

## **Scholars deliver talk on range of topics on NSD celebration of ARCI**

Scholars from some of the premier institutes all over India delivered talks of topics ranging from 3D printing, alloy design, water purification, artificial intelligence, renewable energy, smart materials at a talk series organized by International Advanced Research Centre for Powder Metallurgy & New Materials (ARCI) on the occasion of National Science Day.

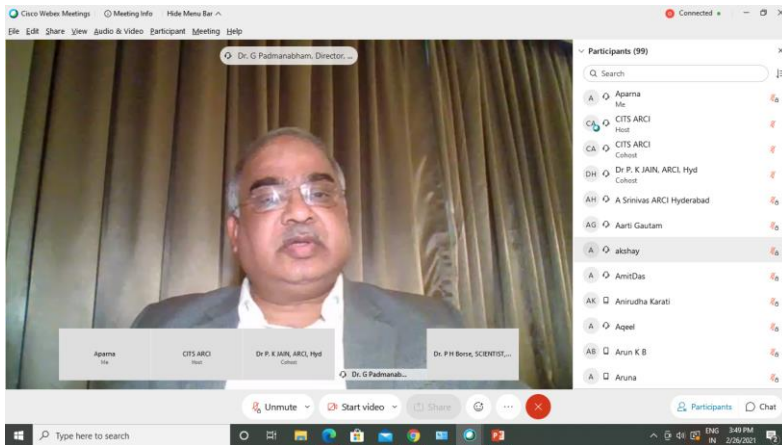
The best three among the young research scholars from IISc, IITs, NITs and Universities who participated in the talk series were evaluated based on a 3-minute presentation were selected by a panel of eminent professors and senior scientists based on the novelty, scientific/technical content and relevance to societal needs.

The prize winners were Ms M. Sai Kiran, DST Inspire Fellow (SRF) from Sri Sathya Sai Institute of Higher Learning, Anantapur Campus, Ms Jagriti Singh, Research Scholar, Centre for Nanoscience and Engg., IISc, Bangalore and Ms S. Mamatha, Research Scholar, Centre for Ceramic Processing, ARCI, Hyderabad.

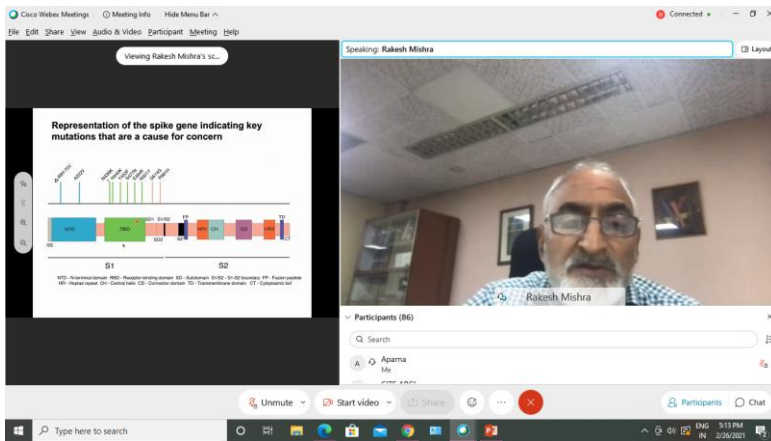
Speaking on the occasion, Dr G. Padmanabham, Director, ARCI, congratulated the young scientists for carrying out materials research in socially relevant areas such as energy, health, environment, advanced manufacturing and so on. He urged the young researchers to elevate their curiosity not only in understanding the scientific phenomena but also the social circumstances in which they live. While mentioning that the best science is happening at the interface of different science streams, he highlighted the importance of interaction among young researchers across disciplines. He underscored emerging materials research trends such as metamaterials, high entropy alloys, application of artificial Intelligence in understanding & designing materials, 3D Printing and so on.

As a part of the ARCI's outreach activity, Dr Padmanabham released ten 'Science and Technology Demo Videos for Students' based on ARCI technology developments. These will be circulated to all schools in the form of a DVD and will also be available on the ARCI website ([www.arci.res.in](http://www.arci.res.in)). More such videos will be periodically added on to the ARCI website.

Dr Rakesh K Mishra, Director, CSIR-CCMB Hyderabad, elucidated the challenge, the exciting science, the rigour and the practical aspect of deploying a usable vaccine in the current pandemic situation at the National Science Day talk on 'The Science, Development and Deployment of Vaccines'.



