Temple University
College of Engineering

## Summer Research Webinar Series

**Friday, June 5, 2020**
**12:00 PM - 1:00 PM**
**Zoom Video Conference**

# Flattening the Curve: COVID19 Pandemic from a Control Systems Perspective

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**Abstract:**
The coronavirus SARS-COV2 has triggered the global pandemic COVID-19 in December 2019 taking a heavy toll on human lives and global economy. As of May 26, 2020, this respiratory disease has infected over 5.5 million people in 216 countries around the world causing over 346 thousand deaths including close to 100,000 deaths in the USA. For lack of a vaccine, many local and state governments have resorted to strict stay-at-home orders and shuttering of businesses to suppress the virus transmission although there are long term economic impacts. We are constantly reminded by the news media and government officials that these actions help "flatten the curve". This raises many questions in everybody's mind. What exactly is meant by "flattening the curve" and how does it help minimize the infection rate and fatalities? How long would we have to wear face masks and follow stay-at-home orders? What is the projected number of temporary hospital beds that will be required for patient care? What is the estimated number of fatalities? Would there be a second wave? When could the stay-at-order be lifted without triggering a second wave? … and many more…

This research provides answer to these and many more questions based on control systems concepts. Using the epidemiological model of virus transmission and concepts of optimal control, this research formulates the virus intervention problem as a mathematical optimization problem, and seeks answer to the above questions. Simulation results will be presented on the impacts of various intervention methods and possible outcomes for failure to follow the government guidelines.