Lab Journal of The Department of Communication and Journalism

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UNIV VOICE

Science EDITION

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Cyornis Rubeculoides

CAMPUS DWELLERS

PAVITHRA DJ

Kariavattom: The University campus of Kariavattom is blessed with many variety of birds. A recent study done by Dr.G.Prasad, Head of the Department , Zoology –University of Kerala and P Nisanth(former MSc student) has recorded the presence of 62 species of birds in the whole of Kariavattom Campus.

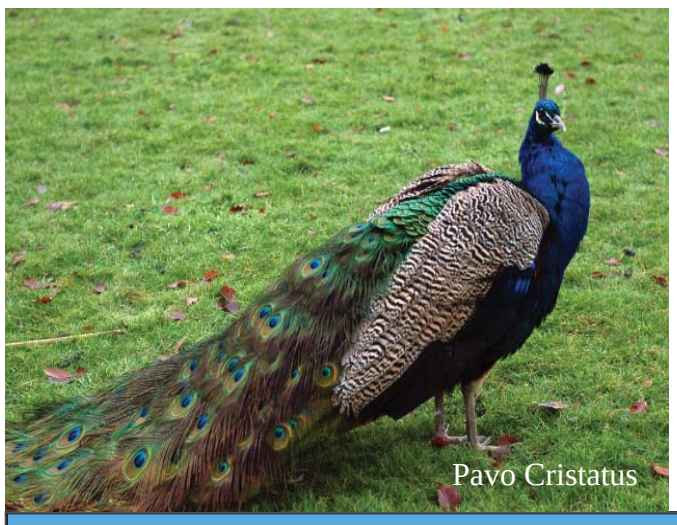
Birds are the most diverse and fascinating vertebrates that dwell in almost all habitats. They play a major role in providing different ecosystem services and also serve as good bio indicators. The richness or abundance of avifauna is directly related to the health of ecosystem. The avifaunal diversity assessment has become an important tool in bio diversity conservation and for identifying conservation areas.

The present study was done for a period of five months from March 2015 to August 2015.The six transects (S1-S6) selected for the assessment consisted of mixed vegetated areas, wetlands with thick vegetation, marshy areas, human inhabited area, area with Acacia vegetation and also areas with mixed habitats. These transects contain both disturbed and undisturbed areas. Diversity indices of the birds recorded were calculated and the areas where bird diversity is concentrated were found out.

During the study,62 species of birds belonged to 14 orders and 32 families were spotted from Kariavattom Campus.

Site S5, 'South-west region' of the campus supported maximum number of birds. Evenly distribution of birds was seen in site S4 'Hymavathy pond and associated wetlands' and Site S2, 'Eastern side of campus' supported the least. The study shows that the abundance and richness of birds increase along with the abundance of floral species and habitat diversity.

The present study shows that the avian fauna of Kariavattom Campus is sufficiently rich in species diversity. The patches of undisturbed areas, mixed vegetation and the presence of wetlands in the campus could be the factors which support bird diversity.



Pavo Cristatus

Streptopelia Chinensis

GUEST EDITOR'S VOICE

Prof. R.V.G Menon, was the Principal of Government College of Engineering, Kannur. He was deputed as the director of Agency for Non-conventional Energy and Rural Technology (ANERT). He authored "An Introduction To The History And Philosophy Of Science", which is a comprehensive guide for science students of both school and university level .

Prof R.V.G Menon

THE SCIENCE OF SURVIVAL

Prof R.V.G Menon spoke to the editorial board of Univ-Voice and shared his views on devolopment, energy crisis and climatic change. Here are a few excerpts;

• What do you think must be done to inculcate scientific curiosity in children from school level?

The method of teaching science has to change. Children must be allowed and encouraged to work with their hands, and plenty of practicals must be given, with enough opportunity to experiment and make mistakes.

• Do you think that most developmental projects in Kerala do not give much emphasis to the environment?

Yes, most development projects in Kerala are not geared to protect the environment. Most often mere civil works are encouraged. There has to be a change in the concept of development itself.

