SRISTI

GYTI

Gandhian Young Technological InnovationAwards

TECHNOLOGICAL INNOVATIONS

by Young Creative Minds

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Gandhian Young Technological Innovation Awards (GYTI)

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Gandhian Young Technological Innovation Awards GYTI(2014)

Introduction

Over the last four years, techpedia.in, originally starting with the student volunteers at SVNIT Surat, has pooled more than 180,000 titles and summaries of engineering projects pursued by about 600,000 students from over 600 institutions. Society for Research and Initiatives for Sustainable Technologies and Institutions [SRISTI] aims to achieve several objectives through this platform: [a] promotion of originality, which in the absence of a database of this kind, will be very difficult to ensure, [b] encouraging students to take up socially, industrially and ecologically important challenges to meet the unmet needs of society, [c] to encourage collaborative learning, [d] to link academia and industry so that entrepreneurs, particularly from small industries get technological support through final year projects of engineering students, [e] help find market for the technologies developed by the students and [f] use open innovation platform for challenge awards and distributed innovation management for generating extremely affordable products and services.

Through a close cooperation with the Gujarat Technological University, a unique ecosystem for innovation was developed so that students got credit for identifying the problem in summer and got further academic credit for trying to solve these problems in the final year. The Punjab Technical University made it obligatory for students to upload the final year projects before they can get degrees. The PTU has also offered 50 fellowships of Rs. 25000 each per month to students who wish to set up enterprises after their graduation. During the last two years, more than 30000 students worked on the problems of more than 6000 MSME units as a part of their academic work in Gujarat. SRISTI has also propagated the idea of National Innovation Club through this platform among various colleges in Karnataka, Punjab, Gujarat, Odisha, etc., to search, spread, and celebrate innovations and sense the unmet needs of society. The Hon'ble President of India has advised such clubs to be set up in Central Universities, NITs and other institutions. The 'wicked' problems need special focused strategy. SRISTI organized, with the support of ILO, a summer school to develop prototypes to eliminate child labour and/or increase the income of the parents and reduce the risk in the work. Six prototypes were developed in three weeks.

Most global indices on innovation neither take into account the grassroots innovations in the informal sector nor look at the ideas of school and college students. Indian leadership in some of these areas is getting widely recognized.

At SRISTI's techpedia.in, the Gandhian Young Technological Innovation (GYTI) awards were set up to encourage a) technologies on the edge, b) those having social impact and c) MLM (More from Less for Many) that is frugal innovations. Thanks to hundreds of faculty members in India and abroad, and executives from leading tech companies, we reviewed 1400 nominations from 313 Technology and Scientific Institutions from 23 states in India and selected 13 innovations for award and another 27 for appreciation. We hope that all the 40 student teams of GYTI awards and appreciation will resolve to work together to make India more innovative and inclusive. It is also very nice to see so many students wishing to keep their solutions in the open source.

Dr. R.A. Mashelkar, Chairperson, NIF and the Chair of the Advisory Committee of AASTIIK and SRISTI gave away the awards this year. He motivated the students to make a transition from 'More from Less for Money' to 'More from Less for Many'. The frugal engineering, which is also called as Gandhian engineering, has created worldwide awareness about Indian leadership and potential in this regard. He exhorted the students to build upon each others' ideas to come out with extremely affordable solutions for the masses.

There are many challenges that need to be addressed such as: [a] providing financial support for extremely early stage technologies so that these can acquire much more robust form, [b] protect IPRs even if some of the technologies have to be kept in open source later, [c] provide a sanctuary of innovations so that innovation, investment and enterprise can be linked and [d] help students set up companies to take their ideas forward in both economic and social market.
A SRISTI Social Innovation Fund has been set up with the contributions from some of the well wishers to support extremely early stage innovations even if the risk is too high. We hope more contributors will join this Fund. We are very grateful to all the volunteers, faculty colleagues and above all the young students for making techpedia.in a portal of first choice in their journey for making life meaningful and purposeful through projects addressing real problems, developing frugal solutions or pushing the frontiers of technological edge.

We are imperfect, inadequate and poorly endowed but we have a big enough heart to assimilate your aspirations and generosity, just be open, be inclusive, be amiable.

We hope that all the students, including those who could not get awards will do all within their power to spread the spirit of inclusive innovation ecosystem through collaboration, compassion and co-creation. Honey Bee Network wishes the winners all the strength in their future endeavor.

