 5:30pm, will be held at The Riverside at Minneapolis Event Centers, located at 212 2nd St SE, Minneapolis, MN 55414.

Some transportation options are listed at https://mixedinteger.org/2025/local, and more information is available at https://pts.umn.edu/resources/getting-around-campus-maps.



Campus Map



University of Minnesota
MINNEAPOLIS EAST BANK
Monday-Friday (Fall/Spring/Finals)
Campus Connector - 121
University Ave Circulator - 122
4th Street Circulator - 123
East Bank Circulator -120
No service
Saturday-Sunday (Fall/Spring/Finals)
Intersession/Breaks/Summer Session
Find real-time bus tracking at z.umn.edu/gophertrip
Public (lower daily max)
Public (higher daily max) & Contract parking
U of M meter parking (time limits vary)
Contract parking
Facility entrance and/or exit
Disability parking area - 3 hours free
Disability parking area - posted rates apply
Disability transfer zone
Electric vehicle charging station
Motorcycle contract parking area
Campus Transit Routes
Campus Connector
East Bank Circulator
University Avenue Circulator
4th Street Circulator
Bus stop (color indicates route)
Paratransit service: z.umn.edu/paratransit
Find parking hours/rates at pts.umn.edu
Events may alter parking facility use and campus bus routes
9/22
North
500 Feet
Talks
Keller Hall
Welcome Reception / Poster Session
Coffman Memorial Union
DINKYTOWN
STADIUM VILLAGE
PROSPECT PARK
Mississippi River
WASHINGTON AVE MALL
Huntington Bank Stadium
Como and 29th Ave Vicinity
Parkway South Vicinity
Washington Ave Mall, between Pleasant St and Walnut St, is for buses and emergency vehicles only.
To Como Ave
To St. Paul Campus
Parking & Transportation Services
University of Minnesota
300 Transportation & Safety Building
511 Washington Avenue SE
Minneapolis, MN 55455
Phone 612-626-7275 | Fax 612-624-8899
pts.umn.edu | parking@umn.edu
Copyright © 2022 Regents of the University of Minnesota. All rights reserved.

Schedule

Summer School: Monday, June 2, 2025
Workshop: Tuesday, June 3 – Friday, June 6, 2025

Time	Day 1 Tuesday, June 3, 2025	Day 2 Wednesday, June 4, 2025	Day 3 Thursday, June 5, 2025	Day 4 Friday, June 6, 2025
9:00 – 9:15	*Registration*			*Light Breakfast*
9:15 - 9:25	**Opening Remarks**			
9:25 - 10:00	Ward Romeijnders (Groningen)	Victor Reis (Microsoft Research)	Martine Labbé (Bruxelles)	Jim Luedtke (Wisconsin-Madison)
10:00 – 10:25	Flash Talks (Y. Li, S. García)	Flash Talks (D. Catanzaro, G. Muñoz, T. Serra)	Flash Talks (A. Çördük, Z. Peng, J. Zhang)	Flash Talks
10:25 - 10:55	*Tea / Coffee Break*			
10:55 - 11:30	Amélie Lambert (CNAM)	Luze Xu (UC Davis)	Christina Büsing (Aachen)	Joris Kinable (Amazon)
11:30 - 12:05	Claudia d'Ambrosio (CNRS)	Qimeng (Kim) Yu (UdeM)	Xian Yu (OSU)	**Concluding Remarks**
12:05 - 2:00	*Lunch (not included)*			
2:00 - 2:35	Alinson S. Xavier (Argonne)	Emma S. Johnson (Sandia)	Domenico Salvagnin (Padova)	
2:35 - 3:10	Poster Teaser #1	Tobias Achterberg (Gurobi)	Hamidreza Validi (Texas Tech)	
3:10 - 3:40	*Tea / Coffee Break*			
3:40 - 4:15	Poster Teaser #2	Haihao Lu (MIT)	Yuan Zhou (Kentucky)	
4:15 - 4:50	Esra Büyüktahtakın Toy (Virginia Tech)	Computational Competition	**MIPS Business Meeting (virtual option available)**	
4:50 - 5:00		**Group photo**		
5:30 - 8:00	Poster Session / Welcome Reception	*Conference Dinner*	*Optional (not included): Surly Brewing*	

Summer School Speakers

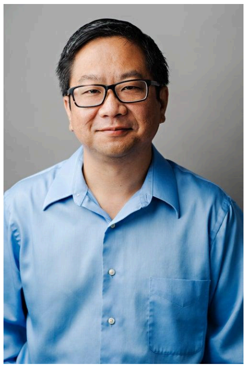
Time	Summer School Monday, June 2, 2025
9:00 – 9:30	*Light Breakfast*
9:30 – 9:45	**Opening Remarks**
9:45 – 10:30	Philipp Christophel (SAS)
10:30 - 10:45	*Tea / Coffee Break*
10:45 - 11:30	Philipp Christophel (SAS)
11:30 - 1:15	*Lunch (not included)*
1:15 - 2:00	Ricardo Fukasawa (Waterloo)
2:00 - 2:15	*Break*
2:15 - 3:00	Ricardo Fukasawa (Waterloo)
3:00 - 3:15	*Tea / Coffee Break*
3:15 - 4:00	Andrés Gómez (USC)
4:00 - 4:15	*Break*
4:15 - 5:00	Andrés Gómez (USC)
5:00 – 5:10	**Group photo**
5:30 - 8:00	*Optional (not included):* *The Market at Malcolm Yards*

Philipp M. Christophel (SAS Institute Inc.)

Implementing Numerical Optimization Algorithms

Abstract: Implementing efficient and scalable numerical optimization algorithms, whether for a dissertation project, research or commercial use, poses some unique challenges. In this talk we point out some of these challenges and give suggestions on how to tackle them. The advice ranges from outlining processes and requirements for successful development of optimization algorithms to practical coding tips any PhD student, researcher or developer who works on the implementation of optimization algorithms should know.

Bio: Dr. Philipp M. Christophel is currently the Technical Lead for LP/MILP Solver Development at SAS Institute Inc. For the last 15 years, he has been one of the principal developers for the SAS linear and mixed integer optimization solvers working on primal heuristics, simplex, presolver, branching, and cuts. Before SAS, he received a PhD in business computing from the DSOR Lab at the University of Paderborn and spent a summer at CORE, UCLouvain.



