

ZEYNEP ERTEM

2304 S LAKELINE BLVD. UNIT 382
CEDAR PARK, TX 78613

WEBPAGE: [HTTP://WWW.BIO.UTEXAS.EDU/RESEARCH/MEYERS/ZEYNEP/](http://WWW.BIO.UTEXAS.EDU/RESEARCH/MEYERS/ZEYNEP/)

EMAIL: ZEYNEPSERTEM@GMAIL.COM

MOBILE: (413) 992 9267

OBJECTIVE I am intrigued by building **mathematical models** and **optimization** solutions to high-impact real-world problems in **healthcare systems** by leveraging large-scale mixed integer programming, graph theory, and stochastic simulation methods. My recent research is focused on the **optimization of infectious disease** surveillance systems and control policies, and the development of **decision-support** software for pandemic preparedness and response.

EDUCATION **Texas A&M University, College Station, TX**
Ph.D., Industrial and Systems Engineering; September 2015
Dissertation: “Characterizing and Detecting Cohesive Subgroups with Applications to Social and Brain Networks”
Advisor: Dr. Sergiy Butenko

M.E., Industrial and Systems Engineering; May 2010
Advisor: Dr. Sergiy Butenko

Middle East Technical University, Ankara, Turkey
B.S., Industrial Engineering; June 2007
Minor in Mathematics

WORK EXPERIENCE

- **Postdoctoral Research Fellow**, Department of Statistics and Data Sciences, University of Texas at Austin, Austin, TX, January 2016 - Current
- **Instructor**, Industrial and Systems Engineering Department, Dwight Look College of Engineering, College Station, TX, September 2014 - December 2014
- **Research and Teaching Assistant**, Industrial and Systems Engineering Department, Dwight Look College of Engineering, College Station, TX, September 2008 - September 2015
- **Research Intern**, Schlumberger-Doll Research Center, Cambridge, MA, May 2011- August 2011
Supervisor: *Benoit Couet*, Program Manager (Uncertainty, Risk & Optimization Department)

MEDIA COVERAGE My work has been featured in several local and national news outlets.

- **University of Texas**, Flu Season Forecasts Could Be More Accurate with Access to Health Care Companies’ Data. [Link](#)
- **The Daily Texan**, UT-Austin researchers develop more accurate approach to flu season forecasting. [Link](#)
- **Becker’s Hospital Review**, Athenahealth data offers best predictions of flu season, study finds. [Link](#)
- **KXAN**, UT researchers find health company data can help predict flu risk. [Link](#)
- **Science Daily**, Flu season forecasts could be more accurate with access to health care companies’ data. [Link](#)

- **The Now**, Researchers come up with better flu forecasting model. [Link](#)
- **Medical Xpress**, Flu season forecasts could be more accurate with access to health care companies' data. [Link](#)
- **CBS-Austin** UT Researchers: Access to health record data could increase flu season forecast accuracy [Link](#)

PUBLICATIONS

- **On the Multi-source Influenza Forecasting: A Bayesian Approach**
Ertem, Z., Raymond, D., Meyers, L.A., *PLOS Computational Biology*, September 2018 (Impact Factor: 4.55)
- **The Maximum Independent Union of Cliques Problem: Complexity and Exact Approaches**
Ertem, Z., Lykhovyd, E., Wang, Y., Butenko, S. *Journal of Global Optimization*, July 2018 (Impact Factor: 1.74)
- **Scale Reduction Techniques for Computing Maximum Induced Bicliques**
Shahinpour, S., Shirvani, S., Ertem, Z., Butenko, S., *Algorithms*, October 2017 (Impact Factor: 1.44)
- **Detecting Large Cohesive Subgroups with High Clustering Coefficients**
Ertem, Z., Veremyev, A., Butenko, S. *Social Networks*, July 2016 (Impact Factor: 3.57)
- **Demographic Breakdown of Twitter Users: An analysis based on names**
Oktay, H., Firat, A., Ertem, Z. *Proceedings of the Sixth ASE International Conference on Social Computing May 2014, Stanford, CA*
- **Identifying climatological interactions in global influenza across temperate and tropical regions**
Du, Z., Ertem, Z., Li, Z., Tan, X., Zhao X., Bai, Y., Tian X. 2018 Under review Public Health
- **Inter-urban interactions of mobility via cellular position tracking in the southeast Songliao Basin, Northeast China**
Du, Z., Yang, Y., Ertem, Z., Gao, C., Huang, L., Huang, Q., Bai, Y. 2018 Under review Scientific Data
- **Graph Theoretical Analysis of Brain Networks**
Ertem, Z., Manly, H., Lenox, M., Butenko, S. *Working paper*, 2018
- **Dengue Epidemic Forecasting**
Ertem, Z., Herrera, J.L., Meyers, L.A., *Working paper*, 2018
- **To welcome refugees or not: impact of reemerging infectious diseases**
Ertem, Z., Du, Z., Meyers, L.A., *Working paper*, 2018