Anil K Gupta

Hiranmay Mahanta

Acknowledgements

We are grateful to the Department of Science and Technology, Government of India for partially supporting the techpedia. in initiative at Society for Research and Initiatives for Sustainable Technologies and Institutions. [SRISTI]. The process of scouting and pooling of ideas, screening them and final selection involved a very large number of volunteers within and outside the country. Honey Bee Network is grateful for their help. Specifically, Nisarg Mehta and several past GYTI winners ensured that the announcement of Gandhian Young Innovation Technological award reached almost all the corners of the country. Various student volunteers helped in different regions. For instance, Mohit, Chinmay, Varun and others at NIT Warangal and IIT Bombay helped in reaching more than 300 institutions. Ronak, Adhish and Ishan helped in coordinating with 150 reviewers in academic and industrial setting. Nilesh and various other ICT volunteers ensured that review system for various nominations worked flawlessly to facilitate online participation of reviewers. Numerous experts from industry such as TATA group, Pfizer, JSW, ST Microelectronics, GE, etc., joined hands with academics from IITs, NITs, IISc, CSIR, DST, Technical universities and other private colleges helped in reviewing the nominations. I must particularly thank Dr. P.V.M. Rao and others from IIT Delhi, Mumbai, Guwahati, Kanpur, Hyderabad, Kharagpur, Patna, Madras, etc. The Vice Chancellors of Technical Universities, particularly from GTU [Dr. Akshai Aggarwal], PTU [Dr. Rajneesh Arora] and their team helped in spreading the GYTI message.

Colleagues from National Innovation Foundation [NIF] were very deeply involved such as Dr. Vipin Kumar who helped in designing the GYTI overall strategy, Dr. Nitin Maurya whose help in editing the citations were very critical and Mr. Ramamurthy also for his editorial help. Students from SVNIT, Manisha, Rohit and several others helped in documentation through interviews of winners.

JSW was one of the sponsors of the award function besides SRISTI. Colleagues from Indian Institute of Management, Ahmedabad provided immense support as always. Without their unstinted help, the function would not have been possible.

Dr. R.A. Mashelkar, Chairperson, NIF gave away the awards and inspired the entire techpedia.in movement.

Dr. R.A. Mashelkar
FRS
President, Global Research Alliance
Chairperson , National Innovation Foundation

I want to warmly congratulate all the winners today but also the winners of the last year and the year before last.

When I was going around (GYTI exhibition) today, I was feeling younger, I was feeling amazed at the quality of mind that our young children and students have. What touched me most was that these innovations were not just about making the next supercar or next superbike or super-plane: They were about making the life of every Indian, not some, a bit better. That means you're thinking not just from your head but from your heart. That's something very special. I travel quite a bit -- I was in Europe three times in last 20 days. And the image outside India, unfortunately, is that of a `jugaad India'. And I simply do no like this. Why? Jugaad' is getting less from less for lesser people, getting it somehow, reducing the cost, and with no consideration for safety. That's not My India. My India is what I saw outside (exhibition). My India is one that is a leader in affordable excellence. Now, some might say, that is a contradiction, because what is affordable cannot be excellent and what's excellent can't be affordable. I'm sorry, they have got it wrong. India has shown that it can make this seemingly impossible, possible, again and again.

By using the latest cutting-edge technology, you're not doing `jugaad', putting something together somehow. You're creating world-class excellence. Let me go through some of the examples. Compliance is a big problem in treatment of TB. One of the solutions on display was just about solving that problem. Diagnostics is another area, where India faces huge challenges. Electronics based diagnostics sometimes can be a big problem. When something goes wrong, someone has to repair, and there's often none to repair. So why not paper based diagnostics, no electronics? Take the case of Fuel cell -- the whole world is talking about alternative designs -- and so paper-based fuel cell. You look at, for example, a very low-cost solution to detect whether you have pneumonia, and what does it cost? You look at breast cancer through a new design of diagnostics based on photonics. Visually impaired -- you are concerned about those who cannot see and you created an Email system for them. You're concerned about safety and security, whether it is helmet-

based design, or stampede-based image analysis; whether it is -- I particularly loved this point -- giving all the gadgets to women to make sure we don't have another unfortunate Nirbhaya, who was a victim of an unimaginable brutality in New Delhi last year. So what you are trying to do is, think from the point of view of those who are have-nots, those disabled, those for whom something needs to be done under great adversity, and you are creating products for them. To me, this was the highlight of what I saw. And I, therefore, feel a very happy man today.