Ricardo Fukasawa (University of Waterloo)

Column generation and IP (from textbook to practice)

Abstract: Column generation is an important tool in the solution of several integer programs, yet it is a topic that is not covered in much depth in most textbooks. In this talk I will go over some of the basics of column generation, going through some ideas that are now somewhat standard for people that have worked with column generation (though maybe not for people that just read an IP textbook or took an IP class), and reaching topics that have been appearing more recently trying to push the boundaries of what can be achieved with the technique.

Bio: Ricardo Fukasawa obtained his PhD in the Algorithms, Combinatorics and Optimization program at GeorgiaTech in 2008. From 2008-2009 he was the recipient of the IBM Herman Goldstine Postdoctoral fellowship, and worked at IBM Research in Yorktown Heights. He joined the Combinatorics and Optimization department at the University of Waterloo in 2009 where he has been since and is currently a full professor. He received the Early Researcher Award from the Ontario government. He is interested in exact approaches for hard discrete optimization problems, particularly vehicle routing problems and bilevel optimization problems.

Andrés Gómez (University of Southern California)

Methodologies and Algorithms for Structured Mixed-Integer Nonlinear Optimization

Abstract: Mixed-integer nonlinear optimization problems (MINLPs) are increasingly central to applications in machine learning, model predictive control, energy systems, finance, and beyond. Despite significant advances in MINLP theory and algorithms over the past two decades, deploying these methods to solve complex, real-world problems remains a formidable challenge. In this tutorial, we will survey recent methodologies, algorithms, and theoretical developments that have demonstrated practical success in solving structured MINLPs. We will also discuss open challenges, limitations of current approaches, and promising directions for future research.

Bio: Dr. Andrés Gómez is an Associate Professor in the Department of Industrial and Systems Engineering at the University of Southern California, specializing in discrete and conic optimization with applications in finance, statistics, and machine learning. He earned dual B.S. degrees in Mathematics and Computer Science from Universidad de los Andes (Colombia), followed by an M.S. and Ph.D. in Industrial Engineering and Operations Research from UC Berkeley. Before joining USC in 2019, he served as an Assistant Professor at the University of Pittsburgh. He is the recipient of the Young Investigator Award from the Air Force Office of Scientific Research.

Invited Workshop Speakers

Tobias Achterberg (Gurobi)

From Infeasibility to Feasibility - Improvement Heuristics to Find First Feasibles for MIPs

Abstract: Relaxation Induced Neighborhood Search (RINS) and other large neighborhood search (LNS) improvement heuristics for mixed integer programs (MIPs) explore some neighborhood around a given feasible solution to find other solutions with better objective value. This often leads to a chain of improving solutions with a high quality solution at its end, even if the starting solution is rather poor.

RINS and its variants are the most important heuristic ingredients in Gurobi to find good solutions quickly. But they have one issue: they can only be employed after an initial feasible solution has been found.

This initial feasible solution is usually found by other heuristics, so-called "start heuristics", like rounding of LP solutions, fix-and-dive, or the Feasibility Pump.

In this talk, we discuss a different approach, which works surprisingly well: similar in spirit to the Feasibility Pump, consider infeasible integral vectors as input to the improvement heuristics and search in the neighborhood for vectors with small violation to act as new starting point for the next LNS improvement heuristic invocation.

Bio: Dr. Achterberg studied mathematics and computer science at the Technical University of Berlin and the Zuse Institute Berlin. He finished his PhD in mathematics under supervision of Prof. Martin Grötschel in 2007. Dr. Achterberg is the author of SCIP, one of the best academic MIP solvers. In addition to numerous publications in scientific journals, he has also received several awards for his dissertation and for SCIP, such as the Beale-Orchard-Hays Prize. From 2006, Dr. Achterberg worked for ILOG/IBM as developer of CPLEX in versions 11 to 12.6. Since 2014 he has been involved in the development of the Gurobi Optimizer, currently being the VP of R&D.

Christina Büsing (RWTH Aachen University)

Solving Robust Binary Optimization Problem with Budget Uncertainty

Abstract: Robust optimization with budgeted uncertainty, as proposed by Bertsimas and Sim in the early 2000s, is one of the most popular approaches for integrating uncertainty in optimization problems. The existence of a compact reformulation for MILPs and positive complexity results give the impression that these problems are relatively easy to solve. However, the practical performance of the reformulation is actually quite poor due to its weak linear relaxation.

To overcome this weakness, we propose a bilinear formulation for robust binary programming, which is as strong as theoretically possible. From this bilinear formulation, we derive strong linear formulations as well as structural properties, which we use within a tailored branch and bound algorithm. Furthermore, we propose a procedure to derive new classes of valid inequalities for robust binary optimization problems. For this, we recycle valid inequalities of the underlying non-robust problem such that the additional variables from the robust formulation are incorporated. The valid inequalities to be recycled may either be readily available model-constraints or actual cutting planes, where we can benefit from decades of research on valid inequalities for classical optimization problems.

We show in an extensive computational study that our algorithm and also the use of recycled inequalities outperforms existing approaches from the literature by far. Furthermore, we show that the fundamental structural properties proven in this paper can be used to substantially improve approaches from the literature. This highlights the relevance of our findings, not only for the tested algorithms, but also for future research on robust optimization.

Bio: Prof. Dr. rer. nat. Christina Büsing studied Mathematics at the WWU Münster, the Universidad Comlutense de Madrid and the Technical University of Berlin. She did her dissertation under Prof. Möhring on the topic of Recoverable Robustness in Combinatorial Optimization. She then worked as a PostDoc in Aachen, Lancaster and Vienna.

From 2016 to 2021 Christina Büsing was a Junior Professor for Robust Planning in Medical Care at RWTH Aachen. Since 2021 she is Full Professor for Combinatorial Optimization at RWTH Aachen University. She leads the Teaching and Research Group on Combinatorial Optimization, and her research interests include optimization under uncertainty, robust optimization, combinatorial optimization and applications in health care and energy. Furthermore, she is a founder of the Center for Algorithmics and Optimization at the RWTH Aachen University and leads a lab for mathematics for highschool students.

