**Speaker: Jonathan Bartlett (LSHTM)**

**Date: 15/12/2024 at 16:00 in 4 West 1.7**

**Title: G-formula for causal inference via synthetic multiple imputation**

**Abstract:**
G-formula or G-computation is a popular approach for estimating treatment or exposure effects from longitudinal data that are subject to time-varying confounding. G-formula estimation is typically performed by Monte-Carlo simulation, where potential outcomes under the treatment regimes of interest are simulated from models fitted to the original dataset. Inference for the resulting estimates is usually performed using bootstrapping.

In practice the dataset to be analysed often has missing values, which are commonly handled using the method of multiple imputation (MI). I will talk about how Bayesian multiple imputation methods for creating synthetic datasets can be used to perform G-formula for causal inference, and that a by-product of this is that we can use multiple imputation to impute both missing values in the original data and missing counterfactual values for the treatment regimes of interest.

I will describe the approach and how it differs from regular multiple imputation for missing data, illustrating its performance in simulations and application using data from cystic fibrosis.