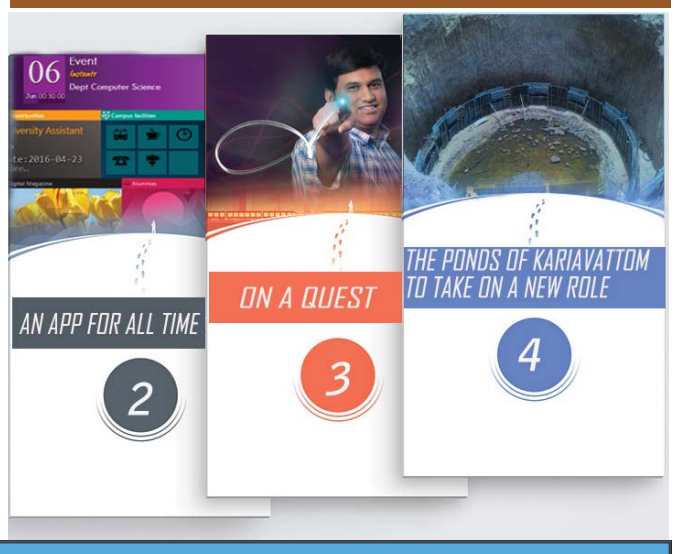
• Do you think that Kerala is heading towards an Energy Crisis? Is it high time that we shift to Renewable Resources such as Solar Energy?

Yes, Kerala is heading towards an energy crisis. The world is running out of fossil fuels, and there is going to be tremendous pressure on all countries, especially in India, to limit Carbon dioxide emissions. We will have to switch over to the renewables under stress.

• With Kerala reeling under the heat and certain districts including Palakkad already crossing 40 degrees, the agriculture industry is facing a big crisis.What can be done to tackle this situation?

The only remedy is to preserve and increase the green cover. This is not a matter of scenic beauty but a question of survival.

SEE INSIDE...



AN APP FOR THE CAMPUS

ABHIJITH S
DHANYA S NAIR

The 2014-16 batch of the Computer Science Department is coming up with a project which the institution can cherish as a gift from its students.

The team is working to bring out a computer/ mobile application which in turn will bring the details regarding the campus to anyone's fingertips.

A group of 30 post-graduation final year students are working day and night for this venture under the guidance of Dr. S. Aji.

The App which is named as 'Collash' will provide it's users with information such as job openings and scholarships, alumni, announcements from the Departments Union , bus timings and daily canteen menu. It will also host a digital form of the campus magazine for users to post pictures, videos etc. from their respective accounts. The app will be primarily made available through mobile and computer browsers. The team behind "collash" is trying to make it possible for users to directly access the app from desktop and mobile. The team is all set to launch the beta version of this application. The app which is designed using PHP MySQL will be available on both android and windows platforms.

The Journalism Department will also have a role to play in this app as the makers are ready to provide them with a section devoted exclusively for the news regarding the campus and university.

The makers of "collash" are very much excited as they are awaiting an almost guaranteed affiliation for the app by the University of Kerala. If the University is ready to support the project and make it their official application, the app will become a very effective and useful tool.

Under the university's patronage the architects of Collash are ensuring services like fee remittance, Digital Certificates, Inter Library service etc.

The makers are awaiting a positive response from the university as it will make the app more mobile among the students and staff of the campus and the University. Readers can access the online version of this app from www.hpc-ku.in/collash.

INDUSTRIAL EFFLUENTS DECREASE SOIL FERTILITY

MEENU S PRASAD
VIDYA VIJAYAKUMAR
MAHITHA K

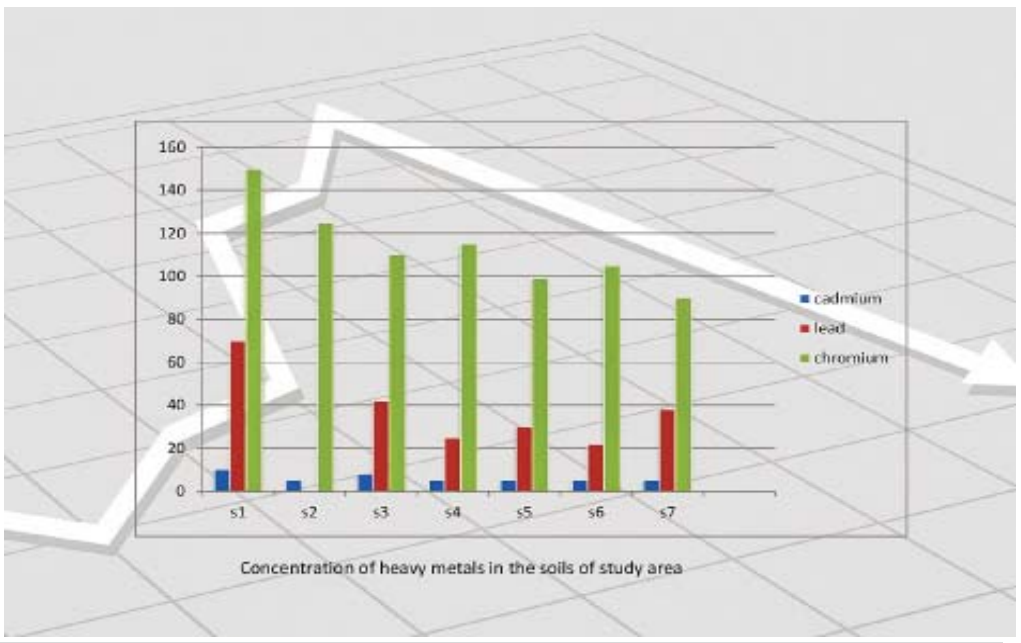
Kariavattom: The study conducted by Department of Environmental Science, University of Kerala in the surroundings of Travancore Titanium Products Ltd. (TTP), Thiruvananthapuram showed that the soil pH was acidic in nature.

