Sertalp B. Çay

Curriculum Vitae

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Research Interest and Expertise

Cutting-edge optimization algorithms and software

Mixed integer optimization and mixed integer second order cone optimization

Black box optimization and auto-tuning for machine learning algorithms

Simulation modeling and simulation optimization algorithms

Education

2012–Present **Ph.D. in Industrial Engineering**, *Lehigh University*, Bethlehem, PA, GPA: 3.95/4.00.

2010–2012 **M.S. in Industrial Engineering**, *Bilkent University*, Ankara, Turkey, GPA: 3.71/4.00.

2005–2010 **B.S. in Industrial Engineering**, *Bilkent University*, Ankara, Turkey, GPA: 3.50/4.00.

Research Experience

2012–Present **PhD Research**, *Lehigh University*, Bethlehem, PA, Advisor: Tamás Terlaky.
Optimization Algorithms and Software
- Currently working on the development of a mixed integer second order cone optimization solver
- Developed a novel warm-starting strategy for second order cone optimization problems after branching
- Applied disjunctive conic and cylindrical cuts on problems arise in financial optimization
- Worked on branching decisions in mixed integer second order cone optimization

2010–2013 **Master Thesis**, *Bilkent University*, Ankara, Turkey, Advisor: Nesim K. Erkip.
Title: Final Phase Inventory Management of Spare Parts Under Non-homogeneous Poisson Demand Rate
- Derived two heuristic approach to solve a real-world problem efficiently
- Achieved 4% optimality gap on average in homogeneous demand cases

2009–2010 **Undergraduate Research**, *Bilkent University*, Ankara, Turkey, Advisor: Murat Fadıloğlu.
Undergraduate research project, PLPE (Production Line Performance Emulator)
- Developed an online web simulation tool (PLPE) for Small and Medium-Sized Enterprises

Project Experience

08/2015–Present **SAS Institute**, *Year-round Operations Research Intern*, Advisor: Imre Pólik.
Development of a second order cone optimization solver
- Developing and improving solution strategies for mixed integer second order cone optimization problems
- Implementing model-based black-box optimization algorithms

06/2015–08/2015 **SAS Institute**, *Operations Research Summer Fellow*, Advisors: Yan Xu, Joshua Griffin.
Hyperparameter optimization for machine learning problems
- Developed a framework for hyperparameter optimization of machine learning algorithm parameters
- Implemented a Bayesian Optimization approach with surrogate-based modeling for autotuning

06/2014–08/2014 **SAS Institute**, *Operations Research Summer Fellow*, Advisor: Joshua Griffin.
PARIS: A parallel multi-start approach for discrete simulation-based optimization
- Developed a state-of-art high performance simulation optimization framework
- Enhanced an existing SBO algorithm with parallelization, multi-start and ranking-selection approaches
- Provided numerical experiments to show dominance over existing algorithms
- Reduced total solution time by 49% and decreased confidence interval by more than 54% on standard test set

2012–Present **ORComplete**, *Collective Blog about Operations Research Studies*, www.orcomplete.com.
- Started a community blog and an initiative social media project to write about contemporary OR topics
- Reached more than 7000 visitors within first year
- Organized 7 web seminars for operations research / industrial engineering students and practitioners

2011–2012 **Android Application Development**, *Locishare*.
- Developed an Android OS based application for multimedia sharing on social networks
- Maintained a web-service associated with the mobile application

2011 **Network Project**, *Bilkent University*, Ankara, Turkey.
- Conducted a project on allocation of hospitals on Ankara network, based on real population and road data
- Developed a software tool on Java, Javascript, PHP and JQuery that works with commercial optimization solvers

Publications

Sertalp B. Çay, Imre Pólik, Tamás Terlaky. *Warm-start of interior point methods for second order cone optimization via rounding over optimal Jordan frames*. Lehigh University ISE Technical Report, 17T-006, 2017. (Submitted)

Sertalp B. Çay, Julio C. Góez, Tamás Terlaky. *Effects of Disjunctive Conic Cuts within a Branch and Conic Cut Algorithm to Solve Asset Allocation Problems*. Lehigh University ISE Technical Report, 16T-005, 2016. (Submitted)

Sertalp Bilal Çay, Enes Bilgin, Cansu Çakır, Yasemin Arslan, Mehmet Fatih Cabıoğlu, Barbaros Tansel. *Optimization on Internal Logistics Activities in BSH Washing Machine Factory*. Endüstri Mühendisliği, Vol. 21,3, pp. 25-38, Sep 2010. – (In Turkish with English abstract).

