

## Course Objectives

1. Exposing participants to the fundamentals of both supervised and non-supervised data mining and machine learning tools such as deep neural and convolution networks, Support Vector Machines, community detection, spin glass inspired cavity-type algorithms, and reverse Monte Carlo techniques.
2. Applying these tools to material science, physics, chemistry and medical imaging problems.
3. Introducing participants to the underlying statistical physics basics that underlay many of these algorithms.

## Course Content

1. Basic statistical mechanics models and concepts
2. Markov chain processes
3. Reverse Monte Carlo algorithms
4. Clustering and community detection
5. Optimization problems
6. Supervised Machine learning
7. Neural networks
8. Deep Neural and Convolution Networks
9. Application in medical imaging, cancer detection, big-data analytics etc.

## Course Venue



School of Minerals, Metallurgical and Materials Engineering  
Indian Institute of Technology  
Bhubaneswar  
Arugul, Jatni – 752050  
Khurda District, Odisha, India.

## Registration Fees

Participants from abroad: US \$250/-  
Industry/ Research Organizations: Rs. 7,500/-  
Academic Institutions:  
Students: Rs. 2,000/- and Faculty: Rs. 5,000/-  
The above fee includes all instructional materials, computer use for tutorials and assignments, laboratory equipment usage charges.

**N.B:** Participants are encouraged to register for the course on the following link before **May05, 2019**.

<http://www.gian.iitkgp.ac.in/GREGN>

## Application Procedure

A one time fee of Rs. 500/- (excluding the registration fee as mentioned above) may required to be paid while registering in the above GIAN web portal.

Participants should further submit the **Registration Fee** (as mentioned above) in one of the following payment modes:

- **Demand Draft:** Drawn in favor of "**CEP IIT Bhubaneswar**"
- **NEFT:** Beneficiary Name: CEP, IIT Bhubaneswar; **Account No:** **24282010001960**, **IFSC Code:** **SYNB0002428**, Bank Name: **Syndicate Bank**, Branch Address: IIT, Bhubaneswar

After the fee payment, please click "Registration" in the website

<https://sites.google.com/iitbbs.ac.in/gian-2019ml-iitbbs> and fill up your details.

The fees should be paid latest by **May 05, 2019**. When paying through net banking please mention course code: **GIAN2019ML-IITBBS**.

Kindly note that no cash payment is accepted and only permissible payment modes are Net-Banking, NEFT, RTGS and through DD.

Physics and biology inspired optimization, machine learning, data mining techniques and their applications in big-data, medical, science and engineering disciplines

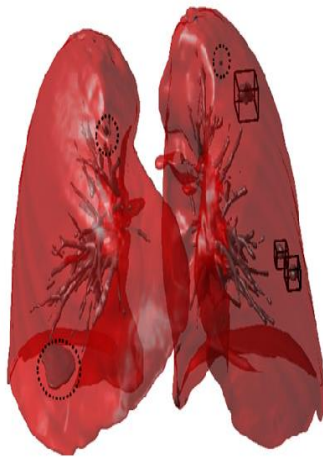
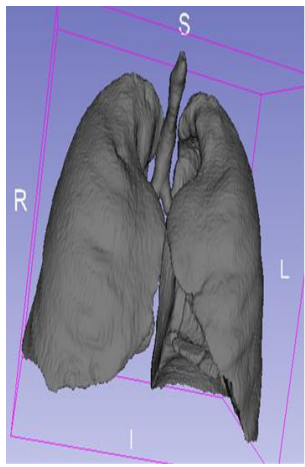
13<sup>th</sup> – 22<sup>nd</sup> May 2019

A Course as approved under the MHRD Scheme on Global Initiative on Academic Network (GIAN)



IIT Bhubaneswar

School of Minerals, Metallurgical and Materials Engineering



## Faculty Members Conducting the Present Course



**Dr. Zohar Nussinov**

Zohar Nussinov received his B.Sc. from Tel-Aviv university and his PhD from UCLA in 2000. He joined Washington University, St. Louis in 2005 as assistant professor.

Currently he is an Associate Professor in the Physics Department at same university. His current research interest include statistical learning tools, condensed matter physics, the application of simple statistical mechanics and classical mechanics ideas to graph theory and satisfiability problems, “quantum critical points”. His work has been published in many renowned journals like physical review letters, physical review E, scientific reports, condense matter physics etc.



**Dr. Kisor Kumar Sahu**

Kisor Kumar Sahu received his PhD from Kyoto University in 2006. He also worked with NASA for levitation experiments in a synchrotron facility (APS, USA).

He joined IIT Bhubaneswar as an Assistant Professor in 2012. Together with Dr. Nussinov and Dr. Satpathy, Dr. Sahu and his students, Mr. Raj Kishore and Mr. R. Krishnan, pioneered the use of ‘Big-data-analytics’ tools in the field of granular media.



**Dr. Manoranjan Satpathy**

Manoranjan Satpathy has received his PhD from IIT Bombay in 1997. His research interest includes Software testing and verification,

software engineering and formal methods. He has published more than forty articles in renowned journals. He joined IIT Bhubaneswar as assistant professor. He has more than eight years of teaching experience and seven years of industrial experience.

“Dream is not what you see in sleep, it is the thing which doesn’t let you sleep”

**A.P.J Abdul Kalam**



**Dr. Kodanda Ram Mangipudi**

Dr. Kodanda Ram Mangipudi is currently an Assistant Professor at IIT Bhubaneswar. He has received his PhD from University of Groningen, The Netherlands.

He has also served as a Scientist at the Institute of High Performance Computing, A\*STAR, Singapore. His major research includes micromechanics, mechanics of cellular solids and nanoporous metals, deformation and fracture at nanoscale, acoustic and phonon band gap engineering, and phase-field modelling of microstructural evolution.



**Dr. Bamdev Mishra**

Bamdev Mishra has received his PhD from University of Liège and Bachelors and Masters degrees from IIT Bombay. He is currently working as a Senior Applied Scientist at Microsoft in the Office

India Intelligence team at Hyderabad, India. Prior to this, he worked in the India Machine Learning team at Amazon in Bengaluru, India. He has also spent a year as a visiting Research Associate at the University of Cambridge in the control group.

## Contact Us

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