You know, we always read in newspapers all the bad news: `India is gone . . . this and that is happening.' Somebody will take World Innovation Index and say, `last year, we were 62 and now we are 64.' Those people, who take the index seriously, should come here and see what is being done. I say this, and we always said this: How Prof. Anil Gupta could conceive this idea of Honey Bee? And you're right, Anil, if Honey Bee Network was not there, National innovation Foundation would not be there. If HBN was not there, an evening like this would not be there. That's why I say, India does not have 1.2 billion mouths but 1.2 billion minds. And, it is incredible, when you see their manifestation. You suddenly find them doing innovations of an incredible nature!

Look at Yerwada jail in Pune, which has about 3600 inmates. They have to make around 10000 chapathis or rotis for lunch and the same number for dinner. They apparently had a dough-making machine. A convicted inmate was very innovative, saw the process in practice then and he was not happy: Machine wasn't working well, it was not mixing dough well and quality of rotis was not good. With his innovation, the quality and speed improved. You know, I used to talk so much about the importance of Indians patenting their inventions, that people used to refer to me as 'patentkar', rather than as 'Mashelkar'. This had been known to these inmates also. So they went to the Superintendent and said some Mashelkar talks about patenting, whenever we have a new idea. So we wnt to patent this. Can we take a patent on this?' I am told that a pune patent attorney Mr Ponkshe, who is no more, helped them! A jail inmate innovating, can one imagine!

We must understand that innovation is about thinking differently, doing things differently for making a difference. The first part you have done, you have demonstrated what you can do. But the story is not complete. Has it made a difference? And that difference, we have to help them make together.

Finally, at the end of the day, what you have designed for the TB (&) pneumonia patients etc., has to finally reach them.

And that is where we require a robust, a conducive national innovation ecosystem. Idea is like a seed. But you don't eat seeds. You eat the fruit. How does one go from seed to fruit?The seed has to be put in fertile soil so it can germinates; you have to give inputs like water, and fertilizer. Finally, it has to grow into a tree. It's a long journey -- the mind to marketplace. And, therefore, what we did today is the first step. And for making a difference, finally, we all will have to help you. And we promise that every possible help will be given in every possible way by us with the kind of organization connections and network we have.

Let me come back to the image we have on India. In the past, a meeting was organized abroad on a new report called `Reimagining India'. I have written this book `Reinventing India.' So I said the challenge is not `reimagining' but `Reimaging India'. Why, because the kind of image we have outside (is) that of a `jugaad nation, a corrupt nation', among others. Is this kind of image fair? When one sees the ground reality, as I saw today: one finds plenty of an innovative India, who is a leader in creating inventions that belong to the unique class of affordable excellence.

Recently I was in Brussels, where they had asked me to give a talk on `Innovation under Adversity.' And what I am particularly proud of, is that they began the session with the video of one of our award winners, Remya, who had developed that pedal-driven washing machine, which Discovery Channel had made video on. And when I finished my talk, they ended it with the `Bicycle on water' by Saidullah yet another of our award winners. Can you imagine 1200 people in the audience from all over the world in that Innovation Forum 2014 looking at these two films as inspiration for them on how to `Innovate under Adversity?' What can be a greater tribute to Indian ingenuity . . .

One of the questions asked at the end of my talk was: how could our experience help EU member nations. I referred to our eternal belief in 'Vasudhaiva Kutumbakam'.. We yearn for improvement in quality of life not just for some of us who are sitting here but for all Indians, not for some Indians but all Indians and not just for all Indians but the whole world. Therefore, the innovations that I saw today are directed towards making India do well, not some Indians do well. I think that is extraordinarily important.

I will like to end by reiterating three core issues: affordability, sustainability and quality. Every innovation that we do must meet these benchmarks, because we

don't want anything that's substandard, not sustainable, or destroys the environment and ecological balance. And `affordability' because it has to be good for all, not good for some. Take this message home and ensure that everything you do in life should be directed to this.

Last point, I am often referred to as `a dangerous optimist'. Now I am 71, and I am getting little worried. I can see India progressing. I can see India is going to make it. I can see 30 years from now what India will be, and I feel sorry I would not be there. So I was saying I would like to negotiate with the God that he can take away whatever days I have been left with, but give me one day after 30 years, when I can come back for just one day and see My India. But, by the way, this deal with the God is now off because you have added so much life and so many years to my life today, that I don't have to do that now!

