





"Science For The People and The People For Science"

28th February 2019

U R Rao Satellite Centre Department of Space, Government of India Old Airport Road, Vimanapura P.O., Bengaluru - 560 017

India's Foray into Space Sciences

After a set of small scale science experiments, on SROSS mission, India took a major stride in announcing a series of important scientific exploratory missions starting with Chandrayaan-1 followed by MOM and AstroSat. In the making are Chandrayaan-2, Aditya L1 and XPoSat missions which will provide unique science.

Chandrayaan - 1



Lunar surface image by Terrain mapping Camera

Chandrayaan-1, India's first mission to Moon, was launched on October 22, 2008 from SDSC SHAR, Sriharikota. The spacecraft was orbiting around the Moon at a height of 100 km from the lunar surface for chemical, mineralogical and photo-geologic mapping of the Moon. The spacecraft carried 11 scientific instruments built in India, USA, UK, Germany, Sweden and Bulgaria. Discovery of the water on the moon is perhaps a major turning point that has changed our view of the moon and given it a whole new perspective. Chandrayaan-1 data is used by scientists all over the world and contributed significantly to lunar science.

Mars Orbiter Mission



Regional dust storm activities over northern hemisphere

The red planet Mars is an attractive destination for planetary scientists and space tourists alike. Littered with clues on water that once flowed on its surface Mars beckons exploration. India sent its first satellite to Mars on Nov 05, 2013, that caught the attention of the world. After a cruise of 300 days, which demanded new technologies and automation, the Mars Orbiter Mission successfully entered a highly elliptical orbit around Mars and since then have been sending us data. It has been configured to carry out observation of physical features of mars and carry out limited study of Martian atmosphere. Numerous pictures from the Mars color camera were useful in identifying changes that happen on Mars in months with

changing seasons. Another payload, MENCA measured how the molecules such as CQ, CO, O and N varies as the height increases. Such studies help us understand how molecules escape from atmospheres. Over a long time this would lead to Planets losing their atmosphere.

AstroSat



High resolution image of UVIT Observations of NGC 2336, one of the best resolved images

AstroSat is India's first dedicated multi wavelength space observatory, launched on September 28, 2015 by PSLV-C30. AstroSat, with its five payloads, orbiting 650 km above the earth, observes the universe in the optical, ultraviolet, low and high energy X-ray wavebands of the electromagnetic spectrum. The instruments onboard AstroSat are Ultraviolet Imaging Telescope (UVIT), Large Area X-ray Proportional Counter (LAXPC), Soft X-ray Telescope (SXT), Cadmium Zinc Telluride Imager (CZTI) and Scanning Sky Monitor (SSM). Simultaneous multi-wavelength observation focuses on some of the

most energetic phenomena in the universe and has brought out various interesting discoveries of various kinds of astronomical objects in the universe.

भारत सरकार अंतरिक्ष विभाग यू.आर. राव उपग्रह केन्द्र

पोस्ट बॉक्स नं. १७९५, हवाई पत्तन मार्ग विमानपुरा डाक घर, बेंगलूर - ५६० ०१७. भारत

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पी. कुन्हीकृष्णन P. KUNHIKRISHNAN निदेशक/ DIRECTOR

MESSAGE

Dear Students and Teachers.

Heartiest greetings and very warm welcome to all of you for the National Science Day 2019 celebrations at U R Rao Satellite Centre (URSC), Bengaluru.

Science has played an important role in the progress of humans on our mother planet and continues to play an overwhelming role in our day to day activities. It is difficult to imagine life on earth without the involvement of science, be it Physical science or Biological science or Social science or Mathematics (logical science). During the 21st century, scientific discoveries / inventions and its applications have grown exponentially and it is imperative that the tempo is maintained for the years to come.

It is important for the younger minds to inculcate the scientific way of thinking, inquisitiveness, curiosity and foster new innovative ideas. Towards this, the teachers, parents, schools and R&D organizations play an important role in shaping the young students.

With an emphasis on popularizing the benefits of science and its applications, in accordance with this year NSD-2019 theme, "Science for the People and People for Science", various events have been conducted for students at U R Rao Satellite Centre, Bangalore. All the events attracted good response from various schools in and around Bangalore and outside the city as well.

I am sure that the events organized by National Science Day 2019 will definitely instill scientific temper on the younger generation to achieve their goals for a brighter future for them and for the country.

