

**Speaker :** Prof. Dr. Sankar K. Pal, Fellow IEEE  
Center for Soft Computing Research, Indian Statistical Institute  
Kolkata 700108, India

**Title:** *Machine Intelligence, F-granulation and  
Data Mining*

**Schedule:** Monday, 5<sup>th</sup> Nov, 2012, 4:00 PM

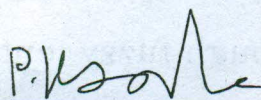
**Venue:** Bangladesh-Korea Information Access Center  
ECE Building (Ground Floor), BUET

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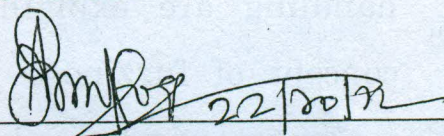
Department of EEE, BUET

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IEEE, Bangladesh Section

 22-10-2012

Dr. Pran Kanai Saha  
Professor and Head  
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### Brief Biography of Prof. Dr. Sankar K. Pal, Fellow IEEE



Sankar K. Pal ([www.isical.ac.in/~sankar](http://www.isical.ac.in/~sankar)) is a *Distinguished Scientist* of the Indian Statistical Institute and a former *Director*. He is also a J.C. Bose Fellow of the Govt. of India. He founded the Machine Intelligence Unit and the Center for Soft Computing Research: A National Facility in the Institute in Calcutta. He received a Ph.D. in Radio Physics and Electronics from the University of Calcutta in 1979, and another Ph.D. in Electrical Engineering along with DIC from Imperial College, University of London in 1982. He joined his Institute in 1975 as a CSIR Senior Research Fellow where he later became a Full Professor in 1987, Distinguished Scientist in 1998 and the Director for the term 2005-10.

He worked at the University of California, Berkeley and the University of Maryland, College Park in 1986-87; the NASA Johnson Space Center, Houston, Texas in 1990-92 & 1994; and in US Naval Research Laboratory, Washington DC in 2004. Since 1997 he has been serving as a *Distinguished Visitor* of IEEE Computer Society (USA) for the Asia-Pacific Region, and held several visiting positions in Italy, Poland, Hong Kong and Australian universities.

Prof. Pal is a *Fellow of the IEEE, USA*. He is a co-author of seventeen books and more than four hundred research publications in the areas of Pattern Recognition and Machine Learning, Image Processing, Data Mining and Web Intelligence, Soft Computing, Neural Nets, Genetic Algorithms, Fuzzy Sets, Rough Sets and Bioinformatics.

Prof. Pal is/ was an *Associate Editor* of IEEE Trans. Pattern Analysis and Machine Intelligence (2002-06), IEEE Trans. Neural Networks [1994-98 & 2003-06], Neurocomputing (1995-2005), Pattern Recognition Letters (1993-2011), Int. J. Pattern Recognition & Artificial Intelligence, Applied Intelligence, Information Sciences, Fuzzy Sets and Systems, Fundamenta Informaticae, LNCS Trans. On Rough Sets, Int. J. Computational Intelligence and Applications, IET Image Processing, J. Intelligent Information Systems, and Proc. INSA-A; *Editor-in-Chief*, Int. J. Signal Processing, Image Processing and Pattern Recognition; a *Book Series Editor*, Frontiers in Artificial Intelligence and Applications, IOS Press, and Statistical Science and Interdisciplinary Research, World Scientific.



# *Machine Intelligence, F-granulation and Data Mining: Concepts, Features and Applications*

**Prof. Dr. Sankar K. Pal, Fellow IEEE**

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## **Abstract of Talk**

Different components of machine intelligence are explained. The role of rough sets in uncertainty handling and granular computing is stated. The relevance of its integration with fuzzy sets under rough-fuzzy soft computing, and the significance of f-granulation for uncertainty handling are explained. Generalized rough sets incorporating the concept of fuzziness in granules and sets and rough-fuzzy entropy measures are defined in this framework. Different tasks such as case generation, classification/ clustering, and measuring image ambiguity measures for efficient mining are then addressed, explaining the roles and characteristics of granules in various real-life applications.

While the method of case generation with variable reduced dimension has merits for mining data sets with large dimension and size, class dependent granulation coupled with neighbourhood rough sets for feature selection is efficient in modelling overlapping classes. Image ambiguity measures take into account the fuzziness in grey region, as well as the rough resemblance among nearby grey levels and nearby pixels, and are useful in image analysis. Superiority of rough-fuzzy clustering is illustrated for brain MRI segmentation problem as well as for determining bio-bases in encoding protein sequence for analysis. F-information measures based on fuzzy equivalence partition matrix are effective in selecting relevant genes from micro-array data.

The talk concludes with stating the future directions of research, challenges and significance to natural computing.