1163-62-404 **Wen-Hao Chiang**, **Xueying Liu** and **George Mohler*** (`gmohler@iupui.edu`), 105 E Westfield Blvd, Indpls, IN 46220. *Hawkes process modeling of COVID-19 with mobility leading indicators and spatial covariates.* Preliminary report.

Hawkes processes are used in machine learning for event clustering and causal inference, while they also can be viewed as stochastic versions of popular compartmental models used in epidemiology. Here we show how to develop accurate models of COVID-19 transmission using Hawkes processes with spatial-temporal covariates. We model the conditional intensity of new COVID-19 cases and deaths in the U.S. at the county level, estimating the dynamic reproduction number of the virus within an EM algorithm through a regression on Google mobility indices and demographic covariates in the maximization step. We validate the approach on short-term forecasting tasks, showing that the Hawkes process outperforms several benchmark models currently used to track the pandemic, including an ensemble approach and an SEIR-variant. We also investigate which covariates and mobility indices are most important for building forecasts of COVID-19 in the U.S. (Received September 05, 2020)