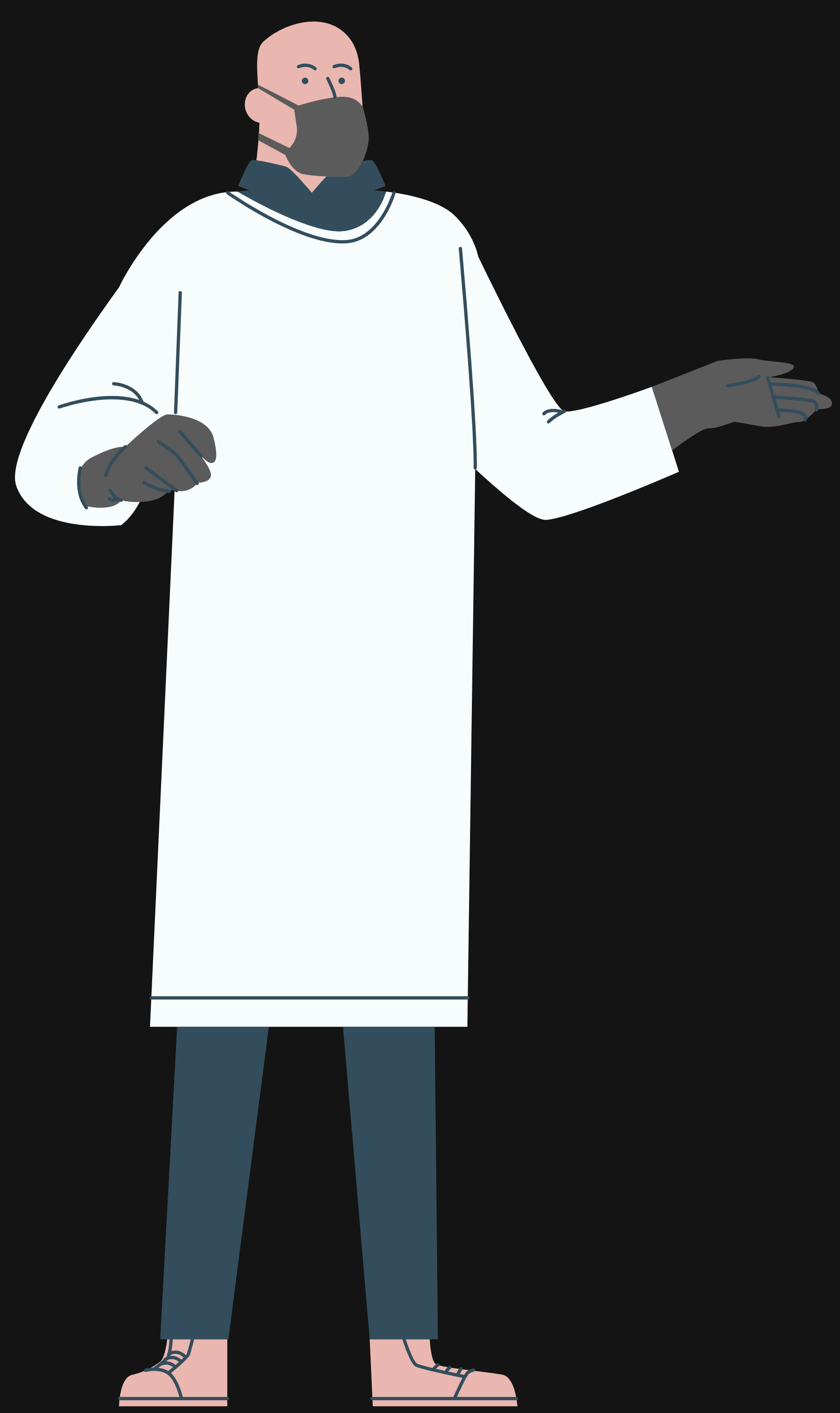
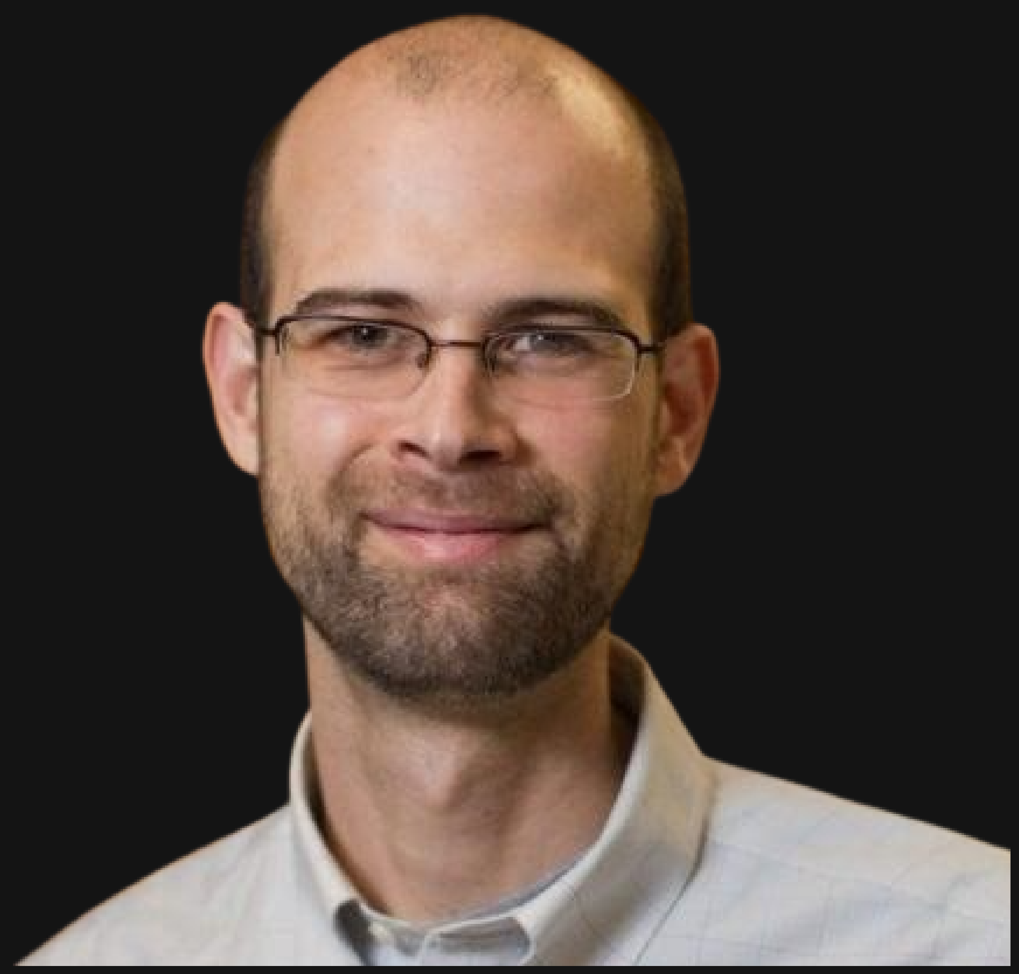
MODELING COVID-19