Esra Büyüktahtakın Toy (Virginia Tech)

Scenario Dominance Cuts for Risk-Averse Multi-Stage Stochastic Mixed-Integer Programs

Abstract: We introduce a novel methodology, termed "Stage-t Scenario Dominance," for addressing risk-averse multi-stage stochastic mixed-integer programs (M-SMIPs). We define the scenario dominance concept and utilize the partial ordering of scenarios to derive bounds and cutting planes, which are generated based on implications drawn from solving individual scenario sub-problems up to stage t. This approach facilitates the generation of new cutting planes, significantly enhancing our capacity to manage the computational challenges inherent in risk-averse M-SMIPs. We demonstrate the potential of this method on a stochastic formulation of the mean-Conditional Value-at-Risk (CVaR) dynamic knapsack problem. Our computational findings demonstrate that the "scenario dominance"- based cutting planes significantly reduce solution times for complex mean-risk, stochastic, multi-stage, and multi-dimensional knapsack problems, achieving reductions in computational effort by one to two orders of magnitude.

Bio: Esra Büyüktahtakın Toy, Ph.D., is an Associate Professor in the Grado Department of Industrial and Systems Engineering at Virginia Tech and the director of the Systems Optimization and Machine Learning Lab (SysOptiMaL). Her research expertise lies in multi-stage stochastic mixed-integer programming (M-SMIP), advancing the frontier of integrated machine learning (ML), optimization, and artificial intelligence (AI) for complex decision-making. She specializes in combining optimization theory, deep learning, and advanced computational methods to develop scalable and intelligent algorithms to solve large-scale combinatorial optimization problems.

Dr. Toy is widely recognized for her methodological contributions to stochastic and combinatorial optimization, as well as her leadership in the transdisciplinary applications of operations research. Her research portfolio encompasses a diverse range of application domains, including healthcare systems, environmental sustainability, and biosecurity. Recent work has focused on resource allocation under uncertainty, as well as the control of epidemic diseases and invasive processes in both natural and managed systems. These include decision-support models for managing complex disruptions, such as disease outbreaks (e.g., COVID-19, Ebola, and Dengue), ecological threats (e.g., emerald ash borer and zebra mussels), and national security challenges (e.g., submarine detection and surveillance in open-ocean warfare scenarios).

She is the recipient of the 2016 NSF CAREER Award. She has secured funding from major agencies including the NSF, USDA, U.S. Forest Service, Office of Naval Research (ONR), and the Minnesota Aquatic Invasive Species Research Center (MAISRC). Dr. Toy has authored 45 peer-reviewed publications, including 23 in A* or A-ranked journals (ABDC Journal Quality List), and has received five INFORMS Best Publication Awards. Her work has been featured in ISE Magazine, the INFORMS Computing Society newsletter, the US Forest Service communications, and other professional outlets for its broad impact on optimization and decision science. She has served as President of the INFORMS Junior Faculty Interest Group (JFIG) and currently serves as an Associate Editor for the INFORMS Journal on Computing. Dr. Toy was also a member of the Steering Committee for the nationwide 2024 NSF ENG CAREER Award Workshop.

[Claudia D'Ambrosio (École Polytechnique)]

Approximating complex functions in mixed integer non-linear optimization: a hybrid data- and knowledge-driven approach

Abstract: The integration of data-driven and knowledge-driven approaches has recently caught the attention of the mathematical optimization community. For example, in Bertsimas and Ozturk (2023) and Bertsimas and Margaritis (2025), data-driven approaches are used to derive a more tractable approximation of some non-linear functions appearing in the constraints of mixed integer non-linear optimization (MINLO) problems. Their approaches involves: i. sampling the non-linear functions; ii. using machine learning (ML) approaches to obtain a good, linear approximation of these functions; iii. integrating it into a mixed integer linear optimization (MILO) models to solve MINLO faster.

We take a similar viewpoint. However, instead of a ML-based function approximation, we apply a statistical learning (SL) approach and fit B-splines. The main advantage of this alternative is that the fitting can be formulated as a mathematical optimization problem. Consequently, prior knowledge about the non-linear function can be directly integrated as constraints (e.g., conditions on the sign, monotonicity, curvature). The resulting B-spline can be modeled as a piecewise polynomial function, which allows the integration in the MINLO model. We test our approach on some instances of challenging instances from the MINLPlib and on a real-world application, namely the hydro unit commitment problem. The results show that, with the proposed method, we can find a good balance between quality and tractability of the approximation.

Bio: Claudia D’Ambrosio is a research director at CNRS (France) and a part-time professor at École Polytechnique (France). She holds a Computer Science Engineering Master Degree and a Ph.D. in Operations Research from the University of Bologna (Italy). Her research specialty is mathematical optimization, with a special focus on mixed integer nonlinear programming and applications. During her whole career, she was involved both in theoretical and applied research projects, in particular in the energy sector and urban air mobility. She published over 70 journal and conference papers, among which Mathematical Programming, SIAM Journal in Optimization, and IPCO conference. She was awarded the EURO Doctoral Dissertation Award for her Ph.D. thesis on “Application-oriented Mixed Integer Non-Linear Programming” and the 2nd award “Prix Robert Faure” (3 candidates are awarded every 3 years) granted by ROADEF society.

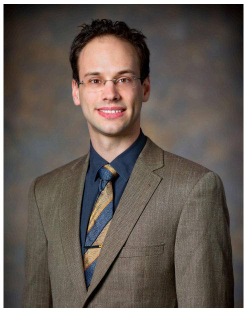
Emma S. Johnson (Sandia National Laboratories)

Negotiating with solvers: Using Generalized Disjunctive Programming to find Computationally Performant MIP Formulations

Abstract: We currently live in a world of powerful (but magical) MIP solvers that implement a seemingly endless supply of tricks and techniques (including presolvers, branching strategies, symmetry detection, cuts, heuristics, etc.). The impact of these capabilities is so significant that the practitioner is no longer best served by searching for the best theoretical formation, and instead finds herself searching over the space of formulations, trying to find a form that minimizes solve time (sometimes without even branching!). From a practical perspective, solvers are black boxes that run on magic pixie dust. Worse still, the "best formulation" is a moving target: the performance of formulations (both in absolute and relative terms) can and does change dramatically from version to version of the solver.

In this talk, I will present a systematic approach for generating and exploring alternative MIP formulations based on Generalized Disjunctive Programming. By combining an approach for representing the logic from a standard MIP with standardized (and automated) routines for reformulating the logical model into a MIP, we can efficiently and expediently explore the space of formulations and empirically identify formulations that are most effective for our problem. I will present preliminary computational results for several canonical problems using several versions of the Gurobi solver to argue that disjunctive programming serves us well by generalizing MIP and thus staying upwind of numerous formulation decisions that can have dramatic effects on solver performance.

