

## In this issue

### Women in S&T *Indian scenario*

Science bows to the weight of evidence and there is ample evidence to show that women are equal to men in their ability to contribute to the growth of science and technology. Yet the low representation of women in science and technology institutions in the country, especially at the higher echelons, shows otherwise.

A General Article in this issue provides data on the recruitment of women over the last 30 years in IISc, IITs, IISERs, NITs, CSIR organisations, top 10 universities, top 20 colleges and other research-rich institutions. Older institutions such as the IISc and the first few IITs have the least percentage of women, hovering around 10%. The average of women faculty in IISERs is marginally better – about 15%. The situation in NITs is better than in IISERs. Cases such as the Savitribai Phule Pune University and the Amritha Vishwa Vidyapeetham that can boast of more than 40% are rare.

Besides analysing the data, Akanksha Swarup and Tuli Dey from the Savitribai Phule University, Pune have some recommendations to reduce the gender gap in science and technology institutions. Turn to **744** for more.

### Frost Heaves in Leh–Ladakh

In the cold arid regions of Leh–Ladakh, water under soil freezes and expands in winter, and the soil above swells up creating mounds. The frost heaves, as they are called, change the landscape and transform the local ecology, often leading to land degradation, reducing the population of edible plants and encouraging invasion by plants with traits that can survive the phenomenon.

Scientists from different institutions under the ICAR have been conducting field surveys on frost heaves in the region from 2013 and now, armed with high resolution satellite imageries, they provide us a micro and macro viewpoint on frost

heaves – the evolution of their morphologies, the soil and water characteristics and the ecological succession that is happening at different altitudes.

For insights on this curious phenomenon, read the Research Article on **page 799** in this issue.

### Monitoring Forest Fires *A citizen science initiative*

The resin-bearing pine trees of the Western Himalayan states of India are highly prone to fires. Forest fires are created purposely or by negligence. Whether the fire is natural or manmade, when it gets out of control, it causes loss of lives, destruction of property and harms the ecology and environment.

Tracking forest fires using satellites is periodic and the fires that start after the satellite passes and before the next pass are not reported. Moreover, small fires and fires under the canopy are not detected. And small control fires created to avoid the risk of large scale fires are also not detected by satellites.

Researchers from the Indian Institute of Remote Sensing have now come up with a citizen science-based geospatial solution to help the Jammu and Kashmir Forest Department report active forest fires. They created an android app and a web dashboard that can be used by forest officials to photograph any fire with GIS tag and upload relevant information to a central server for visualisation and direct action by field staff.

In some remote areas, mobile signals are not available to send the data. To account for such cases, the application has an offline storage functionality to store the observed data. From late 2018, more than 500 fires were identified using the app.

Read the details of the development of the forest fire reporting geospatial solution and its far reaching implications for citizen science, in a Research Article on **page 780** in this issue.

### Intensification of Cyclone Ockhi

At about 8:30 on the morning of 29 November 2017, there was a depression in south of Cape Comorin. Within a span of nine hours it developed into a cyclonic storm. Normally it takes about 24 hours for a depression to develop into a cyclone. What are the factors that propelled the cyclone to develop in such a short period?

Scientists from the IITM Pune and the Savitribai Phule Pune University examined all parameters of the issue again from a thermodynamic perspective. They found a lacuna in the genesis potential parameter used in the models to capture cyclogenesis and to estimate intensity with lead time for enabling responsive action. The models considered sea-surface temperature, but not the local heat content of the sea. The anomalously warm ocean conditions in the Arabian Sea had a role to play in the genesis and rapid intensification of the cyclone. But the models failed to capture the air–sea interaction fuelled by these warm waters.

By tweaking the model appropriately, using a modified genesis potential parameter, they found that the behaviour of the cyclone would have been predictable. The modified parameter can now be used to predict future cyclones in the area. Read the details in the Research Article on **page 771** in this issue.

### Natural Molecules *Anti-SARS-CoV activity*

A Review Article in this issue brings together the latest evidence on the effectiveness of a large number of plant secondary metabolites against SARS-CoV. And the authors ask: if they are effective against SARS-CoV, will they not be effective against SARS-CoV-2 too?

A resource for those who are interested in developing antiviral strategies. Turn to **page 757**.

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