

In this issue

Paid Publishing

In the era of fund crunch?

An average Indian researcher cannot afford to pay US\$ 35 for a scientific paper that is four or five pages long. So when open publishing became an increasing trend in the internet era, there was a sigh of relief. And then voices could be heard protesting the lack of easy accessibility to publicly funded research output. The business model that supported scientific publishing became shaky.

So open publishing was co-opted and a business model was formulated for open publishing. Instead of charging the costs to researchers, who would like to read the papers, charge it to the authors. Thus there are journals that charge up to US\$ 5000 to publish a paper. An amount that most Indian researchers can ill afford. So quite often, the agencies that fund the research end up paying. A General Article in this issue estimates that a total of about US\$ 2.4 million may be spent annually to publish research.

Should India be spending this amount? What are the other options? Read on from **page 703**.

Clearing Foggy Ideas

Measurements matter

Why are Delhi and surrounding areas enveloped by dense fog in winter? Nobody had the foggiest idea. But then ignorance can be costly. The time spent navigating the roads in the fog and the loss to the aviation industry that is forced to delay take off and landing in not only Delhi, but Jaipur, Amritsar, Varanasi and Lucknow, became huge enough to warrant the focussed attention of the scientific community. And the winter fog experiment of the Ministry of Earth Sciences was born.

A Research Article on **page 767** in this issue provides details on the experimental set-up, instrumentation and dataset of the two-month long winter fog field campaign conducted at the Indira Gandhi International Airport in Delhi. A summary of the preliminary

results on the physical, chemical and optical properties, microphysics and dynamics of fog is also provided.

The parameters that help us forecast fogs, a few hours before the event sets in, are a major outcome of the experiment. The experiment will be repeated in the next few winters. And with the data available, perhaps we might even be able to formulate some relevant hypothesis to answer the riddle of the winter fog over the Indo-Gangetic Plains and answer the question of why the number of foggy days has been increasing from the 1980s.

Neuroimaging Trends

Bibliometric analysis

Between 2003 and 2014, about 23,000 papers and more than 1000 reviews were published in the subject area of neuroimaging. There are more than 56,000 scientists as authors. Besides fMRI, new techniques have evolved in the last decade that deal with connectomics and the discipline is now ready to take a bird's eye view on emerging hot areas of research. And that is what scientists from Hong Kong and Japan provide in a Review Article in this issue.

Who are the top authors? What are the patterns of inter-institutional and international collaborations? Which are the journals that have come to specialize in the area? How have they fared in terms of citations? What topics get more citations? What are the buzzwords in the discipline?

Read the bibliometric study on **page 725**.

Live Cell Nanoscopy

New technologies and techniques

Microscopy opened up a vision of the micro world. But the wavelength of light posed a limitation to the resolution of images. We could not resolve structures close to 200 nanometers. The electron microscope improved resolution. But the process was elaborate and the sample had to be 'fixed'.

Enter nanoscopy. Based on the unique photoswitching property of

fluorescence molecules, we can create images of structures within the cell. And the resolution goes down to about 20 nanometers. Photochromatic fluorophores (dyes and proteins that can flip between fluorescence and non-fluorescence states when exposed to specific wavelength) produced images that were not seen earlier – ionic channels, the movement of molecules in a synapse, location of specific molecules within the cell...

In this issue, scientists from Singapore and Japan come together to present a review of the technical options that can be used to produce super-resolution images of live cells. The evolution of new technologies that will revolutionize biology is still in its infancy. The number of publications in the field will perhaps rise steadily in this decade. You can make a start with the review **page 714**.

Knowledge Technologies

For rural empowerment

High speed internet connection to every village in India is not too distant a dream. But when we wake up to that reality, what are the issues that need to be considered? What kind of capacity building exercises have to be undertaken to empower the villagers to use it to empower themselves to sustain development in a knowledge economy?

The Rajiv Gandhi Technology Commission facilitated a study in Pandharpur, Maharashtra. The Bhabha Atomic Research Centre provided the technological and technical support and the Shri Vithal Education and Research Institute hosted the experiment.

From identifying the needs of the villagers to matching those needs with technological solutions to creating ownership of the CILLAGE or cyber village, there are procedures and protocols that make the project successful. On **page 750** in this issue, read about the lessons learned for applying in the immediate future.

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