

5th edition of Science at the Sabha



The panelexhibition titled 'Deep History Sites of Indian Subcontinent' was set up at the entrance of the TTK Auditorium highlighting prehistoric sites discovered over a period of time | SAMEER KULKARNI



(From left to right) Harinath Chakrapani, Shannon Olson, V Madhurima, R Ramanujam answer to questions raised by audience | RITUPARNA PALIT

Continuing fight against antibiotic resistance

SAMEER KULKARNI

In spite of having an arsenal of antibiotics, the drug resistance among the bacteria is increasing in frequency and this a huge public health problem, said Harinath Chakrapani, who heads a laboratory working towards understanding the mechanisms of antibiotic drug resistance at the Indian Institute of Science Education and Research, Pune.

Chakrapani, one of the four speakers at the annual event Science at the Sabha at Music Academy organised by the Institute of Mathematical Sciences, Chennai, was talking about 'Chemical darts to find antibacterial targets'.

Chakrapani explained the process of discovery of drugs. Quinine, which was discovered as the medicine to treat Malaria in the 17th century, was initially just a bark of a tree and it was only later that the specific compound from the bark was synthesised.

His laboratory, he said, through a team of researchers, was finding new ways to combat antimicrobial resistance (AMR), which has emerged as a global public health issue.

Antibiotics consumption has gone up globally, including in India, which means better access to medicines. "But the problem is, consumption of antibiotics is not always necessary - overuse and abuse can be avoided," he added.

In India, according to him, the daily doses have increased, too. Increase in the consumption provides a bigger environment for the bacteria to develop resistance, hence AMR goes up.

He addressed the issue of antibiotic resistance among livestock. India has become a large scale consumer of animal products where excessive antimicrobials are used. Therefore if pathogens were getting resistant then it means that the animals were being over-dosed with antibiotics, he said.

For reasonable solutions to the problem, he said, educating people about antibiotic consumption was important as not completing the prescribed dosage and excessive consumption might result in severe long-term side-effects.

The bacteria developing resistance to antibiotics is natural and has been happening for centuries, he said, it will take few more years to effectively combat antimicrobial resistance.

Changing connections between organisms

SAMEER KULKARNI

Human impact on the ecosystem has disrupted the connections between different organisms, which are fundamental not only to humanity but also to the world, said Shannon Olsson, who heads the Naturalist-Inspired Ecology (NICE) group at the National Centre for Biological Science, Bengaluru.

Olsson was speaking on "Connecting with Nature" at the Music Academy. The annual event, Science at the Sabha, was organised by the Institute of Mathematical Sciences, Chennai.

She talked about the molecular connections between different organisms, including plants and insects, which play an important role in maintaining the stability of the planet. She mentioned pollination (the process by which plants reproduce) and their dependence on bees and other insects.

Bees, according to Olsson, are heavily impacted by increase in the urban pollution and this in a domino effect has also affected the pollination processes. The uninterrupted reproduction of plants is important for growing fruits and vegetables, which are also consumed by humans.

"There are cases of Cardiac arrhythmia among bees," said Olsson, who has developed an Air Quality Index (AQI) sensitive enough for measuring the pollution's impact on bees.

For instance, she added, chillies, which are invariably hot and spicy for humans, are easily digested by the parrots and the seeds excreted by the birds grow into new plants. "Organisms in nature detect chemicals from each other and they are chemically connected," she said.

The climate change and increase in the urban pollution's effect on the agricultural processes should also be studied, she said.

"We are all one planet, things that affect plants, animals and insects will probably have an impact on us, too," she added.

Viewing dance forms through a scientific lens

RITUPARNA PALIT

A detailed study of dance movements can find huge application in robotics, said V Madhurima, speaking at the 5th edition of Science at the Sabha, here on February 16.

"People have analyzed the movements of dancers and sportsmen. I can study movement using an inverse problem approach of a dancer, pick that motion up and apply it to robotics," she said.

Juggling between her love for physics and dance, Madhurima grew up spending her weekdays in academics, and weekends in dance classes. Currently a *Rasika*, a connoisseur of Indian classical dance and music, and a Professor of Physics at the Central University of Tamil Nadu, Thiruvavur, Madhurima has been spending time analyzing the objective aspects of dance, music and photography using the laws of physics.

