

Chugani Memorial Physics Award

The M. M. Chugani Memorial Award of the Indian Physics Association for the year 2006 was awarded to G. Madhavan Nair, Chairman, Indian Space Research Organisation (ISRO), Department of Space, Government of India at the P. C. Saxena Auditorium, IIT Powai, Mumbai on 18 March 2008. The Award is given for excellence in applied physics and carries a citation, gold medal and a cash prize of Rs 100,000. In recognition of his outstanding contributions to space technology and atmospheric science, the In-

dian Physics Association conferred the M. M. Chugani Award 2006 on G. Madhavan Nair. The award was conferred by Bikash Sinha, President of the Indian Physics Association.

Madhavan Nair is a leading technologist in the field of rocket systems and has made significant contributions to the development of multi-stage satellite launch vehicles, achieving self-reliance in access to space using indigenous technologies. In his capacity as the Chairman of ISRO and the Secretary to Department of Space,

he has supported research programmes in astrophysics and atmospheric physics. He has also provided major thrusts to programmes such as tele-medicine and tele-education as well as to a disaster management support system.

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MEETING REPORT

Hyperspectral remote sensing*

The Meet started with a welcome address by M. Arumugam (Annamalai University, Chidambaram) in which he briefly explained about the workshop and the importance of hyperspectral remote sensing in earth system sciences studies. About 110 scientists, teachers, research scholars and postgraduate students from various parts of the country participated in the workshop. Four lectures (and one laboratory demonstration) were delivered in two technical sessions and the summary of the same is as follows.

The first lecture by S. K. De (Geological Survey of India, Bangalore) was on 'Hyperspectral remote sensing – An overview'. He highlighted that hyperspectral images refer the imaging of a scene over a large number of discrete, narrow, contiguous spectral bands through the invisible thermal infrared portion of the spectrum. He also briefly explained about imaging spectrometer, identification of different minerals, crops, application of Modular Optoelectronic Scanner (MOS)

in oceanic studies, discrimination of cloud and snow-covered regions using IRS-P3 MOS data and the role of spectral reflectance in identification of features like vegetation, dry soil, water types, soil, mineral, etc.

The second talk was on 'Use of ground truth hyperspectral spectroradiometer' by Purusothaman (Electroteck Company, Chennai). He deliberated on the specification of two types of spectroscopic instruments – spectrophotometer (works only in natural light) and spectroradiometer (can be used both in natural and artificial lights). The necessity and modular concept of high-resolution FieldSpec3 spectroradiometer, its coverage range [varies in wavelength from UV/V/NIR (350–1000 nm), SWIR₁ (1000–1800 nm) and SWIR₂ (1800–2500 nm)], field spectrometry (provides quantitative measurements of reflectance, reflected radiance or irradiance in the field) and its applications in remote sensing (mineral mapping, agriculture and forestry survey, airborne measurements, atmospheric modelling, fire detection and fire-fuel mapping) and in the laboratory (accessories for liquid, solid and plant analyses; mineral analyses – total protein, moisture, hardness, oil in grains, fatty and amino acids; soil analyses – classification, pH, erosion, soil fertility index, organic compounds and water) were highlighted.

The third lecture was by Rabi N. Sahoo (Indian Agricultural Research

Institute, New Delhi) on 'Potential applications of hyperspectral remote sensing in agriculture'. He brought out the fact that spatial and spectral resolutions are always inversely proportional to each other and emphasized the behaviour of electromagnetic radiation and typical reflectance curve variations from different types of vegetation indices and soils. According to Sahoo, there are few problems in the area of hyperspectral analysis like optimal selection of bandwidth, number of bands and spatial as well as spectral resolutions and some constraints like data storage, communication bandwidth, discrimination/classification accuracy, minimum signal-to-noise ratio, sensor selection, data acquisition procedures and the cost factor.

The fourth lecture was on 'Hyperspectral remote sensing: Potential application in detection of pest and disease infestations in crop plants' by M. Prabhakar (Central Research Institute for Dryland Agriculture, Hyderabad). He discussed the role of remote sensing in crop protection, types of plant-injuries due to pests/disease biophysical basis of plant reflectance and important spectral regions for pest damage. He also demonstrated the validation of pest detection by hyperspectral image with ground-based survey results.

Demonstration of hyperspectral spectroradiometer for 'Lab-based hyperspectral signature data collection' was provided at the end of second session by Puru-

*A report on the Third National NRDMS-DST Advanced Working Group Meet, one-day Workshop on 'Hyperspectral Remote Sensing Applications and Image Analysis' and two-day National Seminar on 'Hyperspectral Remote Sensing and Spectral Signature Database Management System (HYPERSPEC 2008)' held during 13–15 February 2008 at the Department of Earth Sciences, Annamalai University, Chidambaram, India.

sothaman. He explained the uses of different parts and accessories of the spectroradiometer in collection of spectral signatures in the field and laboratory. He also demonstrated how to optimize the parameters to get the signature of particular objects in different light conditions using RS₃ software.