RESEARCH EXPERIENCE

Department of Statistics and Data Science, The University of Texas at Austin
Post-doctoral research

- **Develop forecasting methods for infectious diseases.**
 1. Develop robust forecasting models for infectious diseases.
 2. Utilized machine learning techniques on the Bayes framework.
 3. Develop a method to forecast any infectious disease with multiple other data sources.

Industrial and Systems Engineering, Texas A&M University
Doctoral Dissertation

- **Introduce novel clique relaxation models based on global and local clustering coefficients.**
 1. Develop mathematical models for these clique relaxation models.
 2. Establish structural properties of these clique relaxation models.
 3. Explore connectivity constraints for these clique relaxation models.
 4. Develop network clustering algorithm based on clique relaxation models.
 5. Empirically evaluate the effectiveness of this clustering algorithm on real world social networks.
- **Independent union of cliques problem that unifies maximum clique and maximum independent set problems.**
 1. Develop mathematical models for this clique relaxation model.
 2. Develop a branch and bound algorithm to efficiently solve this model.
 3. Establish structural properties and complexity results for different graphs.
 4. Establish analytical results on tightness of the clique relaxation model.
 5. Develop heuristic based approximation algorithms.
- **Identify the effect of concussion on animal brains via network analysis.**
 1. Represent pre- and post-concussion fMRI data of animal brains as networks.
 2. Utilize network analysis to first identify similar regions in animal brains.
 3. Compare the change in regions and graph structural properties due to concussion.
 4. Apply network clustering to detect changes in clusters due to concussion.
 5. Compare structural properties of these pre- and post-concussion networks.

TEACHING
EXPERIENCE

Industrial and Systems Engineering, Texas A&M University
(Fall 2014) Instructor for Engineering Economics course

- Prepared and taught the class for 66 students (Teaching evaluation 4.30/5.00)

Graduate Teaching Assistant

- Taught production planning, operations research, scheduling, integer programming, linear programming courses; prepared and graded assignments and exams, conducted help sessions, taught classes in the absence of the instructor.

Industrial Engineering, Middle East Technical University

Graduate Teaching Assistant

- Taught management for engineers and introduction to industrial engineering courses; prepared and graded assignments and exams, conducted help sessions, taught classes in the absence of the instructor.

CONFERENCE
PRESENTATIONS

- ★ Ertem, Z., Raymond, D., Meyers, L., 2018 Influenza. MIDAS Networking meeting, Bethesda, MD.
- ★ (Invited Talk) Ertem, Z., 2017 The Maximum Independent Union of Cliques Problem: Complexity and Exact Approaches. VIII International Conference Optimization and Applications (OPTIMA), Montenegro
- ★ Ertem, Z., 2016 Organized a panel session, Future of Disease Modeling in Clinical and Public Health. INFORMS Annual Conference, Nashville, TN.

