

Centre for Atmospheric and Oceanic Science & Divecha Centre for Climate Change
Indian Institute of Science, Bengaluru.

**Summer School on
Big Data Analytics for Ocean, Atmosphere and Climate Research
July 4-22, 2022**

Prof. S. Lakshmivaran

School of Computer Science, University of Oklahoma, USA

Advances in sensing and observation, wireless communication, storage, and computing have led to data-rich regimes and the explosion of interest in Data Science/Bigdata Analytics (DS/BDA). DA/BDA is multidisciplinary but at its core is founded on three pillars – data mining (DM) dealing with model development, data assimilation (DA) specializing in model parameter estimation, and prediction (P) which is generalization/extrapolation. Tools required are classical and high dimensional probability and statistics, multivariate calculus and optimization, algorithmic complexity, concepts and tools from AI and Machine Learning, and numerical simulation. The course will include the following: Historical evolution of Data Science, AI and its interplay, challenges in BDA, an overview of statistical estimation, Optimization algorithms, supervised and unsupervised learning – classification and clustering, modeling using least squares, ridge regression, neural networks – shallow and deep varieties, dimension reduction based on PCA and random projection.

The Goal of this summer school is to provide a broad overview of tools and methods for the analysis of large spatiotemporal data sets that arise in Ocean, Atmosphere, and Climate Science.

Modus Operandi: Three one-hour lectures each day with two in the morning and one in the afternoon. Afternoon sessions will include tutorials on basic mathematical aspects and applications. Lecture notes will be provided.

Prerequisites: The lectures will be aimed at first-year graduate students. Good working knowledge of basic calculus, linear algebra, probability, and statistics along with good programming experience will be assumed.

Participation: The course is free and will be held in both online and in-person modes. In-person attendance and tutorials are limited to 30 participants. Travel/accommodation support not provided. Registration is mandatory. **Applications accepted until 10-06-22.** Apply by submitting this form: <[Big Data Analysis for Ocean, Atmosphere and Climate: 4-22 July, 2022, Indian Institute of Science \(google.com\)](#)>. **Selected candidates will be notified** through email by **17-06-22**.

Course coordinator and contact: Dr. Ashwin K. Seshadri. e-mail: ashwins@iisc.ac.in

Jointly organized by Divecha Centre for Climate Change (DCCC) & Centre for Atmospheric and Oceanic Science (CAOS), Indian Institute of Science, Bengaluru.

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