Talking of *Rasikatva*, the appreciative power of a *Rasika*, Madhurima explained that the aesthetic experience can be better enhanced by understanding movement. She described the three divisions of the human body, as described in *Natyashastra*, *anga* (vital parts like hands, legs, waist), *pratyanga* (secondary parts like shoulder, back, thighs), *upanga* (facial parts) and how each one of them is vital in performing a movement.

Referring to India's cultural texts, Madhurima said, "I have always been fascinated by the *Natyashastra* that was written around 2000 years ago; the amount of observation of human body and the eventual classification is amazing."

While the first half of her talk dealt with the basics of classical dance, the second was about viewing dance through a scientific lens. Madhurima said that there were two broad approaches to analyzing body movement - biomechanics, application of the laws of physics to understand the human body and kinesiology, treating of the body



V Madhurima | CAROLINE D'SOUZA

as a combination of lever and pulleys.

Relating the centre of gravity principle to different dance styles, she explained how different dance forms varied the way a body balanced its centre of gravity, required to achieve stability.

Using the laws of rotational motion, she explained the tricks that *Kathak* or ballet dancers used to achieve successful spins. "Extended legs store momentum. When the dancer brings in the legs, the stored momentum can be used to spin. You can spin faster if you pull in your legs and arms while dancing," she said.

"While a Kathak dancer constantly keeps going on her toes to give the legs the muscle power to for a fluid movement, a ballet dancer uses the tiptoe to reduce friction, pulls in her arms and legs, keeping her core straight. A classic black swan ballet dancer is known to make 32 rotations in 30 seconds at the end of the performance. Researchers have analysed this movement in great detail."

Asked about her views on the scientific studies of Indian dance forms, Madhurima said, "Dance in India has always been treated as divine or pious; hence people do not question it or connect it with science. We need to overcome our inhibitions to question art forms. The confluence of science and arts can create wonders that you would have never wondered of."

Decoding societal patterns using mathematics

RITUPARNA PALIT

Looking logically at the societal relationships is important in order to understand the society better, said R Ramanujam, speaking at the 5th edition of Science at the Sabha, here on February 16.

In his talk "Looking for logic in social practice", Ramanujam, Professor at the Indian Institute of Mathematical Sciences, explained that there was a different rationale that was followed when a person acts individually and in a crowd.

"What is the reasoning pattern that a person applies while acting in these situations? How is an individual rationale different from a collective rationale? We should be able to relate both of these in some logical fashion," he said.

Citing examples from an election, Ramanujam, who won the Indira Gandhi Popularisation of Science Award 2020, described the logical pro-

erties of a voting process, which are, voter's eligibility, vote confidentiality, universal verifiability (every vote cast has been counted), individual verifiability, no summaries, and receipt-freeness (the voter shouldn't be given a slip identifying the candidate he or she voted for).

But are these requirements consistent? And can we run an election that guarantees all these properties? These were the questions answered by him using inferences from economist and Nobel laureate Kenneth Arrow's impossibility theorem.

Drawing analogy to food, Ramanujam said, "From the day we got our food directly from farms to now, where it travels a huge distance before it reaches our plates, a similar scenario is applicable to society and social relationships. It's no longer the things that you see and understand through experience, but is way more complicated. Therefore, some mathematics definitely goes



R Ramanujam | CAROLINE D'SOUZA

into this."

"The logic that we are discussing in the context of social procedure requires insights from mathematical logic, computational theory and game theory; by combining these we can hope to address our society's logical foundation," he said.

Schools neglect sex education

PRIYADA K S

As parents are reluctant to talk to their children on topics like sex and menstruation, these subjects have to be taught at schools; otherwise children will depend on other methods to know more about these things, said Child rights activist Virgil D'Sami.

The National Crime Records Bureau's data of Crimes in India released in 2019 shows that the cases registered under the POCSO Act (The Protection of Children from Sexual Offences Act) in 2018 was 37,830 against 32,608 cases in 2017.

The Crime in India 2018 report puts Tamil Nadu at 6th position in the country, with 2,039 crimes reported under POCSO. The maximum crimes were reported in Maharashtra, followed by Uttar Pradesh.

Virgil, who is the founder of Arunodaya Centre for Street and Working Children, said her centre was providing sex education only for students of middle school and high schools at first.

But in their multidisciplinary committee meeting, which consists of teachers, psychiatrists and psychologists, the teachers suggested providing sex education to primary school children as well. "We conducted counseling classes for teachers as they were reluctant to cooperate at first," she said.

To change the mentality about menstruation among kids, NGOs like Arunodaya conducts sessions with both boys and girls.