With best wishes,

पी. कुन्हीकृष्णन (P. KUNHIKRISHNAN)



CELEBRATION OF NSD – 2019

`National Science Day' is celebrated all over India on 28th February every year with great passion and enthusiasm to inculcate a scientific spirit in the young minds at a very young age. This day is celebrated in commemoration of the discovery of "Raman Effect" by the Indian Physicist Sir C.V. Raman, who carried out ground-breaking work in the field of light scattering, which earned him the 1930 Nobel Prize for Physics. U R Rao Satellite Centre, Bangalore, celebrate the National Science Day, every year, by encouraging students and teachers from various schools in and around Bangalore to participate in various events held at centre.

URSC Celebrated NSD-2019 on the theme "Science for The People, People for Science". The events for the students held at U R Rao Satellite Centre, this year have seen a very wide participation of about 800 students from various parts of Bangalore and nearby. Few of the participants were from outside the city. To start with, on the 16th Feb 2019, two events "Extempore Science Elocution" and "Essay Competition" held for the students. Essay Competition had about 130 students participating from about 30+ schools who wrote excellent essays on two topics "Science for environment protection" and "Should science be driven by Curiosity or Human Need?". The event "Extempore Science Elocution" also had a very overwhelming participation from about 60 students from various schools talking on topics related to the general science.

On the 23th of Feb 2019, four events: The "Spot painting", "Teacher's Event", "Test of Scientific Temper" and "Innovative Ideas" were held. The "Spot Painting" brought the artists in the young and energetic students, which amazed all of us with its charm. Total 100+ students from different schools and Standards participated in the event.

The "Teacher's Event" had 12 presentations selected from the teachers speaking on "Latest advances in science and their impact on our day to day lives", with about 50 teachers and students participating in the event. The event "Test of Scientific Temper" kept all the participating students engrossed into the depths of science for about 90 minutes with various inquisitive questions for them to think through and bring out scientific reasoning.

The event "Innovative Ideas" had a good number of participants with about 30 students bringing out very innovative and thought provoking ideas on two topics: "Water Conservation to save planet Earth" and "Tapping of Energy Resources from our own solar system". It was indeed very inspiring to listen to the ideas of the young kids bringing out very informative points on various topics. It was also a very tight competition and the judges had a tough time in selecting the winners of the different events.

Today, the final day of the celebrations of NSD-2019, two competitions in the forenoon: Science Quiz and Science Skit were held. About 300 students participated in these competitions. While the "Science Quiz" tested the depth of knowledge in the young minds, the "Science Skit" tested the artistic knowledge blended with Science.

There was a Museum on wheel (mobile science museum) from Visvesvaraya Industrial and Technological Museum. The students were entertained with this exhibits largely. In addition, the students and teachers from various schools visited the space exhibition at URSC which has displays of various satellite models right from Aryabhata to Mars Orbiter Mission and exhibits related to space and satellite technology. There was also demonstration of HAM Radio at URSC. Students learn that HAM Radio is a scientific and technical hobby used for communication purpose. It works in a wireless media.

The valedictory function was conducted on 28th Feb, 2019 in the afternoon. Dr.P Kunhikrishnan, Director URSC presided over the function. The Chief Guest Prof. Sharada Srinivasan, from the National Institute of Advanced Studies (NIAS), Bengaluru presented a lecture on "Art and Science of Indian Metals Heritage". The programme concluded with the distribution of prizes for winners by the Director-URSC, Chief Guest and Chairman NSD 2019. NSD-2019 at URSC was a very well organized function with number of events and competitions and an overwhelming response of various schools in and around Bangalore.

Foreword



National Science Day is celebrated all over India every year on 28th February in commemoration of the discovery of "Raman Effect" by Noble Laureate Sir C.V. Raman in the year 1928. The theme for this year, as declared by Government of India, is "Science for the People and the People for Science".

U R Rao Satellite Centre (URSC), formerly known as ISRO Satellite Centre (ISAC) has organized several events related to topics in General Science for students and teachers during the month of February 2019. The National Science Day (NSD-2019) has hosted events on 16th, 23rd and 28th for students and on 23 rd for teachers. The events have been carefully assembled to bring out knowledge in science, innovative thinking in application of science, scientific temper and expression skills of the participating students. The events have been held as oral presentation or written tests or skit performance in either Hindi or Kannada or English as per the choice of the student. The Science day celebrations culminated with a Valedictory function on 28February.

U R Rao Satellite Centre is privileged to have Prof. Sharada Srinivasan of National Institute of Advanced Studies as the chief guest of the Valedictory function and deliver a talk on "Art and Science of Indian metals heritage".

A large numbers of schools responded with great enthusiasm to participate in the events. The organizing committee hopes that the interaction among young students from different schools has provided an enriched experience. Also the event that is conducted exclusively for teachers would have helped in exchanging ideas among the peer group. The overwhelming response with enthusiastic participation from students and teachers has given the organizing committee immense satisfaction.

