DERYA "IPEK" EROGLU

deryaipek@vt.edu **|** deryaipek.com **|** (540) 208-8537
linkedin.com/in/ipekeroglu **|** researchgate.net/profile/Derya-Ipek-Eroglu

---

EDUCATION

Ph.D. in Business Information Technology, May 2023
Virginia Tech, Blacksburg, VA
Dissertation: *Effects of Social Media Platform Design on Individuals' Opinions*
Committee: Dr. Onur Seref (chair), Dr. Michelle Seref, Dr. Paul Lowry, Dr. Alan Wang
GPA: 3.91/4.00

M.S. in Industrial Engineering, January 2019
Middle East Technical University (METU), Ankara, Turkey
Thesis: *A Unified Approach for Center-Based Clustering Problems on Networks*
Advisor: Dr. Cem Iyigun

B.S. in Industrial Engineering, *magna cum laude*, June 2015
Middle East Technical University (METU), Ankara, Turkey

RESEARCH INTERESTS

Social Media Platforms and Societies
Persuasion in Social Media
Natural Language Processing and Representation Learning in Text Analytics
Computational Social Science
Machine Learning – Unsupervised Learning and Clustering
Genetic Algorithms for Heuristic Optimization

PUBLICATIONS

Published

Eroglu, D. I., Seref, O., & Seref, M. M.H.. (2021). Changing Views: Pre-suasion in a Reddit Discussion Community. *AMCIS 2021 Proceedings*, 15. **Won AMCIS 2021 ERF Top 25% Papers Award.**

Szczyrba, L., Zhang, Y., Pamukcu, D., & **Eroglu, D.I.** (2021). Quantifying The Role Of Vulnerability In Hurricane Damage Via A Machine Learning Case Study. *Natural Hazards Review,* 22(3). https://doi.org/10.1061/(ASCE)NH.1527-6996.0000460

Eroglu, D.I., Pamukcu, D., Szczyrba, L., & Zhang, Y. (2020). Analyzing and contextualizing social vulnerability to natural disasters in Puerto Rico. *ISCRAM 2020 Conference Proceedings–17th International Conference on Information Systems for Crisis Response and Management*, Virtual.

Szczyrba, L., Zhang, Y., & Pamukcu, D., **Eroglu, D.I**. (2020). A Machine Learning Method to Quantify the Role of Vulnerability in Hurricane Damage. *ISCRAM 2020 Conference Proceedings–17th International Conference on Information Systems for Crisis Response and Management*, Virtual.

In Progress

Eroglu, D.I., Seref, O., & Seref, M. M. H. Social media platforms from a decision science lens: A data-driven typology. To be submitted to *Management Information Systems Quarterly*.

Eroglu, D.I., Seref, O., & Seref, M. M. H. When the views change: A mixed-methods approach to analyze persuasive communication on Reddit. To be submitted to *Information Systems Journal*.

Eroglu, D.I., & Seref, O. Towards civilized digital spaces: Analyzing effect of news media platforms on conversation toxicity. To be submitted to *Journal of AIS*.

Venkatesh, V., & **Eroglu, D.I.** Emerging Social Media Use Patterns and their Effect on Underprivileged People in India during COVID-19.

Venkatesh, V., & **Eroglu, D.I.** Role of Social Media during COVID-19 in India: Effect of Personality on Coping and Suicidal Behavior. To be submitted to *Personality and Individual Differences*.

Eroglu, D.I., & Seref, O. Networked media and digital society: a simulation-based framework to study opinion dynamics in social networks". To be submitted to *Information Systems Journal*.

Eroglu, D.I., & Seref, O., Seref, M. M. H. Bridging Classification and Visualization for Persuasion Detection on an Online Discussion Platform. Presented in 2020 INFORMS Workshop on Data Science, and To be submitted to *Information Systems Research*.

Eroglu, D.I., & Iyigun, C. A Unified Approach for Center-Based Clustering Problems on Networks. To be submitted to *European Journal of Operations Research*.