The increasing number of cases of crime against children shows the importance of educating children on these issues.

Daphne Margret, zoology teacher at Arignar Anna Government Higher Secondary School said that the teachers followed the syllabus on sex education properly.

She added that clubs like Red Ribbon (to provide awareness on HIV AIDs) were formed for providing awareness among children.

"As a part of these club activities, children get paper cuttings and discuss the news in class. We call in experts to give sex education classes for all students and girls are given separate classes also," Margret said.

S Geeta, a teacher at Chennai Higher Secondary School, said that the school conducted awareness classes and students were given helpline numbers in case they needed help.

"Chennai Corporation takes initiatives in conducting awareness classes. Some classes are conducted for girls and boys separately," she said.

But some schools like St. Francis Savio Matriculation School don't provide any awareness classes to the students. The authorities at the school said that theirs was a primary school and so they didn't feel the need to give awareness on such topics.

The Principal of Advent Christian School said that students are not taught about sex education because of the low student strength.

Scrounging for gold



Children as young as 12 years of age engage in ragpicking business on the 220 acres Perungudi dumpyard. They opt ragpicking over school because of the huge income it generates | RITUPARNA PALIT

'Prostitute' wins best short film

RIZVI SAIF

When the word 'PROSTITUTE' came up in bold white letters on the big black screen, murmurings were heard from the young audience of the SRM College.

This was the opening frame of a short film directed by Arun Yoganath of the Nehru College of Arts and Science. The film tells the tale of a mute woman who was branded as a prostitute after a reporter wrote about her. He took the word of the locals without finding out the truth and the film ends with him realising his mistake.

'Prostitute' won the loudest cheer and the award for the best short film in the inter-college category of "Silver Frames", a national level short film competition con-

ducted on February 18 by the visual communication department of the SRM University of Science and Technology, Ramapuram.

Out of the 300 short films registered, 15 were shortlisted by the faculty and selected students of the department after which they were sent to assistant directors and cinematographers of the Tamil film industry. The judging criteria was based on concept, script, direction, cinematography, editing, sound and overall work.

B. Sharavanan, a professor at the college said, "Most of the entries this year were from the thriller genre and many touched upon the theme of sexual abuse."

The top three short films were selected by veteran director Suseenthiran who was

also the chief guest of the event. The other two winners are 'Yuthishtan' (Pondicherry University community college) and 'Irandha Naal' (PSG College of Arts and Science). These three along with a few other short films directed by the students of the SRM College were screened during the event. The crew of the upcoming movie, *Mafia* was the guests of honour.

The college has been conducting this competition for the past four years but it was made national level only last year. Most of the films screened were in Tamil language. Shankar Vincent, coordinator of the event, said that the entries included English, Hindi, Telugu and a few Malayalam short films as well. The students also organised cultural programs towards the end.

Spanish film festival bids adieu with 'Can't say goodbye'

PRIYADA K S

A movie set in 1980s Spain and the story of two detectives, who are poles apart, trying to solve the missing of two sisters, 'Marshland' is a thriller with beautiful frames that drag the audience in.

The movie was screened at the Spanish film festival organised by Indo Cine Appreciation Foundation in association with Embassy of Spain in India, New Delhi.

The three-day film festival was inaugurated on February 17 by Antony Lobo, Honorary Consul of Spain, Chennai. Cine actress Sukanya Ramesh lit the lamp at the inauguration.

The festival began with Academy Award winning 2009 film "The secret in their eyes" and ended with the movie 'A Gun in Each Hand' on 19 February.

A total of five movies were screened at the festival at Alliance Francaise of Madras, Nungambakam. Other films screened were 'Flowers' on the second day and "Can't Say Goodbye" on the third day.

'Flowers' was the Baque language film to be nominated for the Academy Awards.

E. Thangaraj, general secretary, Indo Cine Appreciation Foundation said that 150 people attended the first day, on the second day it was 100 and about 80 to 90 people came on the last day.

"The festival is mainly for our film society members, so the same people come every year. We have been conducting the festival for seventeen years now," he added.

In 2019 the festival was conducted from May 28 to 30.

Ishita Ghosh, one among the audience, said that it was her first experience coming to a film festival. "The film (Marshland) was good but the inconveniences caused by the issues with the projector disturbed the viewing experience."

She was talking about the technical issues that disrupted the screening of the movie 'Marshland' three times.

Another spectator Triloknath Arivelu said that the films screened at the festival were impressive. "It was my first time here; the experience was similar to other film festivals."