Pelin Cay

Curriculum Vitae

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Research Interests

Prescriptive analytics, Real-life problem solving in industrial settings, Interdisciplinary problem solving, Quantum computing for optimization, Mixed integer nonlinear optimization, Large scale optimization

Education

2012 – 2019 **PhD**, *Lehigh University, Industrial and Systems Engineering*, Bethlehem, PA.

2010 – 2012 **M.S.**, *Bilkent University, Industrial Engineering*, Ankara, Turkey.

2005 – 2010 **B.S.**, *Bilkent University, Industrial Engineering*, Ankara, Turkey.

Work Experience

2019 (Summer) – Present **Operations Research Specialist**, *SAS Institute*, Cary, NC.
- Leading technical aspects of customer projects for SAS/OR and SAS Optimization customers
- Generating mathematical modeling formulations
- Developing customized solutions in business settings using optimization, data science and machine learning

2017 (Fall) – 2019 (Spring) **Sr Associate Operations Research Specialist**, *SAS Institute*, Cary, NC.
- Developed mathematical modeling and software applications for customer projects
  - Optimization engine for mixture problems of pooling manufacturing process
  - Minimization of production costs for wall manufacturing process under quality conditions

2016 (Summer) – 2017 (Fall) **Graduate Intern**, *SAS Institute*, Cary, NC.
Advisors: Ivan Oliveira and Jinxin Yi
- Provided solutions for pro bono and customer problems
  - Optimization of the Boston Public Schools transportation system
  - Optimization of railroad transportation rates for service agreements by shaping loss functions

2015 (Summer) **Givens Associate PhD Intern**, *Argonne National Laboratory*, Darien, IL.
Advisor: Sven Leyffer
- Developed test sets for Mixed Integer Partially Differential Equation Constrained Optimization (MIPDECO) problem library

2013 (Summer) – 2014 (Fall) **Research Assistant**, *Lehigh University, College of Engineering and Applied Sciences*, Bethlehem, PA.
Advisors: Robert Storer and Luis Zuluaga
- Applied statistical approaches to analyze real-time data
- Developed mixed integer nonlinear optimization models for real-life problems for a co-op energy project

2013 (Summer) – 2014 (Fall) **Co-Op PhD Intern**, *Air Products and Chemicals, Inc.*, Allentown, PA.
Advisor: Camillo Mancilla
- Analysis of cost functions using real-time data in gas production
- Solution methodology for real-time nonlinear optimization problems
- Implementation of adaptive curve algorithm with multi linear regression on real-time data

Research Experience

2012 (Fall) – 2019 **PhD Thesis**, *Lehigh University, College of Engineering and Applied Sciences*, Bethlehem, PA.
Advisors: Robert Storer and Luis Zuluaga
Title: Solution methodologies for mixed integer nonlinear optimization problems in gas networks and railroad service agreements
- Deriving time-efficient approaches to solve nonlinear optimization problems in real time.
  - Second order cone relaxation methods and strengthening strategies
  - Providing lower and upper bounds in short time compared to the original problem formulation
- Application of aforementioned methods in practical settings, specifically for gas pipeline networks and service agreements in railroad systems

2010 – 2012 **Master Thesis**, *Bilkent University*, Ankara, Turkey.
Advisor: Bahar Yetiş Kara
Title: Organ Transplantation Logistics: Turkey Case
- Developed mathematical models to improve intra-regional organ flow of regional coordination centers
- Modeled discrete-event simulation to compare performances of status quo and proposed systems

In collaboration with the Organ and Tissue Transplantation Board of Ministry of Health of Turkey

Publications

2019 Cay, Pelin, Camilo Mancilla, Robert H. Storer, and Luis F. Zuluaga. "Operational decisions for multi-period industrial gas pipeline networks under uncertainty." Optimization and Engineering 20, no. 2 (2019): 647-682.

2018 Cay, Pelin, Ali Esmali, Camilo Mancilla, Robert H. Storer, and Luis F. Zuluaga. "Solutions with performance guarantees on tactical decisions for industrial gas network problems." IISE Transactions 50, no. 8 (2018): 654-667.

2018 Savaşer, Sinem, Ömer Burak Kınay, Bahar Yetis Kara, and Pelin Cay. "Organ transplantation logistics: a case for Turkey." OR Spectrum: 1-30.

