

NITheCS

National Institute for
Theoretical and
Computational Sciences

NITheCS Mini-School

Tuesday, 3, 10, 17, 24 & 31 August 2021, 14h00 – 15h00

Prof Deepak Kar, Dr Xifeng Ruan and Prof Bruce Mellado (WITS/IThemba LABS)

“Introduction to Big Data and Machine Learning for Particle Physics”



ABSTRACT

The lectures will include an introduction to the Big Data problem in the context of Particle Physics. Data analysis to extract physics measurements at the Large Hadron Collider (LHC) requires dealing with very large data sets, large multiplicity of formats and distributed systems. Machine Learning is extensively used for the analysis of these large data sets. Lectures will include an introduction to the different algorithms and methodologies in Machine Learning used at the LHC. Lectures will be concluded with a practical session on anomaly detection.

For the practical sessions, please install the following on your laptop prior to attending the events:

- [Anaconda 3](http://www.anaconda.com/distribution): www.anaconda.com/distribution
- [Tensor Flow](http://www.tensorflow.org): www.tensorflow.org

CLICK TO REGISTER

Or register at: <https://bit.ly/3rASNJb>

WANT TO FIND OUT MORE?

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BIOGRAPHIES

Prof Deepak Kar

Deepak Kar is currently an associate professor at the School of Physics at WITS. He is an active member of the ATLAS collaboration at the Large Hadron Collider at CERN, having served in several positions of responsibilities inside the collaboration. His book, "*Experimental Particle Physics*", written for students starting in this field and published by the Institute of Physics (UK), goes through all the steps of analysis of data in LHC.

Previously he was a postdoctoral researcher at the University of Glasgow (2012–15) and Technische Universität Dresden (2009–11). He completed his PhD at the University of Florida in 2008, working on a CDF experiment at Tevatron in Fermilab. He loves exploring new places and has been to 78 countries.

Dr Xifeng Ruan

Xifeng RUAN is a senior lecturer at the School of Physics at WITS. He is an experimental particle physicist in the ATLAS experiment at CERN. Dr. Ruan participated directly in the discovery of the Higgs boson. His work involves Standard Model Higgs physics and searching for new particles beyond the Standard Model. He is also specialised in machine learning technique in data analysis. He obtained his joint PhD diploma in 2013 from CAS in Beijing and the University of Paris Sud. He was a postdoctoral researcher at WITS from 2013 to 2016.

Prof Bruce Mellado

With a PhD from Columbia University, Bruce Mellado is a full professor at WITS and Senior Researcher of iThemba LABS. He serves as the Director of the Institute for Collider Particle Physics and chairs the Institutional Board of the Tile Calorimeter of the ATLAS experiment at CERN. He is also the National Contact Physicist of South Africa at the ATLAS experiment. Furthermore, he co-chairs the Nuclear Particle and Radiation Division of South African Institute of Physics.

Prof Mellado has received several awards and fellowships and is a B1 rated researcher of the National Research Foundation of South Africa (NRF). He is an expert on the Higgs boson and was a leading participant in its discovery that was announced in 2012 and which led to François Englert and Peter W. Higgs being awarded the Nobel Prize in Physics in 2013.

Prof Mellado is a member of the Gauteng Premier's Covid-19 Advisory Committee, where he leads work on predictions. He is also co-president of the Africa-Canada Artificial Intelligence Data Modelling Consortium in partnership with York University and other institutions in Africa.

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