The NSD-2019 Souvenir captures all the events along with names of the winners. The Glimpses aptly bring out the happenings during the celebrations. Prize winning paintings have been incorporated in the Souvenir. Abstract of the invited talk and synopsis of NSD events have also been included. Chairperson, members of the organizing committee and the sub-committees, hope that the activities compiled for the NSD-2019 has achieved its intended purpose and thank all the participating students and teachers for making this event a grand success.

R. Ramasubramanian Chairperson, Organizing Committee NSD 2019

Glimpses NSD-2019



PROF. SHARADA SRINIVASAN, CHIEF GUEST - NSD 2019

Prof. Sharada Srinivasan is a Professor at the National Institute of Advanced Studies (NIAS), Bengaluru. She has made pioneering contributions to the study of archaeology and history of art from the perspective of exploring engineering applications in these disciplines. She has earned her PhD from the Institute of Archaeology, University College London (1996) on Archaeometallurgy of South Indian bronzes, MA from School of Oriental & African Studies, London (1989) and B Tech in Engineering Physics from IIT Bombay (1987).

Prof. Sharada Srinivasan's landmark contributions include archaeometric characterisation of bronzes of South India using lead isotope analysis and archaeometallurgical studies on ancient mining and metallurgy in southern India. She has skillfully integrated archaeological, artistic and historic perspectives with scientific perspectives in her research papers numbering about seventy. Prof. Sharada Srinivasan is a Fellow of the Royal Asiatic Society of Great Britain and World Academy of Art and Science. She has many awards to her credit, few of the prominent ones include the Dr. Kalpana Chawla Young Women Scientist Award for 2011, the Indian Institute of Metals, Certificate of Excellence 2007, Materials Research Society of India Medal 2006, the Malti B. Nagar Ethnoarchaeology Award (2005), the DST-SERC Young Scientist Fellowship, the Flinders Petrie Medal 1989 from University of London, the Materials Research Society Graduate Student Award 1996 and the DST Nurture Scheme and Young Scientist Awards.

She is first author of the book "India's Legendary Wootz Steel" and contributing author to "Ecstasy of Classical Art", the bronze catalogue of National Museum, Delhi and co-editor of "Digital Hampi". She is also an acclaimed performer of the classical dance form of Bharata Natyam and has given numerous lecture-demonstrations.

Art and Science of Indian metals heritage Abstract

The role of scientific techniques in throwing fresh light on problems in the study of history and archaeology has been growing over the past few decades. The study of archaeomaterials using a range of materials characterization techniques has attained significance while geospatial studies have helped throw more light on the extent of archaeological sites. The talk reflects on some aspects of the relevance of technical investigations in throwing light on various aspects of material culture, dwelling particularly on some case studies of archaeometallurgical research from southern India. Some insights from a combination of archaeometallurgical and ethnoarchaeological studies are touched upon such as the traditions of image casting going back to Chola bronzes from Tamil Nadu and of hightin bronze working going back to peninsular megalithic sites, the rare craft of making delta bronze mirrors as in Kerala and explorations into the production mechanisms of wootz high-carbon crucible steel, using a range of techniques including electron probe analysis, inductively coupled plasma atomic emission spectroscopy and lead isotope ratio analysis. The scope for cross-cultural studies is also enhanced through such scientific methodologies.

TEACHERS' EVENT

Scientific knowledge can improve the quality of life at many different levels –from the routine working of our everyday lives to global issues. Science drives our public policies and personal decisions on energy, conservation, agriculture, health, transportation, communication, defence, economics, leisure and exploration. The modern world would not run the way it does, without the understanding and technology that has been enabled by science. This competition prompted the participants to explore the latest advances made in science and how this scientific knowledge impacts our day to day living.



1st Prize: Suman P Raman

(Poorna Prajna Education Centre)

2nd Prize: Monika Bagchi

(BGS National Public School)

3rd Prize: Geetha Hudge

(Lewa High School)

Consolation: Nitin Patil

(Narkhede Vidyalaya HRSEC

College, Maharashtra)

SCIENCE QUIZ

Science Quiz is one of the prime events of National Science Day, conducted on 28th February. This team event in Category C, with 3 members per team, aims to foster scientific knowledge among students, develop the spirit of enquiry and bring awareness of the developments in the field of science. Enthusiastic participation from more than 30 schools in the written preliminary round, saw six team getting selected for the finals. The students excelled in the interesting finals, with six varying rounds, to give us our deserving winners.