Bio: Emma Johnson is a Senior Member of Technical Staff in the Operations Research and Computational Analysis department at Sandia National Laboratories. She has a Ph.D. in Operations Research from Georgia Institute of Technology (2021) and expertise in discrete optimization, particularly mixed-integer linear programming, disjunctive programming, and multilevel optimization. Her research focuses mainly on developing solution methods for large-scale discrete optimization problems in scheduling, logistics, and system design. In addition, she is a developer of Pyomo, an open-source Python package for math programming, and lead developer of its subpackage supporting Generalized Disjunctive Programming.



Joris Kinable (Amazon)

Learning Time-Dependent Travel Times

Abstract: Travel time estimates are essential for a wide variety of transportation and logistics applications, including route planning, supply chain optimization, traffic management, and public transportation scheduling. Despite the large number of applications, accurately predicting travel times remains challenging due to the variability in (urban) traffic patterns and external factors such as weather, road works, and accidents. Travel times are generally stochastic and time-dependent, and estimates must be network-consistent, accounting for correlations in travel speeds across different parts of the road network.

In this talk, we will review several existing machine learning (ML) and operations research (OR) models for predicting travel times. Additionally, we will introduce a novel ML-based method capable of accurately estimating dynamic travel times within intervals of just a few minutes, using only historical trip data that includes origin and destination locations and departure times, without requiring actual itineraries. We formulate the travel time estimation problem as an empirical risk minimization problem, utilizing a loss function that minimizes the expected difference between predicted and observed travel times. To solve this problem, we develop two supervised learning approaches that follow an iterative procedure, alternating between a path-guessing phase and a parameter-updating phase. The approaches differ in how parameter updates are performed, and therefore have different performance characteristics.

We conduct extensive computational experiments to demonstrate the effectiveness of our proposed methods in reconstructing traffic patterns and generating precise travel time estimates. Experiments on real-world data shows that our procedures scale well to large street networks and outperform current state-of-the-art methods.

Bio: Joris Kinable is a Senior Applied Scientist at Amazon where he is responsible for the development and implementation of network design, freight flow optimization and supply planning models for Amazon's Middle Mile Network. He also serves as an adjunct faculty member in the Department of Industrial Engineering and Innovation Sciences at Eindhoven University of Technology (TU/e) in the Netherlands. Previously, Dr. Kinable was an assistant professor in the same department and held an adjunct faculty position at the Robotics Institute at Carnegie Mellon University.
Dr. Kinable earned his PhD in Operations Research from KU Leuven in Belgium and specializes in large-scale mathematical optimization techniques, with applications in transportation, logistics, planning, and scheduling. He publishes in high-impact journals, including INFORMS Transportation Science, European Journal of Operational Research, and Computers and Operations Research and frequently serves as a program committee member for conferences such as CPAIOR, AAAI, and CP.
Additionally, Dr. Kinable is actively involved in the maintenance and development of JGraphT, the largest open-source Java library for graph algorithms and data structures.

Martine Labbé (Université libre de Bruxelles)

Solving Chance-Constrained (mixed integer) Linear Optimization Problems with Branch-and Cut

Abstract: Consider an optimization problem in which some constraints involve random coefficients with known probability distribution. A chance-constraint version of this problem amounts to impose that these constraints must be satisfied with a probability larger than or equal to a given threshold.

Chance-constraint optimization problems (CCOPs) are frequently used to model problems in the domain of energy. They are known to be NP-hard. In the case where objective and constraints are linear, the problem can be reformulated as a mixed-integer linear problem by introducing big-M constants.

In this talk, we propose a Branch-and-Cut algorithm for solving linear CCOP. We determine new valid inequalities and compare them to some existing in the literature. Moreover, we state and prove results on the closure of these valid inequalities. Computational experiments validated the quality of these new inequalities.

This is a joint work with Diego Cattaruzza, Matteo Petris, Marius Roland and Martin Schmidt.

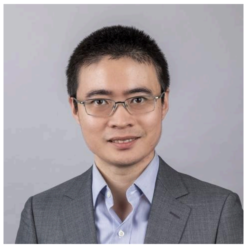
Bio: Martine Labbé is honorary professor at the Université Libre de Bruxelles (ULB). Her main research area is discrete optimization, including graph theory and integer optimization problems and with a particular emphasis on location and network design problems. She is also recognised for her work in bilevel optimization, namely on pricing problems and Stackelberg games. She was president of EURO, the Association of European Operational Research Societies in 2007-2008 and Vice-Chair of the SIAM Activity Group on Optimization (SIAG/OPT) in 2014-2015. In 2019 she was awarded the EURO Gold Medal, which is the highest distinction within Operations Research in Europe.

Amélie Lambert (Conservatoire National des Arts et Métiers)

Quadratization-based methods for solving unconstrained polynomial optimization problems

Abstract: We consider the problem of minimizing a polynomial with mixed-binary variables. We present a three-phase approach for solving it to global optimality. In the first phase, we design quadratization schemes for the polynomial by recursively decomposing each monomial into pairs of sub-monomials, down to the initial variables. Then, starting from given quadratization schemes, the second phase consists in constructing in an extended domain a quadratic problem equivalent to the initial one. The resulting quadratic problem is generally non-convex and remains difficult to solve. The last phase consists in computing a tight convex quadratic relaxation that can be used within a branch-and-bound algorithm to solve the problem to global optimality. Finally, we present first experimental results. Based on joint works with Sourour Elloumi, Arnaud Lazare, Daniel Porumbel.

Bio: Amélie Lambert is currently Associate Professor (Maître de Conférences) at Cnam (Conservatoire National des Arts et Métiers) and member of the team Optimisation Combinatoire in the Cédric (Centre d'études et de recherche en informatique et communication). Her work is on exact solution of nonconvex mixed-integer polynomial programs (general integer, or binary) and especially on quadratic convex reformulations/relaxations of such problems. She was the winner of the 2nd Robert Faure 2022 prize awarded by the ROADEF (French Association for Operational Research and Decision Support) every 3 years to three young researchers in the field.



