Exposé Master Thesis

Aim

To help produce forecasts of cases, effective reproductive numbers, intensive care bed needs and other useful quantities in the current Covid-19 pandecmic.

Methods and Project Parts

Forecasting

- explore different methods and model classes to produce probabilistic forecasts
  - ARIMA models
  - State Space Models
  - Bayesian Structural Time Series
  - Neural Networks
  - partly mechanistic epidemiological models (forecast a trajectory of R_t, the average number of people infected by each ill individual and use a mechanistic model to generate case predictions from that)
- explore ways to find appropriate windows for the data to be included and sensible forecast horizons
  - might involve change point detection or optimising predictive scores

Evaluation

- look at sensible proper scoring rules for probabilistic forecasts
- determine a frame work to sensibly make model choices

Model Stacking and post-processing

- combine models to a reasonable ensemble
  - find an appropriate method, e.g. non-homogeneous regression, stacking and implementation
- find a way to do post-processing of forecasts to achieve better calibration