God Bless You.

CONTENTS

1 *Parichaya - a low-cost medical device to increase adherence among tuberculosis patients in rural Assam* 14
2 *A simple and cost effective retrofitting to improve the thermal and combustion performance of traditional cook stoves* 16
3 *Injectable silk fibroin hydrogel for tissue engineering and drug delivery* 18
4 *Highly stable metallic nanoparticle-semiconductor hetero structures via click chemistry for photoelectro/ photocatalytic applications* 20
5 *Biomimicked polymer surfaces exhibiting superhydrophobic and anti-reflective properties* 22
6 *Development and pilot testing of nano-sized TiO2 based Photocatalytic Oxidation technology for controlling VOCs* 24
7 *Microfluidic immunosensor* 26
8 *Paper-and-pencil' micro fluidic device for Point-of-Care diagnostics* 28
9 *Performance enhancement of microthruster using nano-engineered MEMS structure for long term space mission* 30
10 *A low cost cardiovascular diagnostic instrument for rural healthcare* 32
11 *Low-cost diagnosis of pneumonia* 34
12 *Laser light based fully computerized automated breast cancer and muscle screening system* 35
13 *Development and evaluation of women friendly vaginal in situ hydrogel for sperm immobilisation* 36
14 *Touchpad for malignant tumour (epithelial) detection and imaging* 37
15 *Cost effective vegetable chiller for rural small farmers* 38
16 *Development of microbial fuel cells with improved performance* 40
17 *A transceiver for satellite based communication during emergency using TV white spaces* 42
18 *Adsorptive removal of phenolic compounds using mixed matrix membrane of cellulose acetate phthalate and alumina nanoparticle* 43
19 *Inhalable multiparticulate carrier systems for sustained and targeted delivery of isoniazid* 45
20 *Concept of β breaker dipeptides and its application in Alzheimer's amyloid disruption* 46
21 *Fabrication of organic thin film transistor using single drop of organic or hybrid insulator, conductor and semiconductor materials* 48
22 *Paper-pencil based self-pumping and self-breathing fuel cell* 49

23 *Ultra-High Actuation in a Carbon Nanotube Actuator* 50
24 *Amsler Grid Test Android App* 52
25 *3D model generation from 2D X-Ray images* 54
26 *Laser technology detects hidden materials: applications to security and medicine* 55
27 *Fabrication of stable Liquid Crystal based biosensor* 56
28 *Macrophage specific targeting of mannose functionalized biodegradable polymeric nanoparticles of some anti-leishmanial drugs* 57
29 *Care Mother - mobile pregnancy care* 58
30 *Open source e-mailing system for the visually impaired* 60
31 *Wireless communication and security system embedded safety helmet* 61
32 *Integrated Circuit (IC)-based Flexible Electronic Devices and Displays (ICFEDD)* 62
33 *Microwave coplanar sensor system for detecting contamination in food products* 64
34 *Stampede control using image analysis technology* 65
35 *Novel algal bioreactor for waste water treatment and biofuel (lipid) production* 66
36 *Jaivik Prakash (Biophotonics): A simple tool for detection of hazardous materials and sanitary condition at rural level* 67
37 *Synthesis and design of indigenous polycentric knee for transfemoral prosthesis* 69
38 *Voice activated safety mobile app* 71
39 *Android application for women safety* 72
40 *Identification of safest path using crime records* 73

NOTES

Honey Bee Network 74
SRISTI 76
National Innovation Foundation 78
Techpedia (www.techpedia.in) 80

Parichaya - a low-cost medical device to increase adherence among tuberculosis patients in rural Assam

Himanshu Seth
Indian Institute of Technology, Guwahati

Guide
Prof Keyur Sorathia

Himanshu Seth (M. Des., IIT Guwahati, B. Tech., JIIT Noida) has interest in development of ICTs for low-income communities (ICT4D), Intelligent User interfaces, and Tangible media.

This is a low cost reusable medical kit, which replaces conventional medicine packs and provides a novel approach by combining medicine delivery with generating awareness about the disease among the patients. The kit, which stores the pills, uses illustrations and audio captions to explain the patient meaning of each illustration.

