

The staff club conducted several annual events in badminton, cricket and lawn tennis for its members. The gymnasium is being regularly used and its infrastructure is being upgraded by having motorized treadmill, cross trainer, cable crossover etc. Summer Camp 2019 was organized from 5<sup>th</sup> May to 4<sup>th</sup> June 2019 for the children of Staff Club members. Various sports and cultural activities conducted during the camp were kho-kho, table tennis, badminton, pickle ball, lawn tennis, taekwondo, chess, art and craft, musical instruments, dance etc. Staff Club is also involved in arranging coaching for children of the members by professional coaches.

In addition to sports activities, a few fitness events and lecture by experts were also organized. Cyclothon-2019 was conducted on 30<sup>th</sup> March 2019 in three age group categories. Around 200 participants took part in the event. A lecture on "Secrets of Mind-Body and Alternate Healing" by Dr. Sudhir Khetawat, Chairman, Acupressure Academy and Hypnotherapy Research Centre, Indore, was organised on 1<sup>st</sup> February 2019. Another lecture on "Tips for Healthy and Happy Living" by Dr. Bharat Rawat, Associate Director, Cardiology, Medanta Hosiptal, Indore was organized on 15<sup>th</sup> March 2019. As part of "International Yoga Day" celebrations, special camp on pranayam was organized during 6<sup>th</sup> to 19<sup>th</sup> May 2019 under the guidance of pranayam expert Shri Chandra Shekhar Azad. On 21<sup>st</sup> June 2019, a special yoga session was also conducted. One-day free medical check-up camp for measurement of bone mineral density was organised on 17<sup>th</sup> March 2019 under the guidance of Dr. Abhay Manchanda, Orthopaedic Surgeon and Past-President, Indore Ortho-Association. A three-day long workshop on "Concepts of Interior Design" by Mrs. Ashvini Ghodke, Interior Designer was organised from 10<sup>th</sup> to 12<sup>th</sup> May 2019 for the benefit of families of the RRCAT staff.



*Cyclothon-2019 being flagged-off.*

RRCAT staff club sincerely acknowledges support from Director, RRCAT, with special thanks to Construction and Services Division and volunteers.

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### N.19: Clean and green campus initiatives at RRCAT

RRCAT, since its inception, had given top priority to the activities related to cleanliness and green cover enrichment in the campus. This was given a new thrust with 'Swachha Bharat Abhiyan', which is one of the top priorities of the Government of India. This report describes various initiatives taken at RRCAT in the direction of conservation of the environment.

#### *Disposal of waste and sewage:*

The key for cleanliness lies in the safe disposal of all types of wastes. The accumulated dry waste is presently collected for disposal by Indore Municipal Corporation. The wet waste is processed for producing biogas and organic manure for horticulture use. The biogas is utilized in the kitchen of RRCAT Guest House and Hostels Complex. Bins have been placed at discrete locations for the collection of plastic waste, e-waste, garden waste, etc. About 50 MT of garden waste collected in the township is being processed using bacteria culture and vermiculture technique to generate nutrient-rich organic manure for gardening.



*Sewage treatment plant in the technical area.*

Entire sewage of RRCAT colony is conveyed and treated at oxidation pond. Presently, the whole treated effluent of the oxidation pond is being used for horticulture activities.

#### *Upkeep of water bodies:*

The Sukhniwas Lake in the campus is maintained by periodically removing aquatic weeds, and carrying out desilting during summers, etc.

#### *Plantation campaigns:*

Regular plantation campaigns are organized every year to increase green cover in the campus. As a part of this activity, this year a campaign for preparing Neem (Azadirachta Indica) seedlings with the participation of the colony residents was organized in the month of June 2019. The residents were given the know-how to prepare the saplings along with polybags and home-made manure. This was an attempt to bring masses closer to the nature for the conservation of the environment. The Neem is an indigenous sustainable plant species. The saplings so grown shall be utilized in future plantation campaigns.



*Demonstration of procedure to prepare the Neem seedlings for the students and colony residents.*

### *Measures for conservation of water and soil:*

More than fifty continuous contour trenches were dug this year during summer along the sloppy grassland-terrains of the technical campus. This is to conserve and check water runoff and soil leaching during rainfall. The contour trenches also allow water percolation in soil. This is an effective way of conservation of water and soil around the area.