CATEGORY C

1st Prize: National Public School, HSR Layout

2nd Prize: Teja Vidyalaya

3rd Prize: BGS National Public School

Consolation: Rashtriya Military School, Bangalore

TEST OF SCIENTIFIC TEMPER

This competition was mainly to test the reasoning ability of students to happenings related to normal day-to-day activities and observations of things around them. The students were expected to answer based on scientific principles/concepts. The event "Test of Scientific Temper" tried to explore scientific awareness among student community.



CATEGORY C

INSARM Award: Utkarsh Singh (Sindhi High School,KK Road)

1st Prize: Arnav Aditya Singh (National Public School, HSR Layout)

2nd Prize: Kiran S Rajapurohit (Sindhi High School,KK Road)

3rd Prize: Ishaan Chaudhary (BGS National Public School, Hulimavu)

Consolation-I: Sai Sudheer (Presidency School, Kasturi Nagar)

Consolation-II: K Akshith (Kendriya Vidyalaya, NAL)

INNOVATIVE IDEAS

The competition was designed to challenge the students with problems/situations. The students brought thier innovative ideas with thier science knowledge to provide answers to the given problems/situations. In this process, students were stimulated to apply science creatively and also to the societal benefits





CATEGORY B

1st Prize: Presidency School, Kasturi nagar

2nd Prize: Sishu Griha

3rd Prize: Oxford Senior Secondary School, JP Nagar

Consolation: Kendriya Vidyalaya, NAL

CATEGORY C

1st Prize: National Public School, HSR Layout

2nd Prize: Kendriya Vidyalaya, Malleswaram

3rd Prize: Presidency School, Kasturi nagar

Consolation: Sri Vidya Mandir High School







ESSAY WRITING

HINDI / KANNADA /ENGLISH

This event aimed at assessing the writing skills as well as testing their understanding of the subject. It was an individual event. Students were expected to write on the given topic in one of the languages: Hindi, Kannanda or English. Best essays were selected for the award of prizes based on the content, coherence and presentation styles. Importance was given for the novelty of the ideas presented.

CATEGORY B

Dr. Kasturi Rangan Award : Anoushka Upadhyay (Gopalan National School)

HINDI

1st Prize: Deepankar Kodlekere (Poornaprajna Education Centr

2nd Prize : Sreelaksmi Shenoy (Gopalan National School) 3rd Prize : Akanksha Sharma (Shishya BEML Public School)

Consolation: Shravya N B (Sindhi High School, K K road)

KANNADA

1st Prize : Gowri T N (St. Thomas Public School)

2nd Prize: Ramya S Reddy (Lewa English High School)

3rd Prize: Bruhathee S Kaddi (Sindhi High School, K K Road)

Consolation: Arya Sandeep (St. Paul's English School)

ENGLISH

1st Prize : Pranavi. D. A. (Prarthana Central School)

2nd Prize: Anoushka Goswami (National Public School, HSR)

3rd Prize : Annette Costa (St. Francis Xavier Girls High School)

Consolation : Manvith H (St. Paul's English School)

CATEGORY C

Dr. Kasturi Rangan Award : Pranjali Hebbar (Cluny Convent School)

HINDI

1st Prize : Anshi Mishra (Kendriya Vidyalaya, NAL)

2nd Prize: Pragathi Panchangam (BGS National Public School)

3rd Prize: Kalash Jain (Sri Aurobindo Memorial School) Consolation: Divya Lahoti (Sindhi High School, K K Road)

KANNADA

1st Prize : Lakshmi Kamath (V.V.S. Sardar patel High School)

2nd Prize : Ashwini kumble (BGS National Public School) 3rd Prize : Aishwarya V Shetty (Prarthana Central School)

Consolation: Shreehari G Navaratna (MES Kishor Kendra High School)

ENGLISH

1st Prize : Anushka Thakur (National Public School, HSR)

2nd Prize: Rishik R Pavani (Global Indian International School)

3rd Prize : S Sree Ganesh (Kendriya Vidyalaya, NAL)

Consolation: Laxmi G. Joshi (V. V. S. Sardar Patel High School)









EXTEMPORE SCIENCE ELOCUTION

This event aimed at improving students' oratory skills as well as testing their knowledge about general science. It was an individual event. Students were expected to speak for 3 (three) minutes on a topic picked up 10 minutes earlier. All topics were related to textbook science and wellknown scientists.