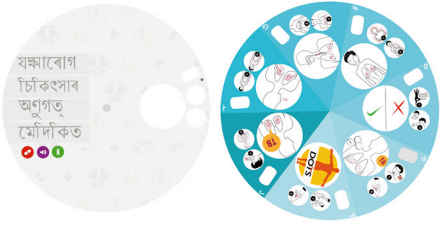
The system enables patients, under the supervision of ASHA members, to utilize their time effectively and get motivated by learning about the disease. The project was started for identifying possible areas for ICT interventions in rural Assam. The theme of the project was adopted after reviewing literature/data published by NRHM Assam and understanding the severity of the problem following discussions with the health officers in Guwahati.

An in-depth qualitative study was carried out across three health care centres in rural Kamrup. The study consisted of many interviews formulated to yield information about the gravity of the problem, health status of confirmed TB cases, diagnosis and treatment, professional-patient relationship etc. This was followed by problem identification, social/cultural/ geographical needs, constraints, use of affinity analysis method to find possible areas for ICT intervention.

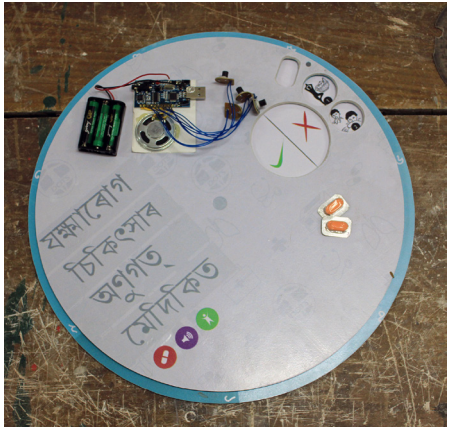
The prototype was tested among users to understand its acceptance among targeted user group. The feedback and observation of the patients while using the innovation will provide vital inputs for improvement of the final product. While this innovation primarily focuses on Category-1 TB patients, further research may be performed to target patients suffering from other categories of TB, too.

PARICHAYA - A Low-Cost Device to Increase Adherence Among Tuberculosis Patients in Rural Assam

TOP VIEW



EXPLODED VIEW



A simple and cost effective retrofitting to improve the thermal and combustion performance of traditional cook stoves

Vijay Hanmant Honkalaskar
Indian Institute of Technology, Bombay

Guide
Prof. Upendra Bhandarkar

Vijay Hanmant Honkalaskar (B. Tech. & M. Tech (Dual degree) in Mechanical Engineering, IIT Bombay) has interest in the field of rural development and has on a number of action research projects.

The improvement in the traditional cook stove was achieved by fabricating a simple twisted tape assembly (costing about Rs. 65), which could be placed on it. This was done without making any changes to the cook stove. The field-level tests resulted in reduction of firewood consumption by about 21%, soot accumulation by about 38% and the time of cooking by about 18.5%.

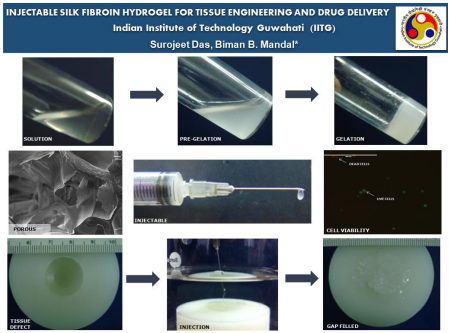
People's participation was ensured at all stages of the process, from initial planning (studying available options, cooking practices, capturing needs) to the actual use in the field. The performance of the cook stoves was evaluated by modifying a standard Water Boiling Test to accommodate the existing cooking practices. The challenge was to devise region-specific testing methodology that would take into account context-specific realities. The optimization of the twisted tape device was first carried out in the laboratory and then implemented in the field. Overall, this participatory process not only addressed people's perceived needs but also ensured no change in their existing cooking practice, while providing a simple affordable locally available solution, acceptable to all.


Twisted tape packs

Injectable silk fibroin hydrogel for tissue engineering and drug delivery

Surojeet Das
Indian Institute of Technology, Guwahati

Guide
Dr. Biman B. Mandal



The research interests of Surojeet Das [M. Tech. (Biotechnology, 2nd year), IIT Guwahati] lie in human tissue engineering, drug delivery systems and in-vitro 3D disease models.