CONFERENCE PRESENTATIONS

Eroglu, D.I., Seref, O., Seref, M.M.H. (2021). Digital Platforms and Echo Chambers: A Comparison of News Platforms and Social Media, 2021 INFORMS Annual Meeting, Anaheim, CA, USA, October 24-27.

Seref, O., Seref, M.M.H., **Eroglu, D. I.** (2021). An Analysis Of Social Media Posts On Covid-19 Vaccine Using Context Maps, 2021 INFORMS Annual Meeting, Anaheim, CA, USA, October 24-27.

Eroglu, D.I., Seref, O., Seref, M.M.H. (2021). Changing Views: Pre-suasion in a Reddit Discussion Community, 2021 AMCIS (Americas Conference on Information Systems), Virtual.

Eroglu, D.I., Seref, O., Seref, M.M.H. (2020) "I Agree, But": A Study On Persuasion In Online Debate Platforms, 2020 INFORMS Annual Meeting, Virtual.

Eroglu, D.I., Seref, O., Seref, M.M.H. (2020) Bridging Classification and Visualization for Persuasion Detection on an Online Discussion Platform, INFORMS Data Science Workshop, 2020.

Eroglu, D.I., Seref, O. (2019) A Simulation-Based Framework to Study Opinion Dynamics in Social Networks. 2018 INFORMS Annual Meeting, Seattle, WA, USA, October 20-23.

Iyigun, C., **Eroglu, D. I.** (2018) Soft Clustering Problems on Networks. 2018 INFORMS Annual Meeting, Phoenix, AZ, USA, November 4-7.

Eroglu, D. I., Pamukcu, D., Iyigun, C. (2018) Genetic Algorithm for Capacitated Single Allocation Hub Location Problem. 2018 INFORMS Annual Meeting, Phoenix, AZ, USA, November 4-7.

Eroglu, D. I., Pamukcu, D. (2016) A Stochastic Program for Debris Collection Problem. 2016 INFORMS Annual Meeting, Nashville, TN, USA, November 13-16.

Pamukcu, D., **Eroglu, D. I.,** Iyigun, C., (2017) A Stochastic Program for Debris Collection Problem. 37th National Congress on Operations Research and Industrial Engineering, Istanbul, Turkey, July 5-7.

TEACHING EXPERIENCE

Instructor of Record, Business Information Technology, Pamplin School of Business, Virginia Tech (Fall 2021)

BIT 2406 – Business Statistics, Analytics & Modeling (Hybrid)

- BIT 2406 is an undergraduate core (required) course that is required by various programs in the Pamplin College of Business, such as Business Information Technology, Accounting, Finance, and Marketing. Therefore, students have diverse backgrounds and interests, which creates the need to tailor the course content and delivery accordingly. Furthermore, this is the first class in which the concept of modeling and optimization is introduced to the students.
- The two sections (in-person and online) combined were approximately 67 students, 60 in-person and 7 online, which is consistent with the average class size of the course. The course is mostly taken by sophomores.
- Designed the entire course based on the course textbook and its supplementing materials. The course textbook is *Introduction to Management Science, 13th Edition by Bernard Taylor, III.*
- Received monthly feedback from the students and made adjustments to the course design to respond to their needs better.
- Topics Covered: Linear Programming, Optimization, Mathematical Models (Assignment, Transportation, Portfolio Optimization, Scheduling, Production Planning, Blending Problems), Network Optimization Models and Algorithms, Multicriteria Decision Making, Decision Analysis, Forecasting Methods.
- SPOT Feedback for Overall Effectiveness: 4.46/6.00 (In-Person) and 5.25/6.00 (Online)

Teaching Assistantship Overview (Fall 2015 – Spring 2022, summary of two institutions)

Operations Research – Linear Programming, Integer Programming, Management Science and Multi-Criteria Decision Making, Project Management, Production Planning, Inventory Planning, Work Systems Analysis and Design

Computation and Programming – Programming with MATLAB, Visual Basic, Visual Basic for Applications (VBA), R

Data Analytics – Statistical Methods, Forecasting, Machine Learning Models, Data Mining Methods, Text Mining, Management Information Systems, Data and Ethics, Cybersecurity Analytics

Graduate Teaching Assistant, Business Information Technology, Pamplin School of Business, Virginia Tech (Fall 2018 – Present)

BIT 5534 – Applied Business Intelligence and Analytics (Dr. Onur Seref) – 3 semesters
BIT 4984 – Fair Data (Dr. Idris Adjerid) – 1 semester
BIT 4464 – Advanced Supply Chain Management (Dr. Barbara Fraticelli) – 1 semester
BIT 3444 – Advanced Business Computing and Applications (Dr. Onur Seref and Dr. Ralph Badinelli) – 2 semesters
BIT 2406 – Business Statistics, Analytics & Modeling (Dr. Barbara Fraticelli) – 1 semester
BIT 4984 – Security Analytics (Dr. Idris Adjerid) – 1 semester

Graduate Research and Teaching Assistant, Industrial Engineering, METU (Fall 2015– Spring 2018)

Industrial Engineering Courses Assisted
IE251 – Linear Programming (Dr. Omer Kirca and Dr. Sinan Gurel) – 3 semesters
IE206 – Scientific Computing for Industrial Engineering (Dr. Cem Iyigun) – 3 semesters
IE323 – Production and Service Operations Planning
IE333 – Work Systems Analysis and Design (Dr. Melih Celik and Dr. Sakine Batun) – 1 semester
IE4903 – Special Topics in IE: Introduction to Data Mining (Dr. Cem Iyigun) – 3 semesters
IE4907 – Special Topics in IE: Multi-Objective Combinatorial Optimization (Dr. Banu Lokman) – 1 semester

Engineering Management Graduate Courses Assisted
EM522 – Data Mining for Business Intelligence (Dr. Cem Iyigun) – 1 semester
EM523 – Monte Carlo Simulation for Operations Analysis (Dr. Mustafa Kemal Tural) – 1 semester
EM501 – Management Accounting and Engineering Economics (Dr. Canan Sepil) – 1 semester

Student Assistant, Industrial Engineering, METU (Spring 2015)
IE304 – Production and Service Information Systems (Dr. Cem Iyigun) – 1 semester

ACADEMIC EXPERIENCE

Graduate Research Assistantship, Business Information Technology, Pamplin School of Business, Virginia Tech (Fall 2018 – Present)

Digital Platforms and Echo Chambers: An Analysis of Bias and Toxicity of News Platforms (Fall 2021 – Present)

- Formulated a research idea based on the news platforms' media bias and platform features
- Analyzed over 50 news platforms categorized by media bias in terms of commenting features
- Collected comment data from a sample of selected news platforms using Python Selenium
- Analyzed the collected data using Doc2Vec and dimension reduction techniques, which indicated discursive differences in different platforms' comments

Social Media Platforms From a Decision Science Lens: A Data-Driven Typology (Fall 2021 – Present)

- Developed a research design to build a typology of social media platforms based on how social media platforms are grouped and how are the social media platform features used
- Performed a digital ethnographic analysis on over 60 different social media platforms to collect which features exist in the platforms

4

- Designed a survey from an inductive epistemological perspective
- The analysis will be based on Analytical Hierarchical Processing which is a technique from Marketing and Decision Sciences fields

When the Views Change: Design-Motivated Persuasive Communication on a Reddit Community (Fall 2020 – Present)

- Formulated research questions with the objective of having a better understanding of a particular discussion community
- Built a theoretical model which is grounded on a cognitive psychology theory called Elaboration Likelihood Model
- Designed a Mixed-Methods approach that has Qualitative and Quantitative components to test the research model, which includes a qualitative and quantitative study
  o Qualitative study is a content analysis that entails categorizing the social media posts
  o Quantitative study is a survey methodology to test the theoretical model, which incorporates the Qualitative Study

Bridging Classification and Visualization for Persuasion Detection on an Online Discussion Platform (Summer 2020)

- Collected text data from a discussion community on Reddit using Reddit API on Python, and preprocessed the data using Python's nlp libraries
- Represented the collected data numerically using Doc2Vec method and dimensionality reduction techniques and built an interactive visualization of the entire corpus
- Implemented a Deep Learning method (bi-LSTM) to detect the persuasive content in the community
- Our findings showed that the developed implementation has limitations on the dataset and the limitations are analyzed using previously developed vector representation to extract the patterns and understand the behavior of the black-box implementation

"I Agree, But…": A Causal Analysis of Persuasion in The Online Debate Platforms (Spring 2020 – Fall 2020)

- Developed an econometric model to unravel the causal mechanisms of persuasion in a discussion community on Reddit
- Proposed a logistic regression approach that uses successful persuasion as a dependent variable and content-related and engagement-related features as independent variables
- Potential limitations and confounding variables are analyzed and discussed

Opinion Dynamics and Simulation of Social Media (Spring 2019 – Fall 2019)

- Developed a Design Research framework to understand the effect of social network's features and the polarity of the provided content on information flow and collective opinion about a dichotomized topic (e.g. politics) on social media
- The framework is a two-step approach; simulation and machine learning.
  o Implemented simulation on MATLAB to simulate the information flow on the network and measure the evolution of collect opinion over time
  o Leveraged machine learning to interpret the simulation results and unravel potential mechanisms of the collective opinion formation

Social Movements and Social Media: An Affordance Perspective (Spring 2019)

- Performed a conceptual analysis and literature search on how social movements are formed on social networking sites
- Based on existing theories about social movements in the literature, developed a new theory named *Theory of Online Mobilization*

Data Collection for Dr. Idris Adjerid (Fall 2018 – Spring 2019)

- Helped one of the projects of Dr. Adjerid with cleaning and annotation of an e-commerce dataset

#MeToo Movement: an Analysis of Twitter (Fall 2018)

- Collected Twitter data related to #MeToo movement on Python
- Tweets are analyzed using topic modeling and are analyzed using statistical analysis techniques
- The findings show that tweets can be used to measure the community's attitude and subjectivity towards the ongoing themes associated with the movement

Summer Research Assistantship for Dr. Viswanath Venkatesh, Business Information Technology, Pamplin School of Business, Virginia Tech (May-August 2021)

- Developed 5 different ideas on a project about coping with stress during COVID-19 and social media in India, and developed paper outlines
- Worked on ways to analyze WhatsApp data using text analytics techniques
- Read coping theories in the IS and Psychology literature
- Analyzed personality and coping realms of the social media literature in the IS discourse

Project Member, SBE-RCUK: The Geopolitical Orientations of People in Borderland States (Principal Investigator: Dr. Gerard Toal), National Science Foundation, (May 2021 – July 2021)

- Worked on a number of datasets and employed exploratory text analytics methods for the following purposes:
- Analyzing multiple corpora to understand the media perception about international politics and hybrid warfare
- Collecting and analyzing news outlet data from 1900 to 2020 to analyze the evolution of media discourse on international politics over time

Project Member, Exploring Social Media Misinformation and the COVID-19 Vaccine in Southwest Virginia (Investigators: Dr. Onur Seref and Dr. Michelle Seref), National Science Foundation (December 2020 – February 2021)

- Collected text data from Twitter, Reddit, and Fox News to analyze social media discourse about opinions on COVID-19 vaccine and understand drivers of vaccine hesitancy

Associate Collaborator, Statistical Applications and Innovations Group, College of Science, Statistics Department, Virginia Tech, Blacksburg, VA (January 2020 – May 2021)

- Guided students from any Virginia Tech graduate program on their data collection, analysis, and method interpretation. The primary focus of the projects was multivariate methods and machine learning

Graduate Research Assistantship, Industrial Engineering, Middle East Technical University (METU), Ankara, Turkey (August 2015 – August 2018)

A Unified Approach for Center-Based Clustering Problems on Networks, Fall 2017 – Fall 2018

- Worked on Network Clustering problems' theoretical properties under different distance metrics (Euclidean and squared Euclidean) and objective functions (fuzzy assignment and hard assignment)
- Built a framework based on the similarities and differences of different Network Clustering problems and explored properties of objective functions
- Developed mathematical proofs for objective functions' properties and cluster centroid locations at optimality
- Generated problem instances to test the developed solution method
- Built a Genetic Algorithm to solve the problem on MATLAB. The algorithm solved the models within the time limits and outperformed the problems in the literature.

A Genetic Algorithm for Capacitated Single Allocation Planar Hub Location Problem, Spring 2017

- Developed a solution method for the Capacitated Single Allocation Planar Hub Problem, which is an NP-hard problem
- Developed a Genetic Algorithm on MATLAB which is able to provide good solutions (2% deviation to the known optimal solutions) within seconds
- The solution method is applicable to strategic decision-making problems such as airline hub location, telecommunication network hub location, and courier network distribution center location

Stochastic Extension of a Debris Collection Problem, Spring 2016 – Fall 2016

- Debris collection problem is studied as it is a substantial step in the aftermath of a disaster
- Stochastic extension to a deterministic debris collection formulation is developed. The formulation included decisions for collection, transportation, reduction, recycle, and disposal of debris in the aftermath of disaster, as well as location of debris processing sites, selection of processes to make available at each site, and capacities of processing facilities.
- The stochasticity nature of the problem comes from the debris material that will need processing after disasters of varying types and magnitudes.
- The solution method, which is an L-Shaped Method (a decomposition algorithm for stochastic programs), is implemented on Java. The analysis shows that there is a significant value the stochastic solution brings, which increases with the type of potential disasters that can be observed.

7

Project Member, Recommendation System for Threat Evaluation and Weapon Allocation of Hisar Missile Systems, Aselsan, Ankara, Turkey with Dr. Omer Kirca, Dr. Ismail Bakal, and Dr. Derya Dinler (October 2015 – April 2018)

- Defined the problem and determined the requirements based on military personnel and hardware engineers' input using various qualitative methods
- Built a mathematical model constraints of which is tailored to the missile system of interest
- Built a recommendation system that finds the heuristic solution to a scheduling problem in real time
- The developed algorithm is implemented in surface-to-air Hisar missile systems to provide real time recommendations to the missile operators

Project Member, Leveraging Digital Channels to Maintain Loyalty of University Students as Is Bank Customers After Their Graduation, Is Bank, Istanbul, Turkey with Dr. Murat Koksalan and Dr. Cem Iyigun (June 2014 – May 2015)

- Performed market research to understand existing products and potential product opportunities for college students
- Analyzed millions of customers' data using Machine Learning algorithms (primarily classification trees) to understand their current technology use and drivers of discontinuity
- Performed a survey to understand customers' bank preferences after graduation and potential drivers
- Made suggestions to Digital Banking department based on gained insights and market research

AWARDS & CERTIFICATES

Outstanding Reviewer Award, 30th European Conference on Information Systems (ECIS), 2022

Summer Research Grant, Business Information Technology, Virginia Tech, May-August 2019, 2020, and 2022

Pathways Grant for Program Assessment and Data Review, Virginia Tech, 2022

Research Grant, SBE-RCUK: The Geopolitical Orientations of People in Borderland States (Principal Investigator: Gerard Toal), National Science Foundation, May 2021 – July 2021

Summer Project Grant with Dr. Viswanath Venkatesh, Business Information Technology, Virginia Tech, May-August 2021

Research Grant, Exploring Social Media Misinformation and the COVID-19 Vaccine in Southwest Virginia (Investigators: Dr. Onur Seref and Dr. Michelle Seref), National Science Foundation, December 2020 – February 2021

Future Professoriate Certificate, Virginia Tech, Spring 2021

Social and Behavioral Research Certificate, CITI, Virginia Tech, Spring 2021

2015-2016 Academic Year Graduate Courses Performance Award, METU, 2017

Graduate Student Scholarship, METU, Fall 2015 – Spring 2018

Dean's High Honor and Honor List, METU, 2011 – 2015

COMPUTER SKILLS

Programming

Python - Advanced
- Data Collection with API
- Web Crawling with Automated Browser
- HTML Processing
- Natural Language Processing
- Visualization with matplotlib and dash plotly
- Machine Learning Implementations
- Deep Learning Implementations with Tensorflow

MATLAB - Advanced
- Data Processing
- Scientific Computation
- Heuristic Optimization

Java – Intermediate
- Optimization with CPLEX
- Object-Oriented Programming
- Scientific Computation

