

## In this issue

### Indian Coastal Radar Network *Measuring currents and waves*

We see waves in oceans because of electromagnetic waves of frequencies ranging from 430 to 770 terahertz. Bring the frequency down to a few megahertz. When the wavelength of the electromagnetic wave is about half of that of the waves, the scattering brings out a remarkable peak signal that gives us an indication of the wave height. And if there is a current in the ocean, this peak seems to shift – akin to the Doppler shift in sound waves. These two phenomena have led to a technology that provides more precise information about waves and currents in the sea than do the buoys set up after the historical 2004 tsunami.

Researchers from the National Institute of Ocean Technology, Chennai give us a bird's eye view of the technology, its present deployment on Indian coasts and its multifarious uses. See the General Article in this issue, **page 372**.

### Food for Frugivorous Birds *Lantana competes for dispersal?*

Lantana was introduced into India about 200 years ago. Since then, the plant has invaded every nook and corner of the subcontinent. The birds that eat the fruits of the plant, and deposit the seeds elsewhere were responsible for this rapid spread.

What is the effect of this invasion on other plants whose fruits are eaten by birds and whose seeds are similarly dispersed? Does lantana pose a threat to the dispersal of other fruit trees that birds like to consume?

Researchers from the Nature Conservation Foundation, Mysuru and the Wildlife Institute of India, Dehradun set out to explore. In and around the campus of the Rishi Valley School in Andhra Pradesh, there is an area of about 60 ha that is protected by fencing. In this area, lantana plants coexist along with other native plants that are attractive to birds as sources of food. The researchers selected two native plants that are regularly visited by frugi-

vorous birds there – *Erythroxylum monogynum* and *Flueggea leucopyrus* – for comparison with lantana.

And they selected patches of 30 meters radius in which at least three focal species were present. Then came long and laborious hours of observation from afar, collecting data with binoculars. They report their results in a Research Article in this issue. Turn to **page 405** for more.

### Queue Dissipation at Signal *Traffic headway modelling*

You stop at the traffic signal. The light turns green. Urged by honking, you start moving. Cars, SUVs, buses, vans, two-wheelers and three-wheelers mingle, with utter disregard for lanes or stop lines, creating mind boggling complexities for those who want to model traffic at intersections in Indian cities. In any case, the models developed elsewhere in the world do not work well here.

The behaviour of traffic seems different in different cities. The width of the road also impacts traffic headway when the light turns green. So even within cities the behaviour of traffic varies.

How long the signal should remain green depends on the rate of queue dissipation. The managers of traffic need something more than just experience and gut feeling to make their decisions.

Satyajit Mondal and Ankit Gupta from the IIT-BHU set out to model the chaos at traffic intersections and collected data from three Indian cities. In a Research Article on **page 437** in this issue, they provide a perspective that may help traffic managers: an insight on how much time and how many vehicles cross the green line before the traffic flow stabilises.

### Mining Metals from E-waste

Tonnes of e-waste are generated each year adding to the previous year's lot. Since reducing the production of electronic goods is inconceivable, reusing and recycling are the only ways to overcome the problem. Re-

cycling units, both formal and informal, focus on copper extraction and, often, more costly metals such as gold and silver are overlooked, primarily because of lack of appropriate processes for extraction.

Now, researchers from the NIT Mizoram, the SRM Institute of Science and Technology, Modinagar, and the CSIR-Institute of Minerals and Materials Technology, Bhubaneswar come together to overcome the limitations of presently available techniques by using a combination of microwave heating and leaching. The process, they argue, can be made commercially sustainable. Turn to the Research Communication on **page 463** in this issue, for details.

### Gene Editing made Easy

Clustered regularly interspaced short palindromic repeats (CRISPR) were discovered in the DNA of bacteria some three decades ago. The discovery of CRISPR associated (CAS) genes in bacteria, in the 1990's, clarified their function in bacteria: recognising and disabling viruses and phages that infect bacteria. It did not take long for humans to recognise the value of the CRISPR-CAS system to edit genes. Though zinc finger nucleases (ZFN) and transcription activator-like effector nucleases (TALEN) were added to the tools for gene edition the CRISPR-Cas9 system is still the dominant tool used in synthetic biology. However, the tool left much to be desired: CRISPR-Cas9 also introduces random insertions, deletions, translocations and other base-to-base conversions. So, one ends up with the desired product only 5% of the time. But that situation is about to change rapidly.

P. K. Gupta from the Choudhury Charan Singh University, Meerut, reviews recent discoveries that make gene editing more precise and productive. Read the Review Article on **page 386** in this issue.

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