Haihao Lu (Massachusetts Institute of Technology)

GPU-Based Linear Programming and Beyond

Abstract: In this talk, I will talk about the recent trend of research on new first-order methods for scaling up and speeding up linear programming (LP) and convex quadratic programming (QP) with GPUs. The state-of-the-art solvers for LP and QP are mature and reliable at delivering accurate solutions. However, these methods are not suitable for modern computational resources, particularly GPUs. The computational bottleneck of these methods is matrix factorization, which usually requires significant memory usage and is highly challenging to take advantage of the massive parallelization of GPUs. In contrast, first-order methods (FOMs) only require matrix-vector multiplications, which work well on GPUs and have already accelerated machine learning training during the last 15 years. This ongoing line of research aims to scale up and speed up LP and QP by using FOMs and GPUs.

Bio: Haihao (Sean) Lu is an assistant professor of operations research and statistics at MIT. His research interests are extending the computational and mathematical boundaries of methods for solving large-scale optimization problems in data science, machine learning, and operations research. Before joining MIT, he was a faculty at the University of Chicago Booth School of Business, and a faculty visitor at Google Research's large-scale optimization team. He obtained his Ph.D. in Operations Research and Mathematics at MIT in 2019. His research has been recognized by a few research awards, including Coin-OR Cup, Beale—Orachard-Hays Prize, INFORMS Optimization Society Young Researchers Prize, INFORMS Revenue Management and Pricing Section Prize, COIN-OR (computational infrastructure for operations research) cup winner, and INFORMS Michael H. Rothkopf Junior Research Paper Prize (first place).

Jim Luedtke (University of Wisconsin-Madison)

Optimally Delaying Attacker Projects Under Resource Constraints

Abstract: We consider the problem of selecting and scheduling mitigations to delay a set of attacker projects. Prior research has considered a problem in which a defender takes actions that delay steps in an attacker project in order to maximize the attacker project duration, given a budget constraint on their actions. We consider an extension of this model in which carrying out the mitigations requires competing limited resources, and hence the selected mitigations must be scheduled over time. At the same time, the attackers may be progressing along their project, and so the timing of completed mitigations determines whether or not they are successful in delaying tasks of the attacker projects. We propose an integrated integer programming model of this bilevel problem by using a time-indexed network that enables keeping track of attackers' task durations over time as determined by the defender's mitigation schedule. We introduce an information-based relaxation and use this to derive an alternative formulation that is stronger and more compact. We find that our reformulation greatly improves the solvability of the model. In addition, we see that considering the interaction of defender mitigation and attacker project schedules leads to 6-10% improvement in the objective over models that ignore this interaction.

This is joint work with Ashley Peper and Laura Albert from UW-Madison.

Bio: Jim Luedtke is a Professor in the department of Industrial and Systems Engineering at the University of Wisconsin-Madison and a Discovery Fellow at the Wisconsin Institute for Discovery. Luedtke earned his Ph.D. at Georgia Tech and did postdoctoral work at the IBM T.J. Watson Research Center. Luedtke's research is focused on methods for solving stochastic and mixed-integer optimization problems, as well as applications of such models. His current research interests include investigation of computational methods for solving two and multi-stage stochastic integer programming problems, and integration of optimization and machine learning models. Luedtke serves on the editorial board of Mathematical Programming Computation and is chair of the Mathematical Optimization Society Publications Committee.

Victor Reis (Microsoft Research)

The Subspace Flatness Conjecture and Faster Integer Programming

Abstract: In a seminal paper, Kannan and Lovász (1988) considered a quantity $\alpha(L, K)$ which denotes the best volume-based lower bound on the covering radius $\mu(L, K)$ of a convex body K with respect to a lattice L. Kannan and Lovász proved that $\mu(L, K) \leq n\,\alpha(L, K)$ and the Subspace Flatness Conjecture by Dadush (2012) claims a $O(\log n)$ factor suffices, which would match a lower bound from the work of Kannan and Lovász.

We settle this conjecture up to a constant in the exponent by proving that $\mu(L, K) \leq O(\log^3 n)\,\alpha(L, K)$. Our proof is based on the Reverse Minkowski Theorem due to Regev and Stephens-Davidowitz (2017). Following the work of Dadush (2012, 2019), we obtain a $(\log n)^{O(n)}$-time randomized algorithm to solve integer programs in n variables. Another implication of our main result is a near-optimal *flatness constant* of $O(n \log^3 n)$.

Bio: Victor Reis is a Senior Researcher in the Algorithms group at Microsoft Research working on differential privacy and discrete optimization. He finished his PhD at the University of Washington in 2023 and spent a year at the Institute for Advanced Study before joining MSR.

Ward Romeijnders (University of Groningen)

Convex approximations for multistage stochastic mixed-integer programs

Abstract: We consider multistage stochastic mixed-integer programs. These problems are extremely challenging to solve since the expected cost-to-go functions in these problems are typically non-convex due to the integer decision variables involved. This means that efficient decomposition methods using tools from convex approximations cannot be applied to this problem. For this reason, we construct convex approximations for the expected cost to-go functions and we derive error bounds for these approximations that converge to zero when the total variation of the probability density functions of the random parameters in the model converge to zero. In other words, the convex approximations perform well if the variability of the random parameters in the problem is large enough. To derive these results, we analyze the mixed-integer value functions in the multistage problem, and show that any MILP with convex and Lipschitz continuous objective exhibits asymptotic periodic behavior. Combining these results with total variation bounds on the expectation of periodic functions yields the desired bounds.

Bio: Ward Romeijnders is Full Professor within the Department of Operations at the University of Groningen. He is an expert on Stochastic Programming, and is broadly interested in theory, methods, and applications of optimization problems under uncertainty that can be used to address societal challenges in, e.g., energy, logistics, finance, and healthcare.

Ward is the Secretary of EWGSO, the EURO Working Group on Stochastic Optimization, and of COSP, the governing board of the international Stochastic Programming Society. Moreover, he serves as Associate Editor of Mathematical Methods of Operations Research and as Guest Editor of a special issue on decision dependent uncertainty in Mathematical Programming. Furthermore, his research is published in journals such as Operations Research, Mathematical Programming, SIAM Journal on Optimization, European Journal of Operational Research, and INFORMS Journal on Computing.

Ward has received several research grants from NWO, the Netherlands Organisation for Scientific Research, for his research. The latest one for a project called "Discrete Decision Making under Uncertainty", in which he will lead a research team to investigate theory, algorithms, and applications of sequential decision making problems under uncertainty involving integer decision variables.

Domenico Salvagnin (University of Padova)

MIP formulations for delete-free AI planning

Abstract: Delete-free relaxations are a fundamental concept in classical AI planning, and the basis of state of the art admissible heuristics for domain-independent A* search, like LM-cut. While considered in general too expensive to be computed exactly, there was a renewed interest in understanding how effectively those can be computed in practice for standard planning tasks appearing in IPC competitions. In particular, several MIP formulations have been proposed in the last decade. In this work we reevaluate current formulations, and propose new approaches that incrementally improve over current methods by using standard MIP techniques, like MIP starts and lazy constraint separation.

Bio: Domenico Salvagnin is Associate Professor in Operations Research at the University of Padua, Italy. He was lead development scientist in the IBM CPLEX team in 2015–2017 and is currently scientific consultant for FICO Xpress. His research interests include computational integer programming, constraint programming and hybrid methods for optimization.

Hamidreza Validi (Texas Tech University)

Polytime Procedures for Fixing, Elimination, and Conflict Inequalities

Abstract: Reducing the number of decision variables can improve both the theoretical and computational aspects of mixed integer programs. The decrease in decision variables typically occurs in two ways: (i) variable fixing and (ii) variable elimination. We propose polytime procedures for identifying fixing and elimination opportunities in binary integer programs using conflict graphs. Our fixing and elimination procedures are built upon the identification of a specific type of path, referred to as hopscotch paths, in conflict graphs. Furthermore, we develop a polytime procedure for adding conflict edges to the conflict graphs of binary integer programs. We will discuss how adding these edges to the conflict graph affects our proposed fixing and elimination procedures. Finally, we conduct computational experiments on a set of MIPLIB instances and compare our computational performance with that of Atamtürk et al. (European Journal of Operational Research, 2000).

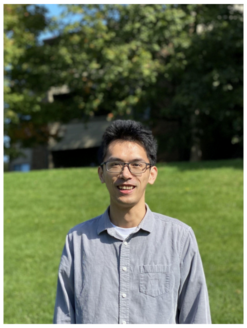
Bio: Hamidreza Validi is an assistant professor in the Department of Industrial, Manufacturing, & Systems Engineering at Texas Tech University. Previously, he was a postdoctoral research associate at Rice University. He has publications in Operations Research, INFORMS Journal on Computing, INFORMS Journal on Optimization, and Mathematical Programming Computation. Furthermore, Hamid is a recipient of the 2023 INFORMS Best Dissertation Award in the Telecommunications and Network Analytics section, the 2021 INFORMS Computing Society Harvey J. Greenberg Research Award, the 2020 IISE John L. Imhoff Scholarship, and the 2019 IISE E.J. Sierleja Memorial Fellowship.

Alinson S. Xavier (Argonne National Laboratory)

MIPLearn: An Extensible Framework for Learning-Enhanced Optimization

Abstract: In many practical scenarios, discrete optimization problems are solved repeatedly, often on a daily basis or even more frequently, with only slight variations in input data. Examples include the Unit Commitment Problem, solved multiple times daily for energy production scheduling, and the Vehicle Routing Problem, solved daily to construct optimal routes. In this talk, we introduce MIPLearn, an extensible open-source framework which uses machine learning (ML) to enhance the performance of state-of-the-art MIP solvers in these situations. Based on collected statistical data, MIPLearn predicts good initial feasible solution, redundant constraints in the formulation, and other information that may help the solver to process new instances faster. The framework is compatible with multiple MIP solvers (e.g. Gurobi, CPLEX, SCIP, HiGHS), multiple modeling languages (JuMP, Pyomo, gurobipy) and supports user-provided ML models.

Bio: Alinson Santos Xavier is a Computational Scientist at Argonne National Laboratory's Energy Systems and Infrastructure Analysis division. His research focuses on solving challenging computational problems that arise daily in the production and transmission of electric power, through a combination of Mathematical Optimization, High-Performance Computing and Machine Learning. Dr. Xavier holds a PhD. in Mathematics (Combinatorics & Optimization) from University of Waterloo, Canada, and a MSc. in Computer Science from Universidade Federal do Ceara, Brazil.

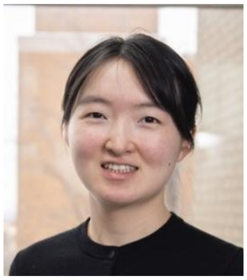


[Luze Xu (UC Davis)]

Gaining or losing perspective for convex multivariate functions

Abstract: Mixed-integer nonlinear optimization formulations of the disjunction between the origin and a polytope via a binary indicator variable is broadly used in nonlinear combinatorial optimization for modeling a fixed cost associated with carrying out a group of activities and a convex cost function associated with the levels of the activities. The perspective relaxation of such models is often used to solve to global optimality in a branch-and-bound context, but it typically requires suitable conic solvers and is not compatible with general-purpose NLP software in the presence of other classes of constraints. This motivates the investigation of when simpler but weaker relaxations may be adequate. Comparing the volume (i.e., Lebesgue measure) of the relaxations as a measure of tightness, we lift some of the results related to univariate functions to the multivariate case.

Bio: Luze Xu is currently a Krener Visiting Assistant Professor at UC Davis. He received his Ph.D. in Industrial and Operations Engineering at the University of Michigan in April 2022. His research interests include mixed integer programming and theories that bridge continuous and discrete optimization. He won the INFORMS Optimization Society Young Researchers Prize in 2024 and IOE Katta Murty Prize for Best Research Paper on Optimization in 2018 and in 2020.



Kim Yu (Université de Montréal)

On L-Natural-Convex Minimization and Its Mixed-Integer Extension

Abstract: L-natural-convex functions are a class of nonlinear functions defined over integral domains. Such functions are not necessarily convex, but they display a discrete analogue of convexity. In this work, we explore the polyhedral structure of the epigraph of any L-natural-convex function and provide a class of valid inequalities. We show that these inequalities are sufficient to describe the epigraph convex hull completely, and we give an exact separation algorithm. We further examine a mixed-integer extension of this class of minimization problems and propose strong valid inequalities. We establish the connection between our results and the valid inequalities for some structured mixed-integer sets in the literature.

