Statistics and Actuarial Science Seminar

Title: Fast and fair simultaneous confidence bands for functional parameters

Speaker: Dominik Liebl (University of Bonn)

Date: Thu 7th November 2019 at 3:00PM

Location: Seminar Room SCN 1.25

Abstract: Quantifying uncertainty using confidence regions is a central goal of statistical inference. Despite this, methodologies for confidence bands in Functional Data Analysis are underdeveloped compared to estimation and hypothesis testing. This work represents a major leap forward in this area by presenting a new methodology for constructing simultaneous confidence bands for functional parameter estimates. These bands possess a number of striking qualities: (1) they have a nearly closed-form expression, (2) they give nearly exact coverage, (3) they have a finite sample correction, (4) they do not require an estimate of the full covariance of the parameter estimate, and (5) they can be constructed adaptively according to a desired criteria. One option for choosing bands we find especially interesting is the concept of fair bands which allows us to do fair (or equitable) inference over subintervals and could be especially useful in longitudinal studies over long time scales. Our bands are constructed by integrating and extending tools from Random Field Theory, an area that has yet to overlap with Functional Data Analysis.