Basic Biology for Engineers & Big Data Analysis

Course Title	**OMICS Technologies: Devices, Statistics & AI/Machine Learning**
Course Category	Pedagogy / **Specialized Skills**/ **Research**/ Generalized skills
Relevant Discipline(s)	Artificial Intelligence & Machine Learning, Data Science, Bioengineering
Duration of course in equivalent integer no. of days (min 3 days, 1 day = 6 hrs of lectures/hands on sessions)	3 days
Proposed dates	Nov 27-29, 2020 & Dec 4-6, 2020

Brief Course Description and Course Contents

WEEK-1

- OMICS technologies: genomics, proteomics & microarrays
- Public data repositories, sourcing and interpreting the data
- Obtaining and formatting data from array express
- Machine learning & non-linear biomarker discovery approaches
- Principals of machine learning, Neural networks, deep learning and Introduction to Artificial Intelligence.

WEEK-2

- System integration & device operation
- Microarrays device fabrication
- Salient Features of Big Data
- Pre-processing of Data – Normalization & Missing value imputations
- Sure Independence Screening, Least Absolute Shrinkage and Selection Operator (LASSO), Shrunken Centroid Method
- Hierarchical Clustering, heat maps, PCA plots
- Networks & pathways analysis & visualization
- Mass Spec Applications from space missions, clinics to terrestrial challenges
- OMICS-based clinical applications

Instructor Details			
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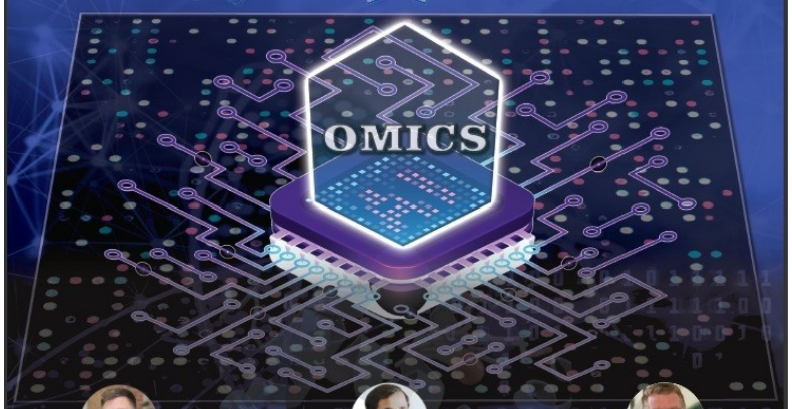
	Speakers		
4	Prof. Graham Ball	Nottingham Trent University, UK	graham.ball@ntu.ac.uk
5	Prof. Geraint (Taff) Morgan	The Open University, UK	geraint.morgan@open.ac.uk
6	Dr. Rodrigo Barderas	Ins&tuto de Salud Carlos III, Spain	r.barderasm@isciii.es

OMICS TECHNOLOGIES:

Devices, Statistics & AI/Machine Learning

IIT Bombay, Mumbai

27th to 29th Nov & 4th to 6th Dec, 2020



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COURSE CONTENTS

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