1163-92-1035 **Evan Milliken*** (evan.milliken@louisville.edu), Department of Mathematics, 328 Natural Sciences Bldg, University of Louisville, Louisville, KY 40292. *Deterministic and stochastic models COVID-19 with vaccination.* Preliminary report.

SARS-CoV-2, the virus which causes COVID-19, rapidly spread around the world during 2020, resulting in a global pandemic. An unprecedented global effort has been made to develop a vaccine to control the spread of this virus and the resulting deadly disease. Recently, studies indicating rapid declines in antibody levels and controversial reports of reinfection have led to speculation of waning immunity to the disease and, potentially, to vaccines in development. Existing research on deterministic mathematical models which include waning immunity and vaccination have variously indicated the possibility of backward bifurcation or the rise of large-scale oscillations. In this talk, deterministic and stochastic models of the population-level spread of SARS-CoV-2 are presented and analyzed. Results are discussed through the lens of implications for vaccination policy. (Received September 14, 2020)