Presentations

2017 Warmstarting of primal-dual interior point methods for mixed integer second order cone optimization,
- INFORMS Computing Society Meeting, Austin, TX, January 2017

2015–2016 *BAYES*: Bayesian optimization solver for global optimization of black-box problems
- Executive Demo, SAS Institute, Cary, NC, December 2016
- PhD Seminar, Lehigh University, Bethlehem, PA, September 2015

2013–2016 Disjunctive conic and cylindrical cuts for portfolio optimization problems,
- INFORMS Annual Meeting, Nashville, TN, November 2016
- MOPTA 2016, Bethlehem, PA, August 2016
- INFORMS Annual Meeting (Invited Session), Philadelphia, PA, November 2015
- ISMP 2015 (Invited Session), Pittsburgh, PA, July, 2015
- CORS / INFORMS Joint Meeting, Montreal, Canada, June 2015
- INFORMS Annual Meeting (Invited Session), San Francisco, CA, November 2014
- COR@L Seminar, Lehigh University, Bethlehem, PA, September 2013

2014 *PARIS*: A parallel multi-start approach for discrete simulation-based optimization,
- PhD Seminar, Lehigh University, Bethlehem, PA, September 2014
- SAS Institute Optimization Brainstorm, Cary, NC, August 2014

2014 Development of disjunctive conic and cylindrical Cuts for MISOCO and their applications to radiation therapy treatment optimization,
- *Poster Presentation:* Intensity Modulated Radiation Therapy II, Lehigh Uni., Bethlehem, PA, May 2014

2012 Final phase inventory management of spare parts under non-homogeneous Poisson demand rate,
- COR@L Seminar, Lehigh University, Bethlehem, PA, September 2012
- YA/EM (OR and IE Society) Annual Meeting, Doğuş University, Istanbul, July, 2012
- *Poster:* Sixth Annual Workshop on Supply Chain and Logistics, Bilkent University, Ankara, June 2012

Work Experience

09/2015–Present **Year-Round Operations Research Intern (Part-time)**, *SAS Institute*, Advisor: Imre Pólik, Topic: Second order cone optimization.

06/2014–08/2014 **Summer Intern in Operations Research Department**, *SAS Institute*, Cary, NC.
Advisors: Joshua Griffin, Emily Nada
- Worked as a graduate summer fellow in Nonlinear Optimization Group
- Presented academic articles and prepared reports about the literature
- Worked on a simulation based optimization project for the SAS Simulation Studio and SAS Operations Research
- Gave a speech about the project and results obtained at then end of the project

09/2010–06/2012 **Research Assistant**, *Bilkent University*, Ankara, Turkey.
- Researched on inventory theory and simulation which is supported by TUBITAK (The Scientific and Technological Research Council of Turkey)

09/2010–06/2012 **Departmental Assistant / System Administrator**, *Bilkent University*, Ankara, Turkey.
- Developed and maintained the academic information systems and database
- Managed the department web-page for 2 years
- Completed many departmental duties, such as management of TA duties and course registrations

Teaching

2015 **Guest Lecturer**, *Lehigh University*, ISE 407, Computational Methods in Optimization.
Topic: Computational Approaches in Interior Point Method

2015 **Senior Teaching and Lab Assistant**, *Lehigh University*, ISE 305/404, Simulation.

2013-2014 **Teaching and Lab Assistant**, *Lehigh University*, IE 305/404, Simulation.
Nominated for the *academic excellence as a teaching assistant award* by students

2012 **Teaching Assistant, Guest Lecturer**, *Lehigh University*, IE 425, Advanced Inventory Theory.

Awards and Certificates

2015 INFORMS Magna Cum Laude Award for *Lehigh University INFORMS Student Chapter*

2014–Present P.C. Rossin Doctoral Fellow, Lehigh University

2014, 2015 SAS Operations Research Summer Fellow in the Operations Research R&D organization, SAS Institute

2012–2014 Dean's Doctoral Assistantship, Lehigh University

2010–2012 Scholarship by the Scientific and Technological Research Council of Turkey for graduate studies

2010–2012 Full scholarship by Bilkent University for graduate studies

2010 Ranked as the 2nd best senior project in YA/EM 2010 National Student Project Competition in Turkey

2010,2012 High Honor standing at graduation from BS and MS program

2005–2010 Full scholarship by Bilkent University for undergraduate studies

2005 Ranked in top 0.1% among approximately 1.5 million attendees in University Entrance Exam (OSS)

2004 Ranked 2nd in IX. Turkey National Mathematics Olympiads in Black Sea Region

Activities and Volunteer Experiences

2015–2016 Industrial and Systems Engineering Unit Representative in Lehigh Graduate Student Senate

2015–2016 PhD Representative in Lehigh ISE Council

2014–2015 President of Turkish Student Club at Lehigh University

2014–2015 President of Lehigh University INFORMS Student Chapter

2013–2016 INFORMS Annual Meeting Blogger, Minneapolis, MN, San Francisco, CA, Philadelphia, PA, Nashville, TN

2013–2014 Vice-President of Turkish Student Club at Lehigh University

Professional Membership

2013–Present INFORMS Student Member

2013–Present Lehigh University INFORMS Student Chapter Member

2013–Present INFORMS Computing Society, INFORMS Optimization Society Member

2013–2015 Association for Computing Machinery Student Member

Skills

Language

Turkish Native

English Advanced

Japanese Basic

Computer Software and Languages

Software ARENA, MINITAB, CPLEX, GAMS, Gurobi, MOSEK, SAS

Language Java, C, C++, Python, Javascript, MATLAB / OCTAVE, PHP, SQL, HTML, CSS, Ajax, JQuery, AMPL

Other LaTeX, Google Maps API, Facebook Connect API, OAuth, Version Control (Git, SVN)