V. Jayaraman (ISRO, Bangalore) in his presidential address at the National Seminar dealt with importance of spectroradiometer for hyperspectral studies and future plans of ISRO in hyperspectral sensor. About 60 research papers were received and 30 were presented in five technical sessions. About 100 teachers/researchers from all over the country participated and deliberated on the present status and future scenario of hyperspectral and multispectral remote sensing. Sanjay Srivastava (ISRO, Bangalore) in his talk on the 'NICHE area of hyperspectral remote sensing' discussed EO pyramids, fundamental concepts in EO, target signature – image to object, spacecraft configuration and mission design, and the role of spectral signature and atmospheric transmission in VNIR region. According to him, spectroscopy of terrestrial targets from space and synthesis of high resolution spectral, spatial and ra-

diometric data are required to ensure geophysical sensitivity for signature merging. Jayanti (MSSRF, Chennai) gave a talk on 'Advanced spatial tools for coastal resource management'. She pinpointed the problems and issues due to depletion of coastal resources like mangrove forests, coral reefs, mud flats and salt marshes and coastal wetlands. She also emphasized on coastal resources, recommendations of the committee constituted by the Government of India under the Chairmanship of M. S. Swaminathan, based on mapping of vulnerability line considering parameters such as elevation, geology, geomorphology, sea-level trends, horizontal shoreline displacement, tidal ranges and wave height. According to her, availability of high resolution and very high resolution data made the spatial tools indispensable in planning and management of resources.

Various aspects dealt within the technical sessions of the seminar include: (1) Hyperspectral remote sensing studies in minerals and agriculture studies; (2) Hyperspectral and multi-angular bidirectional reflectance measurements of some natural surfaces; (3) Remote sensing of canopy dynamics and optimum reflectance ratio for estimating biochemical

content of fodder sorghum and bajra; (4) Creation of hyperspectral signature data base; (5) Retrieval of plant biophysical parameters from BRDF through inversion of radioactive transfer model; (6) Fourier Transform Infrared Spectroscopy spectra of natural crystals of low temperature origin: implications on interpretation of palaeoclimate, modelling sediment diagenesis and hydrocarbon exploration; (7) Advanced Synthetic Aperture Radar for recognition of coastal geomorphological features and land-use assessment; (8) Application of remote-sensing data in geomorphologic mapping; (9) Evaluation and evolution of Indian coasts – with a few case studies using remote sensing and GIS techniques; (10) Integration of Advanced Space-borne Thermal Emission and Reflection Radiometer and Enhanced Thematic Mapper data for studying the alteration zones; (11) Spatial distribution of mangrove, and (12) Geo-statistical analysis for geochemical interpretation of groundwater in hard rocks.

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MEETING REPORT

Preserving our scientific heritage*

Many scientific institutions in India have had a long history, some tracing back their origins to the Colonial period. These institutions have a vast collection of valuable information stored in various formats. However, there has been no tradition in India of archiving old documents and preserving them for posterity. Fragments of history are lost everyday as pioneers retire and institutions fail to take care of their documents. There is an urgent need to create awareness among science insti-

tutions to collect, preserve and catalogue their archival material and create modes of access for researchers. A National Workshop on 'Preserving our Scientific Heritage' was held at the Indian Institute of Astrophysics, Bangalore to address these objectives.

The workshop was unique as it brought together 100 participants from across disciplines comprising historians, librarians, scientists and policy-makers. Siraj Hasan (Indian Institute of Astrophysics (IIA), Bangalore) welcomed the participants and also read out the inaugural address sent by K. Kasturirangan. This was followed by special remarks by M. Vijayan (INSA) who emphasized the need to preserve material that were not of immediate value. Illustrating his point with an example, Vijayan demonstrated how processes and theories of scientific

research sometimes received late recognition. The keynote address was given by Ross Bassett (North Carolina State University in Raleigh). He stressed the need for archiving of science in India, which would reflect indigenous perspectives. In his role as a consultant to the archives of IITs in India, he mentioned that several issues in archiving were linked directly to the absence of awareness among the policy-makers. He also pointed out that without archiving, when the first generation of scientists in India is no more, important parts of India's history would be lost.

Day 1, Session 1 – Collection policies and organization: The main points that emerged from this session were that archiving should be an ongoing process and should be started almost as soon as the institution is set up. All presentations

*A report on the National Workshop on 'Preserving our Scientific Heritage' held at the Indian Institute of Astrophysics, Bangalore during 21–22 January 2008, jointly organized by the Indian Institute of Astrophysics, the Indian Institute of Science, Bangalore and the Tata Institute of Fundamental Research, Mumbai.