Other Languages: GAMS (Intermediate), Cplex (Intermediate), Visual Basic for Applications (Intermediate), C# (Basic), R (Basic), MsSQL (Basic), C (Basic), Visual Basic (Basic)

Package Software and Platforms

Qualtrics, WordPress, Minitab Statistical Software, SAS JMP, Cplex OPL, ARENA Simulation Software, Yasai, XLMiner

SERVICE TO PROFESSION

Paper Reviews

The European Conference of Information Systems (ECIS) – 2020, 2022
Information Systems for Crisis Response and Management (ISCRAM) – 2020, 2021, 2022
The Conference on Information Systems & Technology (CIST) – 2021
Americas Conference on Information Systems (AMCIS) – 2021
Heliyon – 2018

Memberships

Association for Information Systems (AIS), 2020 – Present
The Institute for Operations Research and the Management Sciences (INFORMS) – Data Mining Section, 2015 – Present
Association for Computing Machinery (ACM), 2022 – Present

Service to Conferences

The Institute for Operations Research and the Management Sciences (INFORMS), 2021 and 2022, Session Chair

Information Systems for Crisis Response and Management (ISCRAM) 2021, Poster Track Co-Chair

The Institute for Operations Research and the Management Sciences (INFORMS) 2020, Volunteer for Virtual Support

Service to Institution, Virginia Tech, 2018 – 2022

Book Editor and Publishing Assistant
- Formatted and/or reformatted Dr. Venkatesh's manuscripts
- Collected information about copyright licensing and Creative Commons licensing
- Managed open-access publication process of the book *Road to Success: A Guide for Doctoral Students and Junior Faculty Members in the Behavioral and Social Sciences*
- Supported open-access publication of a new manuscript, which is expected to be published by early 2023

Website Developer and Manager
- Built and documented Dr. Venkatesh's personal website on WordPress
- Maintained the website in terms of keeping functionality and keeping the content up-to-date
- Supported managing his online presence in various research platforms
- Assisted him in his public communication

Service to Institution, METU, 2015 – 2018

Senior Project (Systems Design) Committee Member
Systems Design Committee manages various stages of the senior project process and guides students for potential problems along the way. The committee performed a wide variety of tasks every year, which are listed below.

- Formed 5-people project groups by collecting requests and preferences
- Contacted companies for projects and setting the scope of the projects with company stakeholders
- Matched project groups with the projects
- Collected preferences of the faculty and matching faculty with the projects
- Guided the project groups for the midsemester and end-of-semester deliverables (presentations and reports)
- Resolved conflicts in case there are problems within the group

Senior Elective Course Committee Member
Elective Course Committee manages the elective course selection and allocation process of the senior students. The committee performed a variety of tasks every year, which are listed below.

- Collected elective course information (syllabus and student quota) from the faculty
- Provided the course information to the students and collecting their preferences
- Ran an assignment model that automatically allocates students to the preferred elective courses within the student quota limits

PROFESSIONAL EXPERIENCE

SAP WM Business Analyst, Information Technologies, Enerjisa, Ankara, Turkey, June 2015 - August 2015

Part-time Software Developer, Information Technologies, Deloitte Consulting, Ankara, Turkey, March 2015 - June 2015

Intern, Digital Banking, Turkiye Is Bankasi, Istanbul, Turkey, August 2014 – Sept. 2014

Intern, Information Technologies, Enerjisa, Ankara, Turkey, July 2014 - August 2014

Intern, Press Department, Oyak Renault Automobile Factory, Bursa, Turkey, July 2013 – Sept. 2013

Intern, Lean Management Department, Karsan Automotive, Bursa, Turkey, July 2012 - August 2012

CAMPUS LEADERSHIP

President, TSA at VT (Turkish Student Association at Virginia Tech), 2021 – Present

Social Media Manager and Directory Board Member, TSA at VT (Turkish Student Association at Virginia Tech), 2019 – 2021, Present

Co-Founder and Assistant Choreographer, Turkish Folk Dance Club, 2020 – Present

Social Media Manager, Ole at VT (Flamenco Dance Group), 2018 – 2019