

# The Epidemiology and Economics of Physical Distancing during Infectious Disease Outbreaks

**Prof. Troy Day**

Professor, Head of Department  
Department of Mathematics and Statistics  
Queen's University, Canada

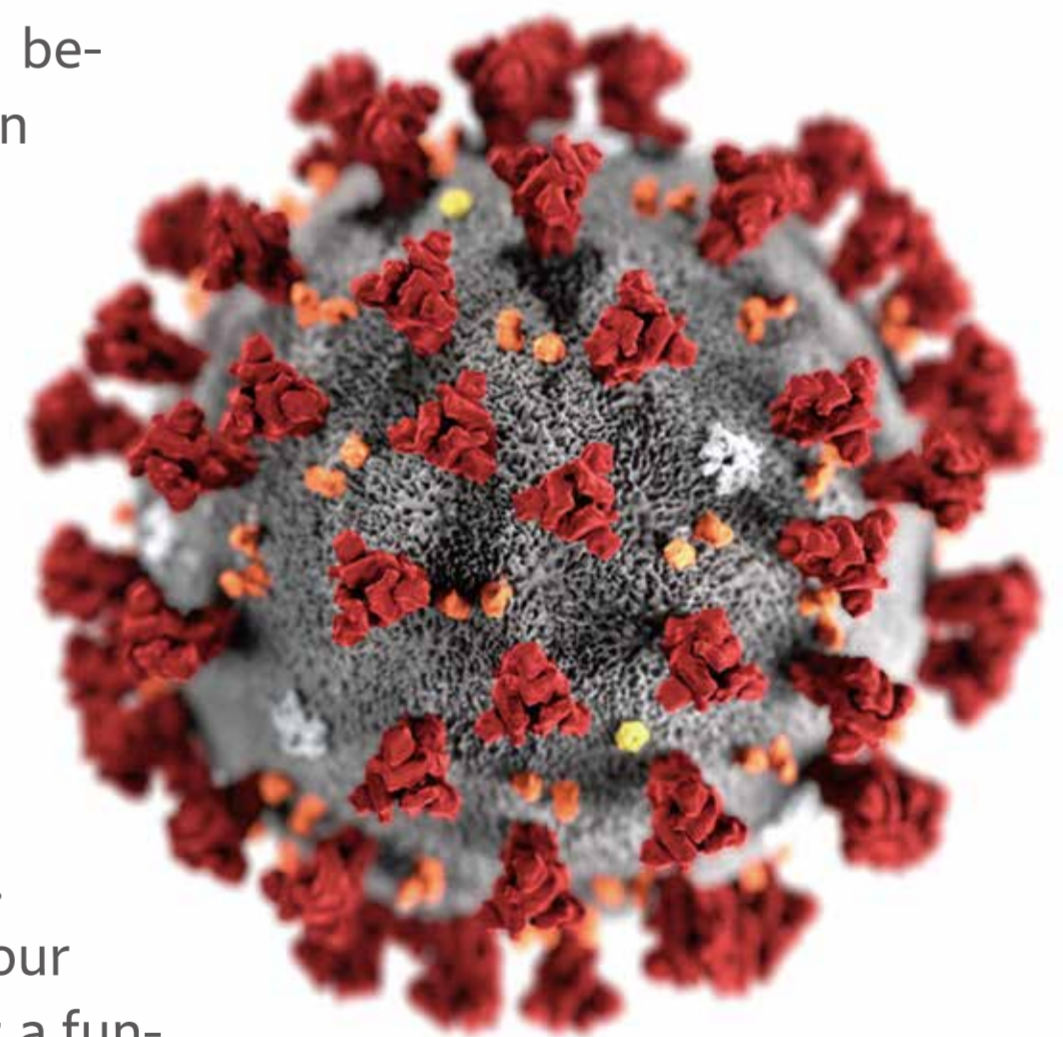


2022 **12/14** Wednesday **11:00 am - 12:30 am (JST)**

via Zoom  
Register here →



People's incentives during an infectious disease outbreak influence their behaviour, and this behaviour can impact how the outbreak unfolds. Early on during an outbreak, people are at little personal risk of infection and hence may be unwilling to change their lifestyle to slow the spread of disease. As the number of cases grows, however, people may then voluntarily take extreme measures to limit their exposure. Political leaders also respond to the welfare and changing desires of their constituents, through public health policies that themselves shape the course of the epidemic and its ultimate health and economic repercussions. In this talk I will use ideas from the study of differential games to model how individuals' and politicians' incentives change during an outbreak, and the epidemiological and economic consequences that ensue when these incentives are acted upon. Motivated by the COVID-19 pandemic, I focus on physical distancing behaviour and the imposition of stay-at-home orders by politicians. I show that there is a fundamental difference in the political, economic, and health consequences of an infectious disease outbreak depending on the degree of asymptomatic transmission. If transmission occurs primarily by asymptomatic carriers, then politicians will be incentivized to impose stay-at-home orders earlier and for longer than individuals would like. Despite such orders being unpopular, however, they ultimately benefit all individuals. On the other hand, if the disease is transmitted primarily by symptomatic infections, then individuals are incentivized to stay at home earlier and for longer than politicians would like. In this case, politicians will be incentivized to impose back-to-work orders that, despite being unpopular, will again ultimately be to the benefit of all individuals.



This is joint work with David McAdams, Fuqua School of Business and Economics Department, Duke University.

