Özge Sürer

Northwestern University
Department of Industrial Engineering and Management Sciences
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Research Interests

Methodology: Statistical and Machine Learning, Predictive Models, Data Analytics/Mining
Applications: Recommender Systems, Public Health, Physical-Statistical Modeling

Education

Northwestern University — Evanston, IL
Ph.D. in Industrial Engineering and Management Sciences — *December 2020*
Advisors: Professors Daniel W. Apley, Edward C. Malthouse
Thesis: Predictive Models for Group-Structured Regression and Classification Problems
Major in *Applied Statistics & Statistical Learning*; Minors in *Analytics* and *Optimization*

Boğaziçi University — İstanbul, Turkey
M.S. in Industrial Engineering — *January 2014*
Advisor: Professor İ. Kuban Altinel
Thesis: Event and Clock-Based Representations of Time in Mathematical Optimization

İstanbul Technical University — İstanbul, Turkey
B.S. in Industrial Engineering — *June 2011*

Academic & Professional Experience

Northwestern Argonne Institute of Science and Engineering — Evanston, IL
Postdoctoral Research Fellow — *January 2021 – Present*
Supervisors: Matthew Plumlee, Stefan Wild
Topics: Bayesian statistical methodology and its applications in machine learning including Gaussian processes, tree models, and dimension reduction, computational statistical inference including multi-model emulators, uncertainty quantification for parameters, model calibrators, and model mixing

United Airlines — Chicago, IL
Statistics and Operations Research Intern — *June 2019 – September 2019*
Topics: Spill & recapture model for predicting the future demand, benchmark studies through data analysis techniques and visualization, decomposition methods to more accurately and efficiently model spill and recapture

Northwestern University — Evanston, IL
Research Fellow, Spiegel Digital & Database Research Center — *September 2016 – September 2020*
Topics: Recommender systems in multisided platforms, data analytics

Teaching Experience

Northwestern University — Evanston, IL
Instructor, Industrial Engineering and Management Sciences Department — *Spring 2019*

- IEMS 303 Statistics (Undergraduate level)
  Class size: 29, Instructor overall effectiveness: 5.35/6.00
  Topics: Foundations of statistics and statistical computing for data analysis, descriptive statistics and statistical inference
  Teaching project: Implemented a project titled "Confidence in Learning Statistics with R Programming Language" as a participant of the Searle Center Teaching-As-Research program

Teaching Assistant, Industrial Engineering and Management Sciences Department

- IEMS 202 Probability (Undergraduate level) — Winter 2017, Spring 2018
- IEMS 303 Statistics (Undergraduate level) — Fall 2016/2018, Winter 2019, Spring 2020

Teaching Assistant, Master of Science in Analytics

- MSIA 421 Data Mining — Winter 2018

Bootcamp Instructor, Industrial Engineering and Management Sciences Department

- Statistics (Ph.D. level) — Fall 2016

Peer-Reviewed Journal Publications

[1] **Özge Sürer**, Daniel W. Apley, Edward C. Malthouse. Coefficient tree regression: Fast, accurate and interpretable predictive modeling. *Machine Learning* (tentatively accepted), 2021.[1]

[2] **Özge Sürer**, Daniel W. Apley, Edward C. Malthouse. Coefficient tree regression for generalized linear models. *Statistical Analysis and Data Mining: The ASA Data Science Journal*, 1–23, 2021. (link)

[3] Haoxiang Yang, **Özge Sürer**, Daniel Duque, David P. Morton, Bismark Singh, Spencer Fox, Remy Pasco, Kelly Pierce, Paul Rathouz, Zhanwei Du, Michael Pignone, Mark E. Escott, Stephen I. Adler, S. Clairborne Johnston, Lauren Ancel Meyers. Design of COVID-19 staged alert systems to ensure healthcare capacity with minimal closures. *Nature Communications*, 12, 3767, 2021. (link)

[4] Seda Yanik, **Özge Sürer**, Başar Öztayşi. Designing sustainable energy regions using genetic algorithms and location-allocation approach. *Energy*, 161–172, 2016. (link)

Peer-Reviewed Conference Proceedings

[5] **Özge Sürer**, Matthew Plumlee. Calibration using emulation of filtered simulation results. *Winter Simulation Conference* (accepted), 2021.[1]

[6] **Özge Sürer**, Robin Burke, Edward C. Malthouse. Multistakeholder recommendation with provider constraints. *Proceedings of the 12th ACM Conference on Recommender Systems*, 54–62, 2018. (link)

[7] **Özge Sürer**. Improving similarity measures using ontological data. *Proceedings of the 11th ACM Conference on Recommender Systems*, 416–420, 2017. (link)

Under Review & In Preparation

[8] Paul J. Rathouz, Victoria Valencia, Patrick Chang, David P. Morton, Haoxiang Yang, **Özge Sürer**, Spencer J. Fox, Elizabeth C. Matsui, Alex B. Haynes, Lauren A. Meyers. Survival analysis methods for analysis of hospitalization data: Application to COVID-19 patient hospitalization experience. Under revision. (link)

[9] **Özge Sürer**, Daniel W. Apley, Edward C. Malthouse. Discovering structure in longitudinal data. In preparation.[1]

Technical Reports

[1] Nazlican Arslan, **Özge Sürer**, David P. Morton, Haoxiang Yang, Michael Lachmann, Spencer Woody, Spencer J. Fox, Lauren Ancel Meyers. COVID-19 alert stages, healthcare projections and mortality patterns in Austin, Texas. Technical Report, 2021. (link)

[2] Haoxiang Yang, Michael Lachmann, **Özge Sürer**, Spencer J. Fox, David P. Morton, Lauren Ancel Meyers. Projecting need for a COVID-19 alternate care site (ACS) in Austin. Technical Report, 2021. (link)

[3] Haoxiang Yang, Daniel Duque, **Özge Sürer**, David P. Morton, Remy Pasco, Kelly Pierce, Spencer Fox, Lauren Ancel Meyers. Staged strategy to avoid hospital surge and preventable mortality, while reducing the economic burden of social distancing measures. Technical Report, 2020. (link)

Book Chapters

[1] **Özge Sürer**, Sezi Çevik Onar, İlker Topçu. Innovation strategy evaluation process using fuzzy cognitive mapping. *Intelligent Techniques in Engineering Management*, 107–128, 2015. (link)

[2] Başar Öztayşi, **Özge Sürer**. Supply chain performance measurement using a SCOR based fuzzy VIKOR approach. *Supply Chain Management Under Fuzziness*, 199–224, 2014. (link)

[1] Available upon request.