- ★ Ertem, Z., Meyers, L., 2016 Seasonal Forecasting For Infectious Disease From Multiple Data Sources. INFORMS Annual Conference, Nashville, TN.
- ★ Ertem, Z., Butenko, S., 2016 Characterizing cohesive subgroups in social networks. INFORMS Annual Conference, Nashville, TN.
- ★ Ertem, Z., Wang, Y., Butenko, S., 2015 Characterizing and Detecting Independent Union of Cliques. INFORMS Annual Conference, Philadelphia, PA.
- ★ Ertem, Z., Wang, Y., Butenko, S., 2015 Characterizing and Detecting Independent Union of Cliques. 3rd Annual Meeting of the Mathematical Modeling and Optimization Institute, Shalimar, FL.
- ★ Ertem, Z., Veremyev, A., Butenko, S., 2014 Detecting Large Cohesive Subgroups with a High Clustering Coefficient. INFORMS Annual Conference, San Francisco, CA.
- ★ Shahinpour, S., Ertem, Z., Butenko, S., 2013 A Global Optimization Algorithm for the Maximum Biclique Problem in Large-scale Networks. INFORMS Annual Conference, Minnesota, MN.
- ★ Ertem, Z., Lenox, M., Butenko, S., 2012 Graph Theoretical Analysis of Brain Networks. INFORMS Annual Conference, Phoenix, AZ.
- ★ Shahinpour, S., Ertem, Z., Butenko, S., 2012 A Global Optimization Algorithm for the Maximum Biclique Problem in Large-scale Networks. INFORMS Annual Conference, Phoenix, AZ.
- ★ Ertem, Z., Butenko, S., 2010. Network Based Models for Analysis of SNPs. INFORMS Annual Conference, Austin, TX.
- ★ Ertem, Z., Butenko, S., 2010. Clustering Analysis Models for Analysis of SNPs. Yalta Optimization Conference: Network Science, Yalta, Ukraine.

HONORS

- ★ Women in OR/MS travel award, 2015
- ★ Texas A&M Industrial and Systems Engineering Department travel award, 2015
- ★ Travel Award, Discrete Optimization Workshop, Kiev, Ukraine, 2010
- ★ Turkish Ministry of Education Scholarship to pursue a graduate degree (\$150,000)
- ★ The Scientific and Technological Research Council of Turkey (TUBITAK) Merit-Based Fellowship for Graduate Students, 2007-2008, (\$20,000)
- ★ YAEM (IE-OR Association of Turkey) systems design project award - Workflow and Layout Improvement

COMPUTER SKILLS

- ★ Programming Languages: C++, Python
- ★ Software Tools: AMPL, CPLEX, Gurobi, PuLP, MATLAB, Lindo, Lingo, GAMS, Arena, Palisade Software Tools, Latex

PROFESSIONAL SERVICE

- ★ Informs Student Chapter in Texas A&M - Served as Vice President of Media
- ★ Member of Women in OR/MS
- ★ Graduate Teaching Academy

LANGUAGES

Turkish-native, English-fluent

RELEVANT COURSE WORK ★ Linear Programming, Nonlinear and Dynamic Programming, Integer Programming

★ Location Logistics of Industry Facilities, Production and Inventory Control, Principles of Scheduling

★ Engineering Optimization, Global Optimization, Large-scale Stochastic Optimization

★ Probabilistic Engineering Decisions, Distribution Theory, Applied Random Processes, Theory of Inference

★ Analysis of Algorithms, Software Engineering

★ Software Tools for Stochastic Decision Analysis

REFERENCES ★ Dr. Lauren Ancel Meyers
Professor, Statistics and Data Science Department, University of Texas at Austin
Phone: (512) 471 4950
email: laurenmeyers@austin.utexas.edu

★ Dr. Sergiy Butenko
Professor, Industrial and Systems Engineering, Texas A&M University
Phone: (979) 458 2333
email: butenko@tamu.edu

★ Dr. Wilbert Wilhelm
Professor, Industrial and Systems Engineering, Texas A&M University
Phone: (979) 458 2348
email: wilhelm@tamu.edu

★ Dr. Lewis Ntamo
Professor, Industrial and Systems Engineering, Texas A&M University
Phone: (979) 458 2360
email: ntamo@tamu.edu

★ Dr. Alaa Elwany
Assistant Professor, Industrial and Systems Engineering, Texas A&M University
Phone: (979) 458 2365
email: elwany@tamu.edu