Bio: Kim is an assistant professor in the Department of Computer Science and Operations Research (DIRO) at University of Montreal. In her research, she develops theory and algorithms for mixed-integer nonlinear programming to facilitate the solution of complex models with real-world applications.

[Xian Yu (The Ohio State University)]

Residuals-Based Contextual Distributionally Robust Optimization with Decision-Dependent Uncertainty

Abstract: We consider a residuals-based distributionally robust optimization model, where the underlying uncertainty depends on both covariate information and our decisions. We adopt regression models to learn the latent decision dependency and construct a nominal distribution (thereby ambiguity sets) around the learned model using empirical residuals from the regressions. Ambiguity sets can be formed via the Wasserstein distance, a sample robust approach, or with the same support as the nominal empirical distribution (e.g., phi-divergences), where both the nominal distribution and the radii of the ambiguity sets could be decision- and covariate-dependent. We provide conditions under which desired statistical properties, such as asymptotic optimality, rates of convergence, and finite sample guarantees, are satisfied. Via cross-validation, we devise data-driven approaches to find the best radii for different ambiguity sets, which can be decision-(in)dependent and covariate-(in)dependent. Through numerical experiments, we illustrate the effectiveness of our approach and the benefits of integrating decision dependency into a residuals-based DRO framework.

Bio: Xian Yu is currently an Assistant Professor of Integrated Systems Engineering at The Ohio State University. She received her Ph.D. degree in Operations Research from the University of Michigan in 2022 and B.S. degree in Mathematics and Applied Mathematics from Xi'an Jiaotong University in 2017. Her research interest lies in sequential decision-making and optimization under uncertainty, with applications in transportation, logistics and supply chain management. Her work aims to bridge theories in stochastic programming, distributionally robust optimization, and dynamic programming, as well as to develop efficient algorithms for solving large-scale complex optimization problems. Xian is the recipient of several awards, including the first place of IISE Pritsker Doctoral Dissertation Award in 2023, IOE Murty Prize for the Best Student Research Paper on Optimization in 2021, and Michigan Institute for Computational Discovery and Engineering Fellowship in 2019.

Yuan Zhou (University of Kentucky)

Title: Measuring Solid Angles for Polyhedral Cones in Arbitrary Dimension

Abstract: Polyhedral cones are of interest in many mathematical fields, such as geometry and optimization. A natural and fundamental question is: how large is a given cone? Since a cone is unbounded, we consider its solid angle measure—the proportion of space the cone occupies. Solid angles generalize plane angles to higher dimensions, but beyond dimension three, no closed-form expressions are known. This makes accurate and efficient approximation methods essential.

To that end, we explore existing methods and introduce a new approach—based on polyhedral decomposition and multivariable hypergeometric series—for approximating solid angles. We analyze the asymptotic error of the series and develop a dynamic truncation scheme that balances computational cost and accuracy. We implement our method in SageMath and apply it to a concrete problem of evaluating facet importance. We present computational results, compare our approach with existing techniques, and discuss its practical implications.

Bio: Yuan Zhou is an Associate Professor in the Department of Mathematics at the University of Kentucky. She earned her Diplôme d'Ingénieur from École Centrale Paris and a master's degree in Applied Mathematics (Actuariat) from Université Paris-Dauphine in 2012. She received her Ph.D. in Applied Mathematics from the University of California, Davis in 2017, under the supervision of Matthias Köppe. Her research focuses on polyhedral geometry and cutting planes, particularly cut-generating functions for integer programming.

Contributed “Flash” Talk Presenters

Daniele Catanzaro (Université Catholique de Louvain, Belgium)

Optimizing over Path-Length Matrices of Unrooted Binary Trees

Bio: I am Professor of Discrete Optimization, currently serving as Head of the Center for Operations Research and Econometrics (CORE) of the Université Catholique de Louvain.

I graduated summa cum laude in Computer Science Engineering at the University of Palermo, Italy, in 2003. In 2008, I was awarded a Ph.D. in Computer Science from the Université Libre de Bruxelles for my research in discrete optimization, network design, and computational phylogenetics, conducted at the Computer Science Department, the Institute of Biology and Molecular Medicine (IBMM), and the Hospital Erasme of the same university. Before joining the Université Catholique de Louvain in 2014, I was a Chargé de Recherches of the Belgian National Fund for Scientific Research (2009-2013), Visiting Scholar at the Tepper School of Business and the Computational Biology Department of Carnegie Mellon University (2010-2012), and Assistant Professor of Discrete Optimization at the Faculty of Economics and Business of the Rijksuniversiteit Groningen (2013-2014). More recently, I have been invited as a Visiting Professor at the Department of Management at the University Ca’ Foscari of Venice, Italy, in 2018 and again in 2024.

I am serving (or recently served) as a member of the program committee for ISCO 2024, an expert for the ERC Horizon calls HORIZON-MSCA-2024-PF-01, and as panel member for the Canadian NSERC/CRSNG (calls 2022-2025).

Akif Çördük (Nvidia)

GPU-Accelerated Evolutionary Framework for Primal Heuristics

Bio: Akif is a senior developer technology engineer at NVIDIA. Akif holds a bachelor's degree in computer engineering and a master's degree in software engineering. He has a background in massively parallel pricing engines and GPU-accelerated combinatorial optimization. He is a co-founding engineer of Nvidia cuOpt which contains accelerated VRP and MIP heuristics. His interests include parallel algorithms, performance optimization, and combinatorial optimization.

Yongchun Li (University of Tennessee Knoxville)

The Augmented Factorization Bound for Maximum-Entropy Sampling

Bio: Dr. Yongchun Li is an assistant professor in the Department of Industrial and Systems Engineering at the University of Tennessee Knoxville. She received a PhD in Operations Research from Georgia Tech. Her research interests lie at the intersection of optimization, machine learning (ML), and statistics, with the goal of advancing ML towards greater interpretability, efficiency, fairness, and robustness.

Gonzalo Muñoz (Universidad de Chile)

Tightening convex relaxations of trained neural networks: a unified approach for convex and S-shaped activations

Bio: Gonzalo Muñoz is an Assistant Professor at the Industrial Engineering Department of Universidad de Chile and a Researcher at the Institute of Complex Systems in Engineering, Chile. He obtained his Ph.D. from the Industrial Engineering and Operations Research Department at Columbia University. His main interests include theoretical and computational developments in Mixed Integer Linear and Non-linear Optimization.