Presentations & Invited Talks

[1] (*upcoming*) Winter Simulation Conference, Phoenix, AZ (December, 2021). *Calibration using emulation of filtered simulation results.*

[2] (*upcoming*) INFORMS Annual Meeting, Anaheim, CA (October, 2021). *Calibration using emulation of filtered simulation results.*

[3] Alberta School of Business, University of Alberta, Alberta, Canada (February, 2020). *Coefficient tree regression: Fast, accurate and interpretable predictive modeling.*

[4] David Nazarian College of Business and Economics, California State University, Northridge, CA (January, 2020). *Coefficient tree regression: Fast, accurate and interpretable predictive modeling.*

[5] Tippie College of Business, University of Iowa, Iowa City, IA (December, 2019). *Coefficient tree regression: Fast, accurate and interpretable predictive modeling.*

[6] INFORMS Annual Meeting, Seattle, WA (October, 2019). *Coefficient tree regression for discovering structure in generalized linear models.*

[7] INFORMS Annual Meeting, Seattle, WA (October, 2019). *Discovering structure in longitudinal data via coefficient tree regression.*

[8] INFORMS Annual Meeting, Phoenix, AZ (November, 2018). *Coefficient tree regression for discovering hidden structure.*

[9] The 12th ACM Conference on Recommender Systems, Vancouver, Canada (October, 2018). *Multistakeholder recommendation with provider constraints.*

[10] The Midwest Machine Learning Symposium, Chicago, IL (June, 2018). *Coefficient tree regression for discovering hidden structure.*

[11] The 11th ACM Conference on Recommender Systems, Como, Italy (August, 2017). *Improving similarity measures using ontological data.*

[12] The 34th National Conference for Operations Research and Industrial Engineering, Bursa, Turkey (June, 2014). *Event and clock-based representations in mathematical optimization.*

[13] The 26th European Conference on Operational Research, Rome, Italy (July, 2013). *Simulated annealing algorithm with variable cluster number and comparison with k-means algorithm.*

[14] The 25th European Conference on Operational Research, Vilnius, Lithuania (July, 2012). *A multi-criteria based evaluation of innovation strategy selection.*

Mentoring Experience

Doctoral student

Bayesian Analysis of Nuclear Dynamics Collaboration, Summer Fellow

- Yuriy Volkotrub — June–September 2021

  Building a statistical method for quantifying the uncertainty in a physics model

Undergraduate students

Northwestern University, Industrial Engineering and Management Sciences Department

- Justin Chen — June–September 2021

  Integration of visualization and diagnostics modules to the Python package `surmise`

- Huangda Shang (co-supervised with D. Morton) — September 2020–March 2021

  Alternative solutions of COVID-19 staged alert systems via derivative-free optimization methods

- Aneesh Kudaravalli, Katherine Johns, Margot Dupeyroux, Robert Wong, Yun Hwan Choi (co-supervised with D. Morton) — September–December 2020

  Investigation of different trigger metrics for COVID-19 staged alert systems

- Achyut Kasi, Cindy Sanchez (co-supervised with D. Morton) — June–September 2020

  Development of a module to produce graphs and reports automatically for the COVID-19 staged alert system

Awards & Honors

- Walter P. Murphy Fellowship for outstanding first year Ph.D. students at Northwestern, Evanston, IL 2015–2016
- Scientific and Technological Research Council of Turkey (TUBİTAK) Scholarship, Turkey 2011–2015
- Council of Higher Education (YÖK) Undergraduate Scholarship, Turkey 2006–2011

Service & Professional Activities

- **Session chair**, INFORMS Annual Meeting, Anaheim, CA October, 2021

  (upcoming) *Data-driven Modeling in Uncertainty Quantification*
- **Session chair**, INFORMS Annual Meeting, Seattle, WA October, 2019

  Interpretable Predictive Models
- **Session chair**, INFORMS Annual Meeting, Phoenix, AZ November, 2018

  Intriguing Tweaks in Data Science I
- **Participant**, INFORMS Doctoral Student Colloquium, Houston, TX October, 2017
- **Participant**, ACM Summer School on Recommender Systems, Como, Italy August, 2017
- **Conference organizing committee member**, Global Conference on Engineering and Technology Management, İstanbul, Turkey June, 2014
- **Session chair**, Global Conference on Healthcare Systems Engineering, İstanbul, Turkey August, 2014

  Health Economics
- **Session chair**, European Conference on Operational Research, Rome, Italy July, 2013

  Artificial Intelligence–Fuzzy Systems

Open-Source Software

- `surmise`, v0.1.1 released July 2021 read the docs, project page

  Python package designed to provide a surrogate model interface for calibration, uncertainty quantification, and sensitivity analysis.
- `CTR`, released September 2020 vignette, project page

  R package for the application of coefficient tree regression (CTR).
- `COVID-19 Staged Alert System`, released May 2020 project page

  Python code for finding the best COVID-19 staged strategy.