Teaching Experience

2015 (Spring) – 2017 (Spring) **Teaching Assistant**, *Lehigh University, College of Business and Economics*, Bethlehem, PA.
IBE 250: Integrated Business and Engineering Honors Program Junior Lab
- Enhanced and managed the online business game for teaching course material

2010 – 2012 **Teaching Assistant**, *Bilkent University*, Ankara, Turkey.
Courses: Principles in Engineering Management, Production System Design, Project Scheduling

Professional Activities

2014 **Reviewer**, *European Journal of Operational Research*.

2013 **Writer**, *INFORMS Annual Meeting 2013, INFORMS E-News*, Minneapolis, MN.

2011 **Editor**, *Bilkent University Industrial Engineering Senior Projects 2011*, ISBN: 978-975-6090-64-0, Meteksan Matbaacilik, May 2011.

Presentations

2019 **Technology Workshop: Solving Business Problems with SAS Analytics and OPTMODEL**, *with Rob Pratt and Ed Hughes.*
- Informs Business Analytics, Austin, TX, April 2019

2017 **Technology Workshop: Solving Business Problems with SAS Analytics and OPTMODEL**, *with Rob Pratt and Ed Hughes.*
- INFORMS Annual Meeting, Houston, TX, October 2017

2017 **Robust Operational Decisions for Multi Period Industrial Gas Pipeline Networks under Uncertainty**, *with Camilo Mancilla, Robert Storer and Luis Zuluaga.*
- INFORMS Annual Meeting, Houston, TX, October 2017

2017 **Optimizing Fleet Scheduling for Boston Public Schools**, *with Jinxin Yi, Jeremiah Riddle and Ivan Oliveira.*
- Manufacturing & Service Operations Management Conference, Chapel Hill, NC, June 2017

2016 **Fast Solutions with Performance Guarantee for Operational Decisions in Real Time Industrial Gas Network Problems**, *with Camilo Mancilla, Robert Storer and Luis Zuluaga.*
- INFORMS Annual Meeting, Nashville, TN, November 2016

2015 **Obtaining Bound Information in Operation Optimization of Gas Pipeline Networks**, *with Camilo Mancilla, Robert Storer and Luis Zuluaga.*
- INFORMS Annual Meeting, Philadelphia, PA, November 2015
- COR@L PhD Seminar, Lehigh University, November 2015

2014 **An Iterative Approach to Solve Gas Pipeline Optimization Problems**, *with Camilo Mancilla, Robert Storer and Luis Zuluaga.*
- INFORMS Annual Meeting, San Francisco, CA, November 2014
- COR@L PhD Seminar, Lehigh University, 2015 (Spring)

2012 (Fall) **Organ Transplantation Logistics: Turkey Case**, *with Bahar Yetiş Kara.*
- YAEM National Congress on Operations Research and Industrial Engineering, Dogus Uni, 2012 (Spring)
- COR@L PhD Seminar, Lehigh University, 2012 (Fall)

Honors and Awards

2014 – 2019 **P.C. Rossin Doctoral Fellow**.

2012 – 2013 **Dean's Doctoral Fellowship**, *Lehigh University*.

2010 – 2012 **Graduate Level Education Scholarship**, *Scientific and Technological Research Council of Turkey*.

2010 – 2012 **Full scholarship in M.S. education**, *Bilkent University*.

2006 – 2012 **Honor and High Honor Standing**, *Degrees at every semester during B.S. and M.S. studies. Awarded by Faculty of Engineering*, Bilkent University.

Skills and Activities

Languages	Turkish (Native), English (Advanced), German (Intermediate), French (Basic), Japanese (Basic)
Programming	C++, Javascript, PHP, Python, SQL
Software	AMPL, ARENA, CPLEX, CuPPy, GAMS, Gurobi, MATLAB, PuLP, SAS, SYMPHONY
Other	Version Control (SVN, Git)
Leadership	Lehigh INFORMS Student Chapter Secretary (2013), ISE Department Council PhD Representative (2014), Department Representative in Lehigh University Graduate Student Senate (2014–2016)
Membership	INFORMS (2012–), INFORMS Computing Society (2013–), INFORMS Optimization Society (2013–)