This study aims at assessing the soil's physico –chemicalcharacteristics and effect of industrial pollution on soil quality. The organic matter and nutrient content in majority of the soil samples from the study area(Titanium,Vettucaud,Kannanthura,Kochuveli,Madhavapuram) recorded low values and therefore soils in the surroundings of TTP industry are of low in fertility.

The soil heavy metal analysis showed that the concentration of Cadmium,Lead and Chromium were high in the station near the effluent discharge site compared to that in the other stations of the study area.The Soil Quality Index(SQI) values calculated based on the selected soil parameters also revealed that the quality of soil in the surroundings of TTP industry is deteriorated.

UNDERSTANDING SOIL pH

Soil pH is a measurement of the acidity or alkalinity of a soil. On the pH scale, 7.0 is neutral. Below 7.0 is acidic, and above 7.0 is basic or alkaline. A pH range of 6.8 to 7.2 is termed near neutral. Soil pH is considered a master variable in soils as it controls many chemical processes that take place.



Concentration of heavy metals in the soils of study area

WHAT CAN BE DONE?

•Maintenance and upgradation of the existing waste water treatment plant with sophisticated pollution control equipments.
•Proper methods should be adopted to reduce the acidity of soils by suitable liming and adjust the pH to a neutral value.
•Creation of awareness among the people in that area around the Travancore Titanium Products industry in collaboration with government authorities which is essential for the proper management of soil quality in Veli industrial area.
•Suitable eco-friendly waste management practices should be adopted in orer to avoid contamination such as growing pollution tolerant plants such as Polyalthia longifolia,Alstonia scholaris etc. in the surroundings of the industry.

THE ACTUALITY OF ACTUARY

SHEHINA S
ATHIRA MS

Actuarial profession is no more limited in the insurance field only. Traditionally it is known as the risk management department of traditional insurance industry. But today's trend shows that the profession is growing beyond that. In today's economics and business sector, uncertainty and risk is a reality A survey conducted by 'Faculty of Actuaries' , a London based leading professional body reveals that almost all sectors of modern business needs actuarial skill set for forecasting and quantifying risk to survive in the competitive world.

The most recent example is the demand for construction actuaries in the construction sector. The risk involved while constructing a building, especially large buildings, need to quantify professionally. The above study reveals that construction insurance is going to grow up to a level beyond today's Motor insurance sector and Health insurance sector.

Construction insurance is not a single case. Modern world is a risky world by all means. If one need to know its real shape and depth, actuarial expertise is inevitable.

The study underlines that actuarial profession is fastest growing top management profession in the world. World need many more actuaries than it is having now.

