



# HEATS 12

Hospital Equipment Awareness and Training Series

## Engineering Principles and Applications of Magnetic Resonance Imaging

Date: Saturday 8<sup>th</sup> August 2015

Venue: Sree Chitra Tirunal Institute for Medical Sciences and Technology,  
Medical College Campus,  
Trivandrum 695 011, Kerala, INDIA.

Organised by

Division of Clinical Engineering  
Department of Imaging Sciences and Interventional Radiology and  
Biomedical Technology Wing

Sree Chitra Tirunal Institute for Medical Sciences and Technology (SCTIMST)



Technical Supporting Partner



IEEE Engineering in  
Medicine & Biology Society  
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## About SCTIMST

Sree Chitra Tirunal Institute for Medical Sciences and Technology (SCTIMST) was established by an ACT of Indian Parliament in 1980 as an Institute of National Importance under the Department of Science and Technology, Government of India. The Institute conjoins the culture of medicine and technology and is one of its kind with a premier focus on tertiary level patient care in advanced medical health facilities, R&D in niche areas of biomaterials and biomedical technology and public health research and training. It also enjoys the status of a University and offers prestigious higher medical/public/clinical engineering courses and PhD programme in the country.

## Division of Clinical Engineering

The Division of Clinical Engineering applies and implements medical technology to optimize health care delivery by imparting training, supervising/ inspecting/auditing, and serving as technological consultants. The safe use and effective maintenance of the equipments in the Institute is also vested in the hands of the Clinical Engineering Division.

## Department of IS&IR

The Department of Imaging Sciences and Interventional Radiology as the name suggests, caters to all the diagnostic & interventional needs of the Institute. The department houses state of art imaging technology including 3T MRI, 1.5T MRI, 256 Slice CT which delivers high image quality, dose efficiency and rapid reconstruction times along with a dual slice CT scanner, a biplane highly efficient Digital Subtraction Angiography system which tremendously decrease procedure time and radiation to the patient, a high performance ultrasound system that captures crisp, high-resolution images even in technically challenging situations.

## Biomedical Technology Wing

Biomedical Technology (BMT) Wing engages in R&D of biomaterials and biomedical technology and its commercialization, testing and evaluation support to industry/academia. It houses a highly interdisciplinary technical team consisting of scientists and engineers having expertise in medical device technology from concept to market.





# HEATS-12

## Technical sessions

### Session 1 MR Installation

Pre Installation: Site Identification, Site Planning and Scope definition, AC Planning, Site Readiness Date Identification RF Flooring, Equipment Arrival, Cryo Chain Functionality, RF Cage Completion, RF Testing, Magnet Room Interiors, AirCon Commissioning in all rooms, Civil Work like Structural Modifications, Paint etc. to be completed in Console and Equipment Room. Installation: Cabling and Interconnects, PGTH Analysis, Power On, Calibrations, Ramping, Shimming, RF Calibration, Gradient Calibrations, System Performance Tests, Special Calibrations.

### Session 2 Latest Advances in MR Imaging

Physics, Magnets, Coils, RF Technology, evolution and need for multi drive RF Technology and integration of Optix, Circular, Elliptical, Optical RF, Dual Drive, Multi Transmit. Receive Chain, Channels, Surface Coil Technology, basic concepts of receiving signal and the latest advancement of GEM. Gradients - evolution of HD gradients. Fast imaging techniques: An introduction of the basic concept of k space, ASSET, ARC, TURBO mode, DISCO. New clinical techniques, silent imaging

### Session 3 Transition to 3T

Physics, 3T clinical advantages- 3T Signal generation, SNR Advantages, Clinical advantages, fMRI, Perfusion, SWAN etc. Spatial resolution, Scan time reduction 1.5 T to 3T Transition- challenges, B0 Field and susceptibility, Effects of the B1 Field and SAR, Dielectric effect, MR compatible devices and safety, Implants and safety.

### Session 4 Artifacts in MRI & Mitigation

Types of artifacts and Mitigation: Motion induced artifacts, Susceptibility artifact, Gibbs artifact, Aliasing artifact, Chemical Shift, Physiological artifacts, RF interference and environmental, Corduroy artifacts, Zipper artifacts, Hardware related artifacts, other types of artifacts.



## Program Schedule 08<sup>th</sup> August 2015

08:30 AM - 09:00 AM Registration

09:00 AM - 11:00 AM Inaugural Session

**Inauguration:** Dr. Asha Kishore  
Director, SCTIMST

**Keynote Address:** Dr.N.R.Jagannathan  
Professor & Head, Dept. of NMR &  
MRI Facility, AIIMS, New Delhi

11:00 AM - 11.15 AM Tea Break

11:15 AM - 11.45 PM MR Installation (Session 1)

11:45 AM - 12.15 PM Latest Advances in MR Imaging  
(Session 2)

12.15 PM - 12.45 PM Transition to 3T (Session 3)

12.15 PM - 01.30 PM Lunch

01.30 PM - 02:00 PM Artifacts in MRI & Mitigation  
(Session 4)

02.00 PM - 05:00 PM Practical Training Sessions

## Patron

**Dr. Asha Kishore**  
Director, SCTIMST

## Organising Chairman

**O.S Neelakantan Nair,**  
Acting Head, BMT wing

## Organising Secretaries

**Mr. Koruthu P Varughese**  
Engineer G & Head, DCE

**Dr. T.R. Kapilamoorthy**  
Professor & Head, Department of IS & IR

**Mr. Muraleedharan C.V**  
Scientist G & Associate Head, BMT wing

## Committee Members

Dr. Kesavadas. C  
Dr. Bejoy Thomas  
Mr. Madhusoodhanan Pillai. B  
Mr. Mohanlal G  
Mr. Manoj G.S  
Mr. Ganesh. P  
Mr. Sasi P.M  
Mr. Suresh K. S  
Mr. Jithin Krishnan  
Mr. Arun K.M  
Mr. Midhun John Paul,  
Ms. Vaishnavi R.S  
Ms. Sreekala. K

## For more details contact:

Koruthu P Varughese  
Phone:04712524411, 8714804819  
Manoj GS : 9446307766,  
Arun KM : 9447356027  
Midhun John Paul : 9497375050  
Email: [dce@sctimst.ac.in](mailto:dce@sctimst.ac.in)

## Registration Fee

Professionals	Rs. 1000/-
Research / Academic Institutions	Rs. 500/-
SCTIMST / EMBS students	Rs. 250/-
Late Registration ( After 4th August 2015 )	Rs 2000/-

Registration Fee is non-refundable. However change in nomination is allowed. Only limited seats are available

## Mode of Payment

Payment can be made by DD/ Cash on or before 4th August 2015. DD to be drawn in favour of "The Director, SCTIMST" (HEATS WORKSHOP ACCOUNT). Cash payment can be made under the head HEATS WORKSHOP' at SCTMST cash counter. Kindly ensure your participation by email with proof of payments to [dce@sctimst.ac.in](mailto:dce@sctimst.ac.in) before 3rd August 2015 as registration would be taken up on a First-cum-First basis.

## Who should attend

The workshop aims at Doctors, Biomedical Engineers, Technicians, Nurses and other medical and paramedical professionals, to encompass in an interactive experience with applications of MRI from the experts.