CATEGORY B

1st Prize: Shrivats Bhaskar Patham (Sishu Griha Montessori and High School)

2nd Prize: Devika S Nair (Presidency School, Bangalore East)

Abhay Datta (Prarthana Central School)

3rd Prize: Saathvik S Sundar (Sishu Griha Montessori and High School)

Consolation I: Shripurna J Patil (Prarthana Central School)

Consolation II: Sakshi N Prabhakar (Sindhi High School, K K Road)

CATEGORY C

1st Prize: Atika Zainab (St. Paul's English School)

2nd Prize: Anuradha Shenoy (Sri Vidya Mandir Education Society)

3rd Prize: Chandan M (Sindhi High School, K K Road)

Consolation I: Sayali A Paramane (Presidency School, Bangalore East)

Consolation II: Vyjayanthi Prabhu (Sri Vidya Mandir High School)

SPOT PAINTING

Spot painting is one of the most sought after events in National Science Day Celebration. It brings out the natural talent in the kids about sharing their ideas and thoughts through drawings, colours and paintings. The theme was based on Science and Technology hence it served as medium to educate young minds about applications of science for better living. It also imparted awareness about ISRO and its mission for nation and its development.

CATEGORY A

1st Prize: Manya S. Gowda (Poorna Prajna Education Centre)

2nd Prize: Manha Saheer (Amara Jyothi Public School)

3rd Prize: Paavani Khattar (Presidency School)

Consolation-I: Rayan (Global Indian International School)

Consolation-II: Bhavika Kothari (Chrysalis High, Varthur)
Budding artist-I: Dharikashree (Prarthana Central School)

Budding artist-II: Riddhima Goojer (Kendriya Vidyalaya, NAL)

CATEGORY B

1ST PRIZE: Parikshith K. V. (Sri Aurobindo Memorial School)

2ND PRIZE: Shashi Bhushan (Poorna Prajna Education Centre)

3RD PRIZE: Smruti Sagar Kavi (Sri Aurobindo Memorial School)

Consolation-I: Saurya Aditya Sahu (BGS National Public School)

Consolation-II: Svithi Shimjit (Presidency School)







SCIENCE SKIT

The Science skit held at NSD 2019 has participation from (thirteen) schools who will be performing the skit in English and Kannada. The topics chosen by the participants vary widely from Science in agriculture to Nuclear science, refelecting their interest and in consonance with the overall theme. The event presents an oppurtunity to bring out the creativity of the budding minds and express themselves to the fullest. It also brings in a sense of camadarie and team work among the students which are essential ingredients to convey the concept / idea chosen, by them.









1st Prize: Presidency School, East

2nd Prize: Prarthana Central School

3rd Prize: Kendriya Vidyalaya, NAL

Consolation: BGS National Public School

ORGANIZING COMMITTEE

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Padmanabhan	TSG	Member
Sankarasubramanian K	SAG	Member
Ramachandra	Facilities	Member
Venkata Sastry Vadlamani	PSG	Member
Umakant	PPEG	Member
Meena Ravindra	LDD	Member
Head, Transport	Transport	Member
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TEACHERS' EVENT

Lalitha Abraham M A

Darukesha B H M

Nagaraja T M

M C Ramadevi

Gautami Sudarsan

Revanna K

PendyalavagdeviBhargavashilpa

EXTEMPORE SCIENCE ELOCUTION

Arjun Dey
Pijush Kanti Pattanayak
Neelima V
Priyanka Ojha
Dr. Akhilesh Kumar
Parth Sharma
Lalit SinghSyunary

SCIENCE QUIZ

Anuradha S Prakasha
Shashank S
SarwadeAbhilashRajendra
ArchanasinghGoojer
Priyanka Bhoi
Pasala Bharath Kumar Reddy
Kush Sreen
Ghanshyam
Ranjith V

SPOT PAINTING

Bhanu Bhasin
Kameshwar Vernwal
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Nisamudeen P N
Tembhare Roshan Bhaktapralhad
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Megha Maheshwari
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Dr.Sankarasubramanian K
SmratiVerma
Anand S K
Navneet Kumar
Netra S Pillai
Megha Maheshwari
Srikar PaavanTadepalli

ESSAY COMPETITION

Dr. Radhakrishna V
Chandrasekhar M V
Netra S Pillai
SrikarPaavanTadepalli
Vivek Kumar Agrawal
Mohamed Azaruddin
Meenal
Braj Bhushan Gupta
Anand Jain

TEST OF SCIENTIFIC TEMPER

Umakant
Venugopal U
Ravi Kulkarni
Shyama Narendranath K C
Sabari Sreekumar
Ranjith V
Vikram V
K Viswanatha Sarma
Harshavardhan J
Mananjay Kumar Verma
Navdeep Garg

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Mamatha D

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Velu T
Katyayini

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Padmanabhan
Ghanshyam



PRIZE WINNING PAINTINGS