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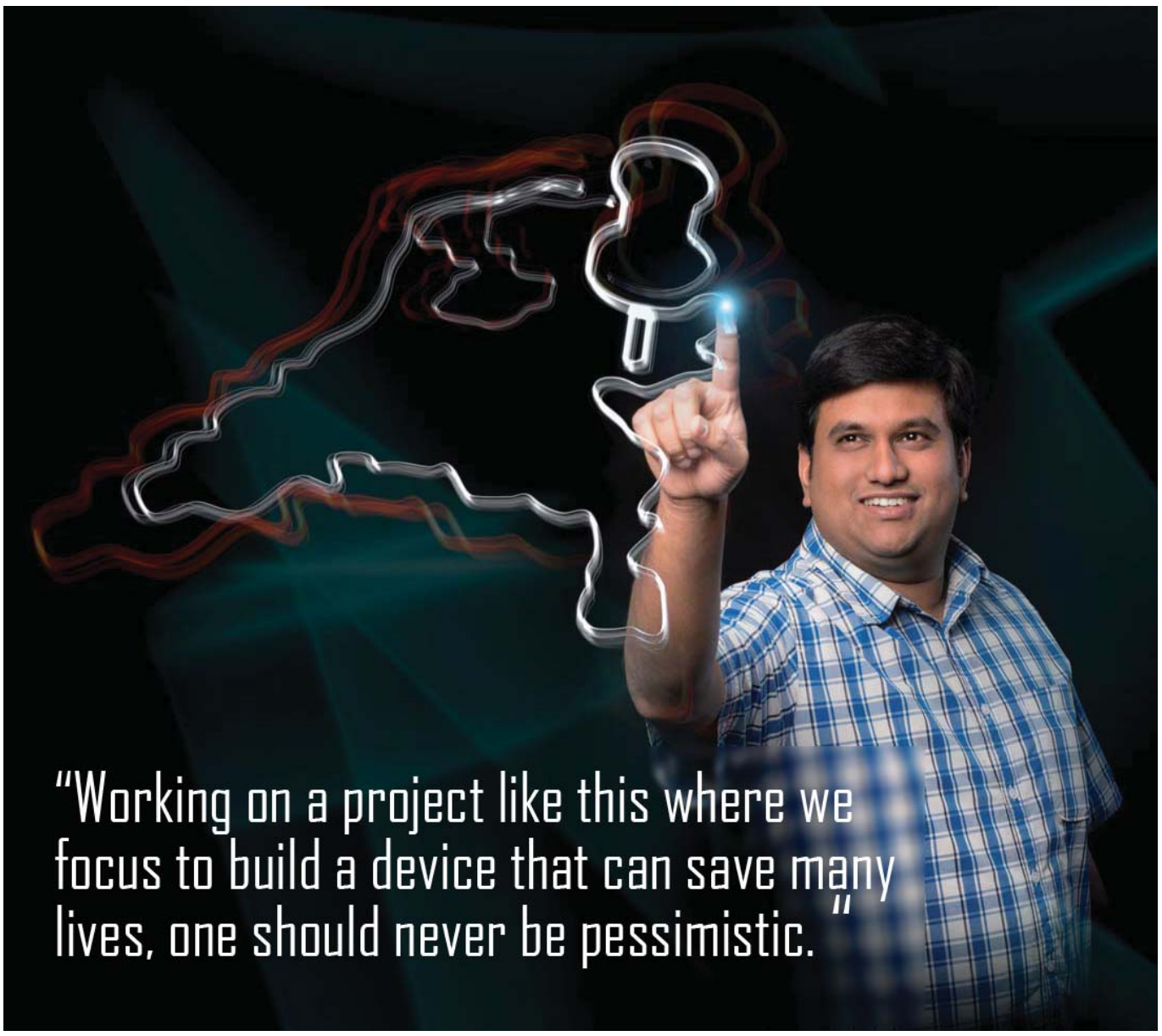
ON A QUEST

DHANESH RAVINDRAN
ABHILASH SUDHEESH

In his quest to save lives, Dilu G Mathew has opted to employ Nanotechnology in the medical realm . Dilu George Mathew, an Indian born Scientist researching at the University of Twente, Netherlands now works on a 'Cancer Detection Sensor', a device capable of detecting cancer from patients' urine. 'This technique could not only save lives, but can also revolutionise cancer treatment.'

The UnivVoice team has conducted an E-mail inteview with him. Excerpts;



Dilu George Mathew, Scientist, University of Twete, Netherlands

Cancer detection and treatment is very expensive and the detection process is usually very painful; Can your method of cancer detection be made affordable to the common people; and what are the other advantages of this method?

Well, our technique will indeed be cheap compared to the state-of-the-art techniques available in cancer diagnostics. On top of that, our technique is non-invasive and hence pain-free. Most importantly this is an early-stage cancer diagnostic technique that improves the chance of survival of the patient.At the moment we focus on detection of cancer from urine which also gives an opportunity to collect more amount of sample/ specimen. Hence, this device can be used for cancer screening. Furthermore, our device is a lab-on-chip device which focuses on point-of-care diagnostics which in turn saves time, usage of expensive techniques and also highly trained professionals.

Could you explain the process involved in your method of detection?

There are limitations to reveal the entire idea/ principle behind our research due to patent issues! However, I'll try to explain a bit.
We fabricate devices with extremely small gaps (gaps are a few nanometer wide) and we use these gaps to trap the "cancer DNA" to know which type of cancer does the patient has. We currently also focus on detection of different stages of cancer for the prognosis of the patient and to verify the effectiveness of the medical regimen.

How effective is this method in diagnosing different kinds of Cancer?

We are at the research face of the device (at Technology Readiness Level 3). Hence it is hard to prognosticate effectiveness at this moment. However, from the subsidiary experiments we have done, we are very positive that this could be a groundbreaking invention which can specifically detect the cancer at a very early stage.

How much progress have you made so far in your research and how long before this technique reaches the clinic from where the service can be made available to the common people?

As I mentioned before, we are at Technology Readiness Level 3. Thus, we are still waiting to make the first prototype that can be used for the clinical trials. Once we have it ready we can go for clinical trials and after the clinical trials we need to approach the European Medicines Agency (EMA) and similar agencies for approval. Hence, it needs a few years (5-7 years) before we can finally introduce our cancer-sensor to market.

Have you hit any walls along the way, any problems that made you feel pessimistic about your work and its future? Please share with us

The whole project is quite challenging right from the beginning, especially the transducing part of the sensor was a bit troublesome. Nonetheless, we could rectify the problems so far. We were never pessimistic about this work. In other words, a scientist or researcher should always be optimistic while being self-critic and should also believe in his strengths. Moreover, working on a project like this where we focus to build a device that can save many lives, one should never be pessimistic.

Like the famous scientist Thomas Edison said, "I have not failed. I've just found 10,000 ways that won't work", each failed trial is a motivation to open the new door for success.

How much has your degree in Engineering helped you in understanding your area of research, is it completely alien to what you do now or do you believe that it has contributed to your understanding of the subject?

I did electronics engineering for my bachelors and studied nanotechnology for masters. My knowledge in the electronics helps me to address the challenges in the detection part of the sensor and knowledge in the nanotechnology helps me to easily do the biosensing and transduction parts of the sensor. I think the track I took for both bachelors and masters helps me a lot in dealing with the day to day hurdles that I face.

Why did you choose to conduct your research in Bionanotechnology abroad? Do you think India lacks adequate infrastructure to fuel such a research division?

Indeed, India lacks some of the necessary infrastructure in this field for example a good fab lab with high-standard clean-room. Also the other fabrication and characterization equipment are not easily accessible/available in India at this moment. Moreover, the chemicals and other supplies that we use for everyday research are expensive compared to the Indian standards which makes it more difficult. However, if you consider the collective infrastructure of our elite institutes these kind of research should be possible, provided that we have enough funding for purchasing the day to day supplies.

Would you be willing to set up an establishment in Kerala which offers this diagnostic service to those who need it? Have you made any plans to do this as well?

We are targeting to develop a point-of-care lab-on-chip device. In layman's words, it would be something like a pregnancy test kit or diabetic test kit or cholesterol test kit which a patient or a doctor can test by themselves without the need of a laboratory or trained lab technician. So I think there is no need for an "establishment" in Kerala for the patients to avail the benefits of such a diagnostic device. Of course we do have plans to sell our sensors world-wide, including India, thus the people in need can buy and use it.

As someone who is conducting a philanthropic research, what do you wish to communicate to the young students of science, who wish to use this discipline to change lives?

Firstly, as a philanthropist, if you have passion to do something for the common people, to save their lives and to improve their living standards: medical field can be your focal plane.

Secondly, as a scientist, if you have a passion for a better world: think out of the box, aim for next to impossible and be creative and self-critic. And if you think you are one of those, as the American biologist E.O. Wilson says, "The world needs you, badly!"

CURCUMIN, EFFECTIVE AGAINST CERVICAL CANCER: RGCB

SOORYA S
GOKUL J B


Curcumin

Thiruvanathapuram:In vitro and in vivo studies conducted by Rajiv Gandhi Centre for Biotechnology(RGCB) clearly proved that Curcumin can be used as an effective chemosensitizer against Cervical cancer.

MultistageSquamous cells carcinoma was induced in the uterine cervinx of Swiss albino mice using 3-methyl cholantrene to evaluate the synergistic anti cancer effect of curcumin. The result proves that curcumin chemotherapeutic efficiency plays a key role in the proliferation of tumour cells.

Cancer has become the most terrifying disease spread in our society, nowadays.Cervical Cancer/Uterine cancer is most common among ladies under the age group of 40-60. Human Papilloma Virus (HPV)infection appear to be involved in the development of more than 90% of cases.Most people who have had HPV infections, however do not develop Cervical cancer. Other risk factors include smoking,weak immune system, birth control pills and having many sexual partners.