Zedong Peng (MIT)

MPAX: Mathematical Programming in JAX

Bio: Zedong is currently a postdoctoral associate at MIT, working with Prof. Haihao Lu. He received his Ph.D. in Control Science and Engineering from Zhejiang University in 2021. He previously worked as an applied scientist at JD.com (2021–2023), a postdoctoral assistant at Purdue University (2023–2024, working with Prof. David E. Bernal Neira), and a visiting scholar at Carnegie Mellon University (2019–2020, working with Prof. Ignacio E. Grossmann).

Sergio García Quiles (University of Edinburgh)

Some preprocessing and polyhedral results on facility location with preferences

Bio: Sergio García Quiles is Reader (Associate Professor) at the School of Mathematics in the University of Edinburgh (UK). His research is focused on finding good formulations and efficient solution methods (preprocessing, exact and heuristic algorithms) for all kind of integer programming problems, especially if motivated by applications. He is interested in all the path from formulating the problem to coding the solution algorithm to squeeze the computational time to the minimum possible. Topics on which he has worked are: discrete facility location (p-median, hubs, preferences, reliability). split delivery vehicle routing, clustering with feature selection, aircraft cockpit design, congress seat allocation, matching problems (hospital/residence, kidney exchange), airport slot allocation, and timetabling activities of electrical buses.

Thiago Serra (University of Iowa)

Optimal Combinatorial Testing with Constraints: The Balancing Act

Bio: Thiago Serra recently joined the University of Iowa's Tippie College Business as Assistant Professor of Business Analytics, following 5 years as Assistant Professor of Analytics and Operations Management at Bucknell University's Freeman College of Management. Previously, he was Visiting Research Scientist at Mitsubishi Electric Research Labs from 2018 to 2019, and Operations Research Analyst at Petrobras from 2009 to 2013. He has a Ph.D. in Operations Research from Carnegie Mellon University's Tepper School of Business, for which he received the Gerald L. Thompson Doctoral Dissertation Award in Management Science in 2018. He obtained his pre-doctoral training in Brazil at the University of Campinas (Unicamp) and at the University of Sao Paulo (USP). During his Ph.D., he was also awarded the INFORMS Judith Liebman Award. His research at the intersection of machine learning and mathematical optimization is supported by the National Science Foundation (NSF).

Junlong Zhang (Tsinghua University)

Construction of Value Functions of Integer Programs with Finite Domain

Bio: Junlong Zhang is an Associate Professor in the Department of Industrial Engineering at Tsinghua University, China. He received his Ph.D. degree in Industrial Engineering from North Carolina State University in 2018. His research interests lie in integer programming and stochastic optimization, and their applications in transportation and logistics. He now serves as an Editorial Advisory Board member of Transportation Research Part E: Logistics and Transportation Review, and an Associate Editor of Journal of Industrial and Management Optimization.

Poster Session Presenters

Full name	***Affiliated institution***	***Poster title***
Anna Deza	University of California, Berkeley	Fair and Accurate Regression: Strong Formulations and Algorithms
Anurag Ramesh	Purdue University	Quadratic Knapsack Problem : A QUBO-Based Approach
Berkay Becu	Georgia Institute of Technology	A Simple Heuristic to Learn Primal Solutions for AC Optimal Transmission Switching Using Historical Data
Bo Tang	University of Toronto	Learning to Optimize for Mixed-Integer Nonlinear Programming
Boyang Han	University of Florida	An Extended Abstract Branch-and-Cut Model to Compare Parameterized Cutting and Branching Behavior
Can Yin	University of Minnesota, Twin Cities	Mobile Parcel Locker Scheduling with Customer Choices under Uncertain Demand
Connor Johnston	University of Florida	Simple Disjunctive Cuts Are All You Need!
Dahye Han	Georgia Institute of Technology	Extreme Strong Branching in NLP: A Computational Study
Dekun Zhou	University of Wisconsin-Madison	Efficient Sparse PCA via Block-Diagonalization
Domingo Araya	Pontificia Universidad Católica de Chile	Exact and approximate formulations for the Close-Enough TSP
Haoyun Deng	Georgia Institute of Technology	On the ReLU Lagrangian Cuts for Stochastic Mixed Integer Programming
Jingye Xu	Georgia Institute of Technology	V-Lagrangian decomposition solves random two-stage integer problems in poly-iteration
Jnana Sai Jagana	University of Minnesota, Twin Cities	A column-and-constraint generation algorithm for robust optimization under flexible uncertainty
Johanna Skåntorp	KTH Royal institute of technology	Exploring Alternative Cutting Planes for Mixed-Integer Semidefinite Programming
Joshua T. Grassel	North Carolina State University	Stress Testing the Numerical Stability of LP and MIP Solvers
Kausthubh Konuru	University of Florida	Generalizing Learning to Cut Models from Synthetic to Diverse Instances
Lillian Makhoul	University of Colorado Denver	Finishing a chapter: computing the volume of the convex hull of the graph of a trilinear monomial over a general box domain
Lingqing Shen	Carnegie Mellon University	Scaling Relaxations with Efficient Algorithm for the Constrained Maximum-Entropy Sampling Problem
Matheus Jun Ota	University of Waterloo	Combining Column Elimination with Column Generation
Matias Villagra	Columbia University	Symmetries and Lift-and-Project Hierarchies
Shannon Kelley	Lehigh University	Strengthening Parametric Disjunctive Cuts
Shivi Dixit	University of Minnesota, Twin Cities	Learning parametric valid inequalities for mixed-integer linear optimization
Stefan Clarke	Princeton University	Learning-Based Hierarchical Approach for Fast Mixed-Integer Optimization
Tu Anh-Nguyen	Rice University	Learning Generalized Linear Programming Value Functions

Waquar Kaleem	Pennsylvania State University	Extreme-Scale EV Charging Infrastructure Planning for Last-Mile Delivery Using High-Performance Parallel Computing
Woojin Kim	University of Wisconsin-Madison	The Chance-constrained Stochastic Diversion Path Problem with Sample Average Approximation
Yongzheng Dai	Ohio State University	Modified Eigenvalue Method for Nonconvex MIQCQP and Parallel Local Branching
Yutian He	University of Iowa	Distributionally Fair Two-stage Stochastic Programming by Bilevel Optimization
Zulal Isler-Ardic	Rensselaer Polytechnic Institute	New optimization approaches for designing experiments