Dr G. Padmanabham, Director, ARCI



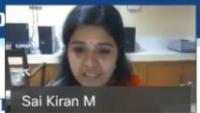
Dr Rakesh K Mishra, Director, CSIR-CCMB, Hyderabad

**FIRST PRIZE WINNER**



# Self assembled PVA-based hydrogel beads for effective defluoridation of ground water

Ms. Sai Kiran M, DST-INSPIRE fellow (SRF), Department of Chemistry, Sri Sathya Sai Institute of Higher Learning, Anantapur Campus, Anantapur



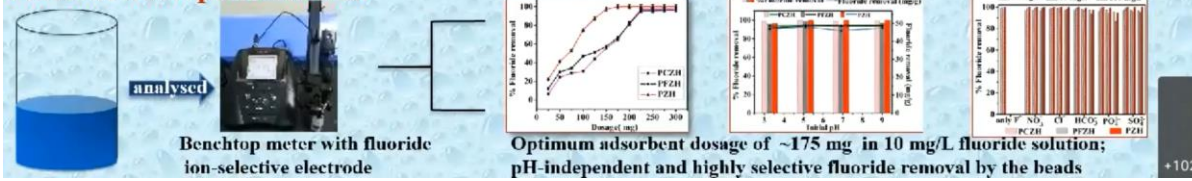
**Introduction:** Fluoride contamination-a matter of global concern; 184 districts in India suffer due to high fluoride in groundwater.

**Objective:** Synthesis of biocompatible, reusable, highly selective, user-friendly adsorbent with high fluoride removal capacity for real-time water samples.

### Synthetic scheme:



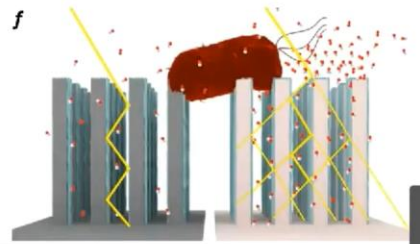
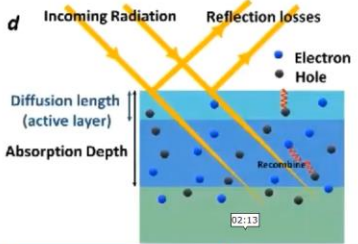
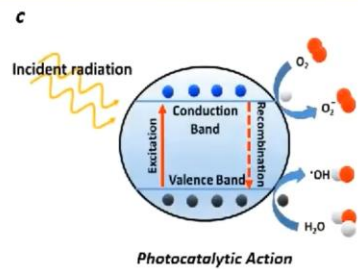
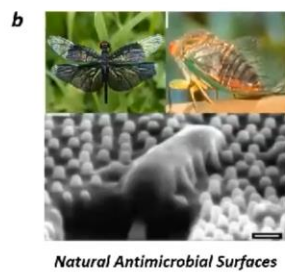
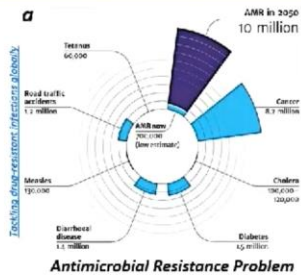
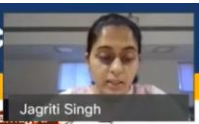
### Fluoride adsorption studies:



## SECOND PRIZE WINNER

# The optical wrestle : Why Is Black Silica Better than Black

Jagriti Singh\*, Shubham Jadhav, Sushobhan Avasthi, and Prosenjit Sen, Centre for Nano Science and Engineering, Indian Institute of Science,



## THIRD PRIZE WINNER

### 3D Printing of Ceramics - An Emerging Technology

S. Mamatha, Papiya Biswas, Dibakar Das, Y Srinivasa Rao and Roy Johnson  
International Advanced Research Centre for Powder Metallurgy and New Materials (ARCI)

DA

Dr M Buchi Suresh A

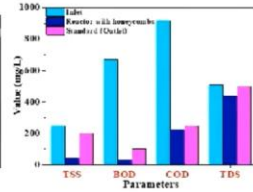
- Need for Indigenisation of the equipment and process: Demonstrated ceramic 3D printing process based on an indigenous polymer printing machine in combination with ceramic extrusion expertise of ARCI
- Novel environmentally friendly methyl cellulose based gelation process applied to 3D printing for the first time as a substitution of UV polymerization (*published in Journal of Alloys and Compounds, 770 (2019), impact factor: 4.650, Ceramics International, 44 (2018), impact factor: 3.830, Ceramics International, 45 (2019), impact factor: 3.830*)

#### Applications Developed :

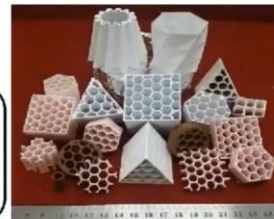
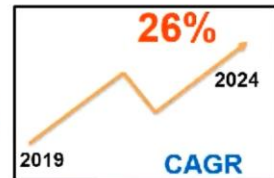
- 3D printed honeycombs as substrates in bioreactor for Sewage treatment and met stipulated environment standard



Bioreactor with honeycombs



Performance markers such as TSS, BOD, and COD have shown substantial reduction confirming to the stipulated standard



3D printed samples (ARCI)

- Advantages of 3D printed honeycomb substrates with optimum surface to volume ratio for miniaturization, weight reduction and high mass transfer offering flexibility to design the phytoreactors economically (*Journal of Water Processing Engineering Technology, 37(2020) impact factor: 3.465*)