About 90% of Cervical cancer cases are Squamous cells carcinomas, 10% are adeno carcinoma,and a small number are of other types. Early diagnosis is typically by Cervical screening followed by a Biopsy. Medical imaging is then done to determine whether or not the cancer has spread.

By the studies conducted by RGCB ,of the 150 to 200 type of HPV known, 15 are classified as high risk type; three are probable high- risk, and 12 are low- risk. Cigarette smoking, both active and passive, increases the risk of Cervical cancer.And long term use of oral contraceptives is associated with increased risk of cervical cancer.

RGCB is a premier research institute in India ,exclusively devoted to research in Molecular and Biotechnology. Cancer research lab in RGCB mainly focus on identification of non-toxic chemo sensitizers which can be used along with the conventional chemotherapeutic drugs used for cancer treatment so that the cost and toxicity due to chemotherapy can be minimized.

Smart phones generate power with new coating

A transparent material that can be attached to a smart phone's touch screen could help the device generate electricity whenever anyone taps it, researchers in China say.

Touch screens are now found on most cell phones and tablets. Using a touch screen typically involves finger taps, and scientists at Lanzhou University in China reasoned that the mechanical energy from these motions could be converted into electricity to charge the phone's batteries, which could significantly extend the working time of these portable devices.

The researchers developed a new material based on a transparent silicone rubber known as PDMS. Scientists embedded wires in this rubber that were made of lead zirconate titanate that were only 700 nanometers, or billionths of a meter, wide. For perspective, this is about 140 times thinner than the average width of a human hair.

As the rubber solidified, the researchers used electrical fields to align the nanowires in the rubber in columns. This alignment helped set both the material's electrical and visual properties. Such nanowires are bent they generate electricity, a phenomenon known as piezoelectricity. By making sure the nanowires are lined up with one another, the researchers helped ensure that they would react to finger taps in unison, generating as much energy from the motions as possible.Electrical signals from nanowires could also help researchers develop more sensitive touch screens.

'DO AND LEARN'

RAMEEZ K
ATHIRA MM

Kariavattom: Are you fed up with the classroom learning? How about finding innovative ways of making learning a beautiful experiment?

The Department of Computatational Biology and Bioinformatics has come up with a novel idea of 'learning by doing'. For this they are conducting a'Fruit –fuel experiment which generates electricity from fruits and vegetables.It is a research based on practical experiments.

The purpose of this study is to determine the factors affecting voltage generation using a fruit galvanic cell.When suitable electrodes are embedded into the fruit, it turns into a wet cell and acts like a battery. Different anode, cathode combinations are used with different fruits and vegetables; combination of fruits and vegetables were connected to a multimeter and measured the voltage produced. A Light Emitting Diode was connected across the fruit cell to investigate the effective utilization of the voltage produced from fruit cell practically.

For this ongoing research programme the students are required to generate questionnaires. This year 30 questions were filtered from a total number of 160 questions. It is an innovative way that helped to live through the process of experimentation, paper writing and peer reviewing and thus dwell more into the art of research.


Students working on fruit cell

NEED OF THE HOUR

Recent global increases in species extinction and habitat deterioration has driven biodiversity research into becoming a prominent component of ecological sciences. Anthropogenic threats such as habitat destruction and the increasing menace caused by fisheries and pollution has affected the marine ecosystem. Starting from the study of ecology over a century ago, increasing extinction rates caused biodiversity research to evolve from addressing academic issues to researches aimed at preserving and conserving biological diversity. Current biodiversity research aims at understanding the consequences of the ongoing transformation of ecosystems and biosphere by human processes so as to ultimately design strategies to conserve biological diversity and use ecosystems in a sustainable manner.

Biodiversity research has evolved to include large-international concerted research programmes , which provide a new impulse to biodiversity research. Most importantly these concerted programmes aim at engaging a true international contribution, which is particularly important for biodiversity research as there is often a mismatch between the geographic distribution of potential research effort and that of biodiversity richness and threats. Biodiversity research is so phenomenal that imbalances across topics, systems and scales of analysis may have developed. The examination of patterns in the resulting research effort is essential to identify gaps, improve the balance across various scales of analyses and habitats, tion of research to address these problems at a global scale.

THE PONDS AT KARIAVATTOM TO TAKE ON A NEW ROLE

VISHNU

The recharge structure being constructed near the Botany Department

Kariavattom: The Campus is all set to meet its fresh water demands by constructing two large diameter wells. The proposed sites for the wells are near the Hymavathy pond and the pond behind the department of Botany.

