



**SMU | LYLE**

*Engineering Management, Information, and Systems*  
**Seminar Series**

**Research Seminar**

**Modeling and Data Analysis for COVID-19 Healthcare  
Demand Projections in Arizona**



**Dr. Esma Gel**  
**Associate Professor**  
**School of Computing, informatics, and**  
**Decision Systems Engineering**  
**Arizona State University**

**Friday, March 5, 2021**  
**11:00 a.m. – 12:15 p.m.**

**Zoom link: <https://smu.zoom.us/j/95095343594>**

**Abstract:** Beginning in March 2020, the U.S. emerged as the global epicenter for COVID-19 cases with little to guide policy response in the absence of extensive

data available for reliable epidemiological modeling in the early phases of the pandemic. While Arizona policymakers relied initially on state-by-state national modeling projections from different groups outside of the state, we sought to create a state specific model using a mathematical framework that ties disease surveillance with the future burden on Arizona's healthcare system. Our framework uses a compartmental system dynamics model using a SEIRD framework that accounts for multiple types of disease manifestations for the COVID-19 infection, as well as the observed time delay in epidemiological findings following public policy enactments. This talk will present our findings and experiences with using the model in different stages of the pandemic. In particular, it will focus on the use of different sources of data to fit the various model parameters to obtain reliable projections for Arizona between April 2020 and January 2021.

**Biography:** Gel's research focuses on the use of stochastic modeling and control techniques for the design, control and management of operations in various settings, with emphasis on manufacturing and service systems, business and logistics processes, and health care systems. Since the beginning of the COVID-19 pandemic, she has been working as the lead modeler for the Modeling Emerging Threats for Arizona (METAz) workgroup of ASU with a group of epidemiology and public health experts. The projections produced by the group have been able to predict trends in hospitalization and deaths from May 2020 to present and is informing projection updates provided to the Arizona Department of Health Services by ASU. Gel's work has been published in leading journals of her field and funded by the National Science Foundation as well as several industrial partners such as Intel and Mayo Clinic. Gel holds a B.S. degree in Industrial Engineering from Middle East Technical University, Turkey, and M.S. and Ph.D. degrees in Industrial Engineering from Northwestern University, obtained in 1995 and 1999, respectively.