Injectable hydrogels have a potential advantage over various other biomaterial matrices due to their properties like minimal invasiveness, targeted delivery and ease of encapsulation of bioactive molecules and cells before gelation. The present study describes the fabrication of silk fibroin hydrogel by utilizing Bombyx mori and Philosomia ricini silk. To optimize the hydrogel for biomedical applications, studies like transition time analysis, model molecule release profile, scanning electron microscopy, Fourier-Transform Infrared spectroscopy, mathematical modelling, in-vitro analysis etc. were undertaken.

Silk, in recent times, has found increased biomedical applications for its unique qualities like high biocompatibility, mechanical strength, easy sterilization, controlled rate of in vivo degradation, presence of cell attachment sites and minimal inflammation in vivo. Silk hydrogel when loaded with growth factors, cells or drugs could be injected directly in a minimally invasive manner into a defective site requiring a matrix for tissue regeneration or could be utilized for sustained release of drugs and bioactive molecules providing a safe alternative avoiding the complications of an open surgery. Moreover, the cost of fabrication of silk hydrogel is much less than the available options like collagen, hyaluronic acid based products and visco supplements.

The fabricated injectable hydrogel has been found to possess all the qualities of the silk polymer such as mechanical strength, easy sterilization, controlled rate of degradation inside the body, minimal immune response. Also it is completely biocompatible and non-toxic.

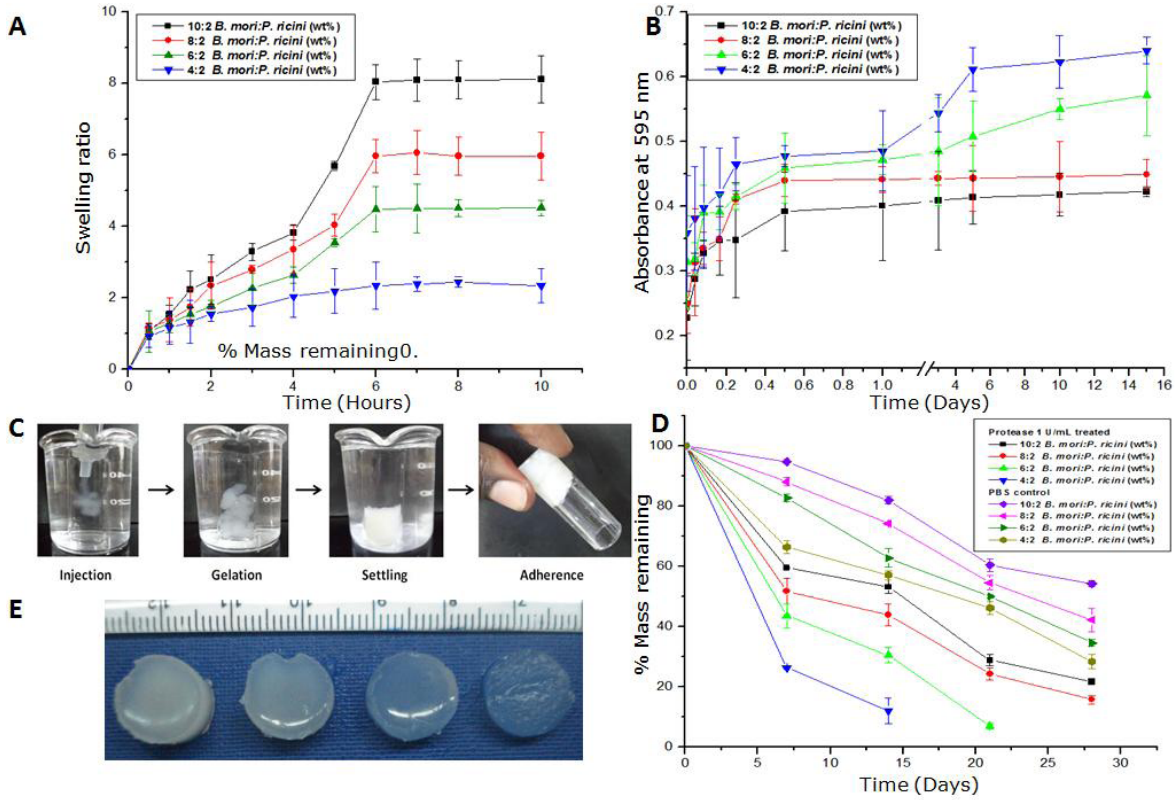


Fig. Representative images of injectable silk hydