SPARC Four day Workshop and Conference

Indian Institute of Technology Kanpur

January 30th - February 2nd 2020

SPARC Workshop Details:

Advanced Neuroimaging (ANI) and its clinical applications

January 30th - February 1st, 2020

Theme:

ANI in the guise of High Definition Brain Tractography (HDBT) is a new technology that is popular for imaging the white matter of the brain. It is a unique window on human brain anatomy. This non-invasive technique continues to grow in popularity as a way to study brain pathways that could never before be investigated in vivo. This course provides an overview of the practical aspects of ANI, from understanding the basis of the technique through selection of the right protocols, trouble-shooting data quality, and analyzing data optimally. ANI is a non-invasive magnetic resonance imaging (MRI) technique for visualizing and quantifying tissue microstructure based on diffusion. The course discusses the theoretical background underlying ANI and advanced techniques based on higher-order models and multi-shell diffusion imaging. It covers the practical implementation of ANI; derivation of information from ANI data; and a range of clinical applications, including neurosurgical planning and the assessment of brain tumors. Its practical utility is enhanced by decision schemes and a fully annotated brain atlas, including color fractional anisotropy maps and 3D tractography reconstructions of major white matter fiber bundles.

Workshop and Conference Content:

Workshop Day 1: First Half

Basic neuroanatomy, Brain Structure, Cortical and subcortical regions, White matter anatomy, 10 major white matter tracts and its basic functions. Neuroanatomy of disease brain, Disrupted cortical, subcortical and white matter tracts in tumor cases, neurodegenerative diseases

Workshop Day 1: Second Half

Introduction to MRI, MR acquisition and protocol, k-space, T1/T2/PD acquisitions, spin-echo, gradient echo. Diffusion processes in Human Brain, Diffusion MR Imaging, Diffusion reconstruction method, Diffusion Tensor Imaging, Qball Imaging, HDFT reconstruction, Fiber Tracking.

LAB: Get Familiar with tools. DSI Studio, MRTRIX, FSL. Loading nifti files.

Workshop Day 2: Full Day

Advanced Diffusion Imaging, Micro-structural imaging, Fiber Tractography, Segmentation of major Tracts. Pipeline Discussion, Artifacts in diffusion MRI.

LAB: Segmentation of Fiber Tracts on HCP dataset. For advanced user, pipeline processing is shown and discussed in detail

Workshop Day 3: First Half

Presurgical Planning, Segmentation of Fiber Track in patient, Advanced diffusion imaging like NODDI and SMT models, Deep learning techniques in Diffusion MRI.

LAB: Segmentation of fiber tracts on tumor case, analysis of NODDI on some cases and discussion of Deep learning based techniques.

Registration Fee towards workshop:

Rs. 5000 for faculty and Rs 4000 for students (includes Lunch and Tea/Snacks every day)
All registered workshop participants are eligiable for free conference registration.

Accommodation:

Few rooms are available on first cum first basis in the Guest House of IIT Kanpur (Rates: Rs. 1500 (single occupancy) / Rs. 2500 (Double occupancy)

Food:

Breakfast/lunch/dinner are available in Guest House at the rate of Rs.100/Rs.200/Rs.200 i.e. Rs. 500 per day. One may also choose to eat at different eateries/restaurants across the campus.

Eligibility:

Radiologists, Neurosurgeons, Neuroscientists, bioengineers, medical students, Biomedical/ Mechanics Engineers, Neuro-Psychologist etc. are welcome to join the workshop.

M.Tech/M.Sc/M.S/B.Tech/B.S. students and research scholars working in allied areas to the theme of the workshop may immensely benefit from the workshop participation.

Contact:

Prof. B. V. Rathish Kumar / Prof. Sudhir Pathak / Prof. Aditya Nigam / Prof. Chirag Ahuja
IIT Kanpur / University of Pittsburgh / IIT Mandi / PGI Chandigarh
Email: advnrimg.2020@gmail.com
Phone:0091-512-679-7660/7636

SPARC Conference Details:

Recent Trends in Neuro-imaging and it clinical applications

February 1st - 2nd , 2020

High definition fiber tracking and its application in neurosurgery can be one of the effective techniques that can be utilized in presurgical planning and can be used for the predictive neurosurgery with apriori assessment on the potential outcome of the surgeries especially related to brain tumor, brain concussions etc. Major Lab in US such as UPMC in conjunction with LRDC and Stanford University is successful using this techniques.

The conference aims at bringing together the leading practitioners/researchers/academicians working at the frontiers of Neuroimaging and its clinical applications to promote the sharing and learning of very recent and emerging trends along the theme of the event.

Topics Covered:Neuroimaging, Diffusion MRI, High Definition Fiber Tracking, Presurgical planning using HDFT, Diffusion MRI processing, Advanced diffusion imaging, quantitative diffusion MRI, Clinical case studies etc.

Invited Speakers:

Prof. **Walter Schneider***, Senior Scientist, Learning Research and Development Center, Pittsburgh, Professor of Psychology, Professor of Neurosurgery, Professor of Radiology.,

Prof. **Ajay Niranjan***, Associate Director, Center for Image-Guided Neurosurgery Director, Radiosurgery Research, University of Pittsburgh

Prof. **Sudhir K. Pathak**, Research Professor, Learning Research and Development Center, University of Pittsburgh

Prof. **B. V. Rathish Kumar**, Department of Mathematics and Statistics, IIT Kanpur

Prof. **Paramjeet Singh**, HEAD of Neuroradiology, Postgraduate Institute of Medical Education and Research, PGIMER, Department of Radio Diagnosis and Imaging, Chandigarh

Prof. **M. K. Tiwari**, Professor of Neurosurgery, Postgraduate Institute of Medical Education and Research, PGIMER, Chandigarh

Prof. **Chirag Ahuja**, Neuroradiology, Postgraduate Institute of Medical Education and Research, PGIMER, Department of Radio Diagnosis and Imaging, Chandigarh

Prof. **Deepak Gupta**, Professor and Consultant Neurosurgeon, Department of Neurosurgery, AIIMS and associated JPN Apex Trauma Centre New Delhi, India, Chair-Pediatric Neurosurgery Fellowship, Program & Services

Prof. **Aditya Nigam**, Assistant Professor, School of Computer Science and Electrical Engineering (SCEE), Indian Institute of Technology Mandi

* Web Presenter

Papers:

Paper presentation by the participants on the case studies from their clinical experience or research work along the lines of this recent technology are encouraged Interested participants may send the 1-2 page extended abstract of the envisaged presentation in the following format: (Title, Affilliation, 100 word abstract, body consisting of brief motivation, introduction, methodology, outcome, references). The abstract should be submitted in MS DOCX format only.

Registration Fee towards ONLY conference:

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