*Continuous contour trenching on slopes.*

About fifteen years ago, an artificial lake was created to augment the storage capacity of the Sukhniwas Lake, which has improved the groundwater level. The overspill from this lake is brought to the Sukhniwas Lake through a pond located midway, which has drastically reduced the silt content reaching to the Sukhniwas Lake.



*A view of an artificial lake near guardhouse.*

### *Increasing use of solar power :*

As a regular exercise of augmenting installed capacity of renewable energy resource, a solar powered 3 HP submersible pump set with a control panel has recently been commissioned in the colony. The water pumped from the open well is being utilized for watering the nearby plantation using drip lines and operating a fountain.



*Solar powered pump for horticulture needs.*

The Construction and Services Division has played a vital role in the execution of the activities related to conservation of the environment.

### *Celebration of 'Swachhhta Pakhwada':*

The second fortnight of February, which includes National Science day, is observed every year as 'Swachhhta Pakhwada' in all DAE units. RRCAT also commemorated this event during 16 - 28 February, 2019, in which many innovative cleanliness related initiatives were taken, which include: public awareness programmes, hands-on cleanliness drives in the technical as well as colony area, painting competitions, street march showing placards on cleanliness, street plays, quizzes on cleanliness and hygiene, and, pledge by students and teachers. Photographs captured during some of the events are shown below. Special efforts are being made to reuse construction debris and plastic waste gainfully.



*Short films on Swachhhta screened before the Science Day gathering; RRCAT employees participating in cleanliness campaigns and quizzes; Reuse of construction debris for earth retaining structures; Reuse of plastic waste (cable sheath) as protective gaskets against sharp edges of thin CRGO sheets.*



Events organized in AECS, Indore, during the Swachhta Pakhwada.

Apart from these, a competition for the 'Cleanest office of Division / Independent Section' was held and a survey for the same was conducted to further motivate the staff members to keep their offices neat and clean.

A detailed report on various activities carried out during the pakhwada is available on RRCAT website (<http://www.rrcat.gov.in/organization/cat/GreenRRCAT.html#>). A committee constituted by the Secretary, DAE, for evaluating the performance of the participating units awarded RRCAT the certificate of excellence with second rank among all DAE units, for its exemplary work in the pakhwada.



Certificate of Excellence with second rank to RRCAT in appreciation of the Swachhta related initiatives.

The appreciation of the Swachhta related initiatives by DAE is basically culmination of the team effort of all RRCAT employees, AECS Students and teachers, and CISF staff.

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### N.20: RRCAT Seminars during January-June 2019

**Insights into novel group IV semiconductors – from isotopically engineered materials to non-equilibrium alloys:** *Dr. Samik Mukherjee, Postdoctoral Research Fellow, Ecole Polytechnique Montreal, Canada, January 14, 2019.*

In this talk, Dr. Mukherjee outlined the recent progress in the area of isotopically engineering group IV semiconductors with focus on nanoscale and quantum structures, and devices. The atomistic-level investigations of isotopically programmed nanoscale materials were presented based on laser-assisted atom probe tomography. In later part of the talk, he focused on prospect of monolithic integration of optoelectronic devices on Si-platform using Sn-rich group-IV metastable alloys. Such integration is a long-sought-after paradigm which holds the key to a myriad of opportunities in ultrafast data transfer, low-power electronics, energy conversion, and sensing, to name a few. Recent results related to the growth and atomistic-level characterization of GeSn and SiGeSn alloys were highlighted by the speaker.



**Development of cryogenic engines for ISRO's launch vehicles:** *Dr. Nawal Kishore Gupta, Former Deputy Director and Project Director for Cryogenics at ISRO, February 04, 2019.*

This talk covered various interesting aspects of ISRO launch vehicles and their associated developmental stories. Denial of imported technology in the 1990s proved to be blessing in disguise for ISRO scientists to develop the technology of their own, for the launch of next generation Geosynchronous Satellite Launch Vehicle, GSLV MK II and MK III. Similarly, denial of cryogenic engine had helped the country to independently develop cryogenic upper stage. PSLV is used for launching remote sensing satellites and GSLV is used for launching communication satellites. ISRO indigenously developed cryogenic engine for its launch vehicle MK III that can put 4-Tonne geosynchronous satellite in GTO.



**Challenges in engineering product development:** *Prof. N. S. Dinesh, Professor, Dept. of Electronic Systems Engineering, IISc, Bengaluru, February 15, 2019.*

Product development aids in self-reliance and prosperity of any country. Engineering product development is a synthesis of several disciplines. Product development is a passionate endeavour of experts from