This proposal was put forward by Dr. E. Shaji, Dept. of Geology and the project was inaugrated by Dr Veeramanikantan, Hon Pro Vice Chancellor.

The water requirement of the campus is almost 5 lakh litres per day. As per the proposal, this can be met with these wells by remodeling them into recharge structures and gully plugs. The wells are recommended to have a diameter of 10 to 12 meters and a depth of 12m below ground level depending on the water pressure. A small diameter well has to be constructed inside the well with a depth of 1 m and diameter 1.5 m. The well will have a storage capacity of 4 lakh litres. 2 lakh litres of water can be pumped from the well using a 2 to 5 HP pump. A four hour gap was recommended by the report between successive pumpings. The construction of the wells are under progress and the university engineer is in charge of this project.

The well which is being constructed near the Haimavathy Pond

The Hymavathy pond and the pond behind the Department of Botany are to be converted into recharge structures to maximize the utlisiation of these water resources. The ponds which are good natural percolation tanks are to be restored and de-silted. De-silting will be minimal, removing silt and sand which were deposited by erosion . The bottom layer will not be affected by this process but the side walls will be mended using rubble masonry and geotextiles. The eco system will be protected during the process however many Acacia trees will be cut down.

Natural gullies exist within the campus which at present drains water into the pond and to the valley. Most of them are not well maintained which lead to aggravated soil erosion. These gullies are blocked due to various construction activities. They need to be plugged suitably to reduce the velocity of the surface runoff. Contour bunds are proposed at 20m contour. These structures are mainly soil conservation structures and help in increasing the soil moisture and to recharge the ground water. The contour bund with rubble can be constructed at the 20 meter contour of the watershed.

These recommendations are good enough to tackle the water scarcity the campus has to face during the summer seasons and these techniques can really help the campus by meeting its fresh water needs mostly by itself using its own resources.

All the bacteria living inside you would fill a half-gallon jug or 10 times more bacterial cells in your body than human cells, according to Carolyn Bohach, a microbiologist at the University of Idaho. Most of these bacteria are helpful; in fact, we couldn't survive without them. Bacteria produce chemicals that help us harness energy and nutrients from our food.

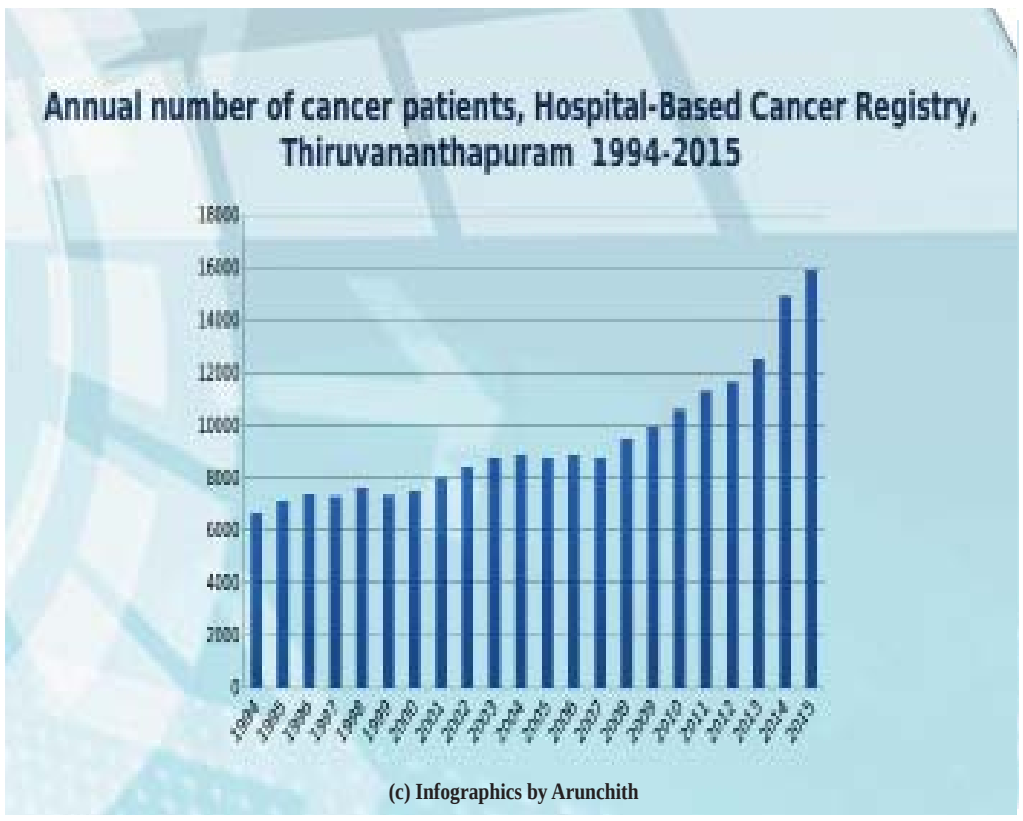
An average active person take around 7,500 step/day. If you maintain that daily average and live until 80 years of age, you'll have walked about 216,262,500 steps in your lifetime. Doing the math; the average person with the average stride living until 80 will walk a distance of around 110,000 miles.