SEMINAR BY
UGA STAT CLUB



Dr. John Drake

Director of the Center for the Ecology of Infectious Diseases



THU 15 APR @ UGA BOTANICAL GARDENS**	**SEMINAR @ 4.30 PM + DINNER @ 6.00 PM**	LIVE **IN-PERSON + LIVE OVER ZOOM**

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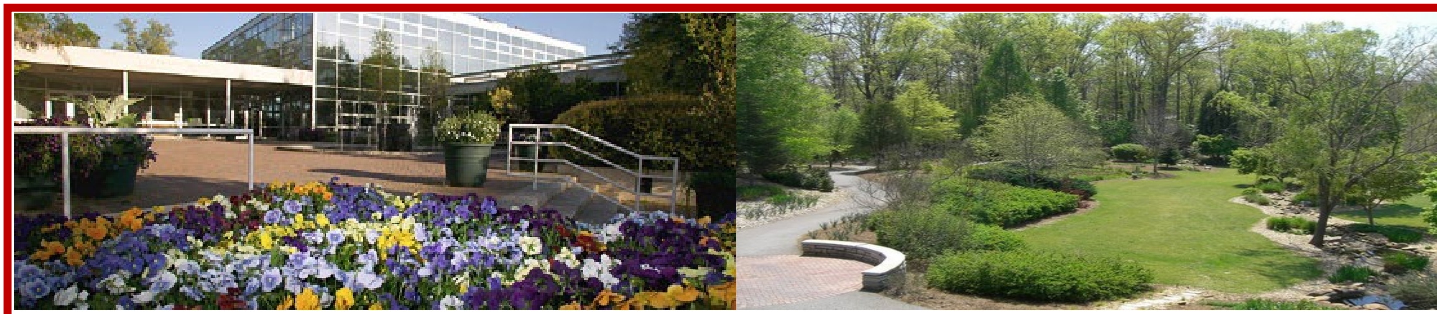
** COVID-19 HEALTH AND SAFETY PROTOCOLS WILL BE FOLLOWED.



THE UNIVERSITY OF GEORGIA
DEPARTMENT OF STATISTICS

John Drake

Odum School of Ecology

University of Georgia

4:30 PM, Thursday, Apr 15, 2021

Semi-automated Modeling of COVID-19 in the United States

We present a stochastic model for the transmission of the SARS-CoV-2 virus from March 2020 through the present in all states of the United States, for inference, forecasting, and scenario analysis. The model is a modified SEIR type stochastic model, with compartments for susceptible, latent, asymptomatic, undetected and detected symptomatic, diagnosed, hospitalized, recovered, and deceased. Compartments are split into multiple sub-compartments using the linear chain trick to allow for more realistic distributions of movement through compartments. Model features include realistic interval distributions for presymptomatic and symptomatic periods; independent rates of transmission for asymptomatic, presymptomatic, and symptomatic individuals; time varying rates of case detection, isolation, and case notification; and realistic intervention scenarios. To model the effect of human behaviors on transmission, we include a relative human mobility covariate based on state-level cellular phone data, as well as a state-specific latent trend process, modeled using a fitted spline, that allows transmission to vary over time due to environmental factors and other behaviors that can reduce transmission but are difficult to measure (e.g. wearing a facemask). Fixed model parameters are defined using clinical outcome reports, and the model is fit to case and death reports for each state. We currently consider three scenarios for each state based on a change in relative human mobility; namely, return to pre-outbreak baseline mobility (i.e. normal mobility), maintenance of last measured mobility (i.e. status-quo mobility); and further reduction to 30% of baseline (i.e. shelter-in-place mobility).