NITheCS
National Institute for
Theoretical and Computational Sciences

NITheCS Colloquium

Monday, 19 September 2022, 16h00 – 17h00 SAST

Prof Stefan Lotz (North-West University & SANSA)

‘Knowledge Discovery in Time Series Data’

ABSTRACT

The abundance of data is a blessing to scientists the world over, enabling us to build better models, make more accurate predictions and ultimately understand our world better. Modern machine learning developed along with the increased volumes of high quality data to the extent that deep neural networks have become inexplicably accurate solvers of complex problems. The downside is that these models are often ‘black-box' in nature, in the sense that we do not understand why or how a certain result was obtained.

With this in mind, we established the project, ‘Knowledge Discovery in Time Series Data’, as the main focus of the NITheCS research programme, ‘Machine Learning in Theoretical and Computational Sciences’.

The project aims to build methods and tools for the interpretation of complex modelling problems in the time-series domain. This means non-stationary, non-Gaussian, non-linear interactions between cause and effect quantities as they show up in the sciences. In this talk, we will introduce the project and discuss the problem of interpretability of time-series problems in the context of deep learning and the tools we are developing to address this issue.

BIOGRAPHY

Stefan is a space physics research scientist based at the SA National Space Agency facility in Hermanus. He obtained his PhD in physics from Rhodes University in 2012.

Stefan holds a C2 rating from the National Research Foundation and an extraordinary professorship at the Faculty of Engineering at North-West University. The affiliation with NWU stems from collaboration with the MUST Deep Learning research unit where the focus is on utilising machine learning for scientific research.

His research interests are space weather, specifically geomagnetically induced currents, solar wind magnetosphere coupling and, more broadly, machine learning and the interpretability of complex models.

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