A healthy heart can pump about 70 ml of blood out in each beat and it beats around 70 times a minute. So, if you multiply the amount of blood that the heart can pump by the number of beats in a minute, you actually get about 4.9 litres of blood.

The Great Barrier Reef is an interlinked system of about 3000 reefs and 900 coral islands, divided by narrow passages, just beneath the surface of the Coral Sea. Spanning more than 2000 km and covering an area of some 350000 sq.km, it is the largest living structure on Earth and the only one visible from space. But this fragile coral colony is beginning to crumble, battered by the effects of climate change, pollution and manmade disasters.

CANCER PATIENTS IN KERALA GOING UP, RCC RECORDS

NANDANA U S
GEETHU V NAIR



(c) Infographics by Arunchith

Thiruvananthapuram: According to the records of Regional Cancer Centre (RCC), Thiruvananthapuram, the number of cancer patients in the state are increasing day by day.

The changing life style, use of tobacco, consumption of alcohol etc. are the major reasons behind this increase in number. RCC, is a leading institution which has excelled in cancer prevention, diagnosis and treatment. It works directly under the Govt. of India, they recently published a very shocking report. Their hospital based cancer registry shows that a total of 15909 new cancer patients were registered during the span of 2014-15. It was 14903 in 2013-14 and 15,019 , which was 306% more than what it was in 1982. Compared to the beginning years, the recent years have witnessed a large increase in number of patients.

The reports revealed that oral cavity cancer (14%) is the most prominent form of cancer among males followed by lung cancer (13.8%). Among females breast cancer (28.2%) is the most common one, followed by thyroid (14.2%).As per the published reports, in children, leukemia (55.1% in boys and 43.4% in girls) is the predominant cancer. 62.3% of all cancer patients were in the age group of 35-64 years. In this group, the leading cancer sites were the oral cavity for males (16.6%) and in the breasts for females (19.1%). The proportion of tobacco related cancers (oral cavity-lip, tongue, oesophagus, larynx, lung and urinary bladder) relative to all cancers were 42.0% in males and 12.3% in females. This report foreshadows a very dangerous future for Kerala.

OncoNET

The telemedicine project of RCC is no longer functional. RCC setup Onconet in April 2001 with the help of Indian Space Research Organisation (ISRO) and CDAC, Trivandrum. It worked successfully for one year. The lack of awareness and the knowledge etc. lead to the failure of OncoNET.

NATURE'S ALTERNATIVE FOR SOAP

ARUNCHITH DS
DEEPTHI RENJITH

Are any of us sure that the food we eat is non-toxic? You might answer this question with a 'yes' since you wash your fruits and vegetables before consuming them.

Do you think that this is really enough? Because scientists may disagree with you, they say that the food you consume everyday has poisonous residues of chemical pestisides in them. Such toxic substances are not washed away easily by pure water.

Fear not! Beacuse scientists have discovered a natural way for cleansing fruits and vegetables of these hazardous substances. They advise the use of Soap Nut or soapberries also referred to as Washing Nuts or Reetha (Hindi). They contain 'Saponins', which is a natural refiner. When it comes in contact with water it creates mild suds, which is similar to soap.


SOAP NUTS

This technique is not at all new; for hundreds of years people in India and Nepal have been doing their laundry and cleaning with Soapnuts.

Soap nuts can be used for cleaning almost anything, from washing clothes to cleaning and shining of ornaments. And now they find a new usage in day to daylife, that is the 'cleansing and detoxifying' of food materials to make our daily life less toxicated.

The method of using soap nut liquid to clean is simple: Soak the fruits and vegetables in a soap nut solution for approximately 10 minutes, rinse off and enjoy food free from harmful chemicals and it's residue. The soapnut solution can also be reused for household cleaning.

DEPT. OF BOTANY

The students of the Department of Botany, University of Kerala are now researching on soapnuts to identify the other medicinal applications of this natural disinfectant.