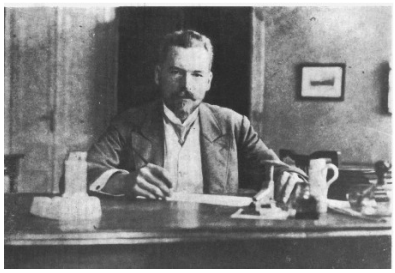

Contribution ID: **52** Type: **30 minute lecture**

Using stochastic models to describe the coronavirus epidemic

Thursday, 3 December 2020 09:30 (30 minutes)

In December 2019, a novel new strain of coronavirus (COVID-19) was identified as it spread through China and subsequently throughout the world, resulting in a pandemic. As the health systems became overwhelmed, a need arose for real-time surveillance and modelling to identify the breaking points caused by increased numbers of infections and hospitalised individuals. We combined surveillance data for Scotland, detailing new COVID-19 cases, deaths, hospitalisations and critical care beds, with a modified stochastic Susceptible Exposed Infected Recovered Hospitalised Critical Dead (SEIR-HCD) model. The model parameters are adjusted daily, to fit the real-world data, using a Bayesian statistical particle filtering technique. The estimation technique uses an acceptance/rejection method combined with correlated multi-dimensional diffusion and drift model to effectively search the parameter space. We show close agreement between data and model output and discuss how changes in parameters reflect the changing transmission dynamics of the virus and severity of the disease.

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