



MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent institution of MAHE, Manipal)

Department of Biomedical Engineering

Guest Lecture on

**AMPLIFYING HUMAN COGNITION USING
VR/AR INTERFACES**

Guest Speaker:



Dr. Sushil Chandra

Scientist 'G' INMAS

Defence Research and Development Organization (DRDO)

Monday, 04 March 2019 at 10:30 AM

Venue: AB5 – ECE Seminar Hal, AB -5, MIT, Manipal

All are cordially invited

Dr. G. M Bairy

Professor & Head

Dept. of BME, MIT, Manipal

COURSE – CUM – WORKSHOP

Matching, Modeling, Meta-Analysis, Information Theory & Machine Learning

**Supported by the United States – India Educational Foundation and
US Fulbright Specialist Program**

Hosted by Manipal Institute of Technology, MAHE, Manipal – 576 104

Dec. 10 – Dec. 23, 2018

Target Audience: Graduate Students (Masters/PhD) and Junior Faculty – of Biomedical Engineering, Computer Science, Statistics, and physicians/surgeons – towards developing a collaborative spirit across variety of fields.

Objectives: .

- Master data manipulation, visualization, transformation, and regressions
- Master multi-dimensional distances, densities & divergences
- Master meta-analysis and meta-regression
- Understand basics of Shannon Entropy and its derivatives.
- Understand basics of classification and clustering.
- Understand Neural Network & Fuzzy modeling.
- Understand basics of Statistical/Machine/Deep Learning.
- Applications in Neurology/Neurosurgery



**Pitchaiah Mandava, MD PhD
MSEE**

Fulbright-Nehru Specialist
Baylor College of Medicine
& Michael E. DeBakey VA Medical
Center
TX 77030, USA

Summary: The first week of the two-week course is designed to slowly build confidence in programming skills, & also introduce the basics of neuroscience. Programming will be primarily done on MATLAB. Week 2 will end in a two-day project. The course will start at a basic level of mathematics and introduce basic concepts involved in linear algebra, and probability & random variables. The basic introduction will be followed by data display & data-manipulation, and go through increasingly detailed concepts of modeling, statistical learning & machine learning, applicable to the field of Medicine. The course will provide a mixture of didactic and project-based hands-on workshops. Each afternoon will comprise of projects stressing on the concepts learned during the day. The first two afternoons will comprise of individual simple projects. The other 10 afternoons are meant for small group projects, to encourage collaboration.

Freely available international and local databases will be used. Project examples are drawn from the field of Neurology/Neurosurgery, though the principles learned are broadly applicable to other fields.

Local Course Lead & Contact



**Ramesh R. Galigekere, PhD
Professor**

Dept. of Biomedical Engineering
Manipal Institute of Technology
MAHE, Manipal-576104

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Program

Week 1:

Day 1: Introduction to elements of linear algebra, and the concepts involved in probability & random variables. Reading and creating databases.

Day 2: Methods of data-display. Univariate and Multivariate Analysis. Logistic Regression. Transformations (Square Root, Logarithmic, Arc-Sine Square Root, Freeman-Tukey). Basics of Neuroanatomy.

Day 3: Distances (Euclidean, Manhattan, Mahalanobis, Bhattacharyya, Kolmogorov-Smirnov), Divergence (Kullback-Leibler), and Matching of Populations; Basics of Neurophysiology and Microarchitecture of the Nervous System

Day 4: Meta-analysis and Meta-regression. Vascular Supply of the Brain

Day 5: Information Theory: Shannon Entropy, Cross Entropy and relation to Maximum Likelihood, Akaike Information Criterion (AIC), Takuechi Information Criterion (TIC), Bayesian Information Criterion (BIC). Ischemic and Hemorrhagic Stroke

Day 6: Models and alternate models. Model-selection based on Maximum Likelihood, AIC, BIC. Basics of Neuroimaging

Day 7: * Faculty-meet: review of the week's proceedings, and planning for next week.

- Students: self-arranged non-didactic weekend activities.

Week 2:

Day 8: Modelling (Neural Networks, Fuzzy Logic), Clustering (K-Means, Bayesian, Support Vector Machine, Gradient Descent)

Day 9: Fundamentals of CT imaging and storage of data.

Day 10: Statistical Learning and Machine Learning

Day 11: Machine Identification of Infarct, Blood, Edema on CT of the head.

Day 12: Development of Deep Learning Algorithms to predict patients destined to have good outcome

Day 13: Completion of the Projects. End-of-course celebration.

Day 14: *Faculty-meet: Review of the course.*

Fee: Rs. 5000/- (for 14 days; includes accommodation & working lunch)

How to Apply: People willing to participate in this course should send an Email immediately with: (i) CV, (ii) Letter of Intent indicating clearly, their background & objective, to the Local Course-Lead. Only 40 applicants can be accommodated, and the choice of the Committee will be final. Instructions for final registration will be sent to the selected candidates, ASAP/before November 10, 2018.

Course-Instructors:

- Dr. Pitchaiah Mandava, MD PhD MSEE
- Dr. Jeevan, PhD (IIT Delhi), Dept. of Biomedical Engineering, MIT, Manipal
- Dr. Ganesh Murthy, MSc (Engg) & PhD (IISc, Bangalore), Mercedes-Benz R & D India, Bangalore)
- Dr. Ramesh Galigekere, MSc (Engg.) (IISc, Bangalore), PhD
- Dr. AP Prathosh, PhD (IISc Bangalore), IIT-Delhi



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DEPARTMENT OF BIOMEDICAL ENGINEERING MIT MAHE
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All faculty and students are cordially invited for the guest lecture on

PROCESSING OF FUNDUS IMAGES

Guest Speaker: Dr. Neelam Sinha
Associate Professor, IIIT, Bangalore

Date & Time: 23.10.2018 at 2:30 PM

Venue: 208, AB-5, MIT Manipal

Dr G. Muralidhar Bairy
HOD

Ms. Sheeba Davis
Coordinator

About Guest speaker:

Dr. Neelam Sinha received her PhD from IISc, Bangalore. Her thesis was on strategies for rapid MR imaging. Her previous stints include MILE Lab, IISc and MR Imaging group at GE Healthcare, Bangalore.

Her research interests are in Medical imaging, Processing, Computer Vision Strategies for Rapid MR Imaging, Diffusion Weighted MR Imaging, EEG Analysis, Time Series Analysis, MR Image Reconstruction



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**Guest Lecture on
Career Guidance**

Guest Speaker:



Mr. Tejas Bengali

Director, Strumed Solutions Pvt. Ltd., Mysore

Saturday, 30 March 2019 at 2 PM

Venue: AB5 – 211

All are cordially invited

**Dr. G. M Bairy
Professor & Head
Dept. of BME, MIT, Manipal**