

## Data Science Seminar

Hosted by the Department of Mathematics and Statistics

- Date: Tuesday, March 14, 2023
- Time: 12:00pm - 1:00pm
- Room: Zoom
- Speaker: Dr. Holger Dette (Ruhr-Universitaet Bochum)
- Title: Functional data analysis on Banach spaces.

### ***Abstract***

Functional data analysis is typically conducted within the  $L_2$ -Hilbert space framework. In this talk we go one step further and develop data analysis methodology for functional time series in the space of all continuous functions. The work is motivated by the fact that objects with rather different shapes may still have a small  $L_2$ -distance and are therefore identified as similar when using an  $L_2$ -metric. However, in applications it is often desirable to use metrics reflecting the visualization of the curves in the statistical analysis. We develop two-sample tests as well as confidence bands, as these procedures appear to be conducive to the proposed setting. Particular interest is put on relevant differences; that is, on not trying to test for exact equality, but rather for pre-specified deviations under the null hypothesis. The procedures are justified through large-sample theory. To ensure practicability, non-standard bootstrap procedures are developed and investigated addressing particular features that arise in the problem of testing relevant hypotheses. If time permits, we will extend these results to the function on function linear model using an RKHS approach.

Biography of the speaker: Dr. Dette is a leading researcher in mathematical statistics, in particular in optimal experimental design, time series analysis, functional data, nonparametric statistics and biostatistics. Most of his research is motivated by concrete applications and he is collaborating with several pharmaceutical companies and with the European Medicines Agency (EMA) and the Food and Drug Administration (FDA). Until today he has supervised about 55 PhD students in all areas of statistics has published more than 380 publications in peer reviewed journals. He is a fellow of the American Statistical Association, a fellow of the Institute of Mathematical Statistics, an elected member of the International Statistical Institute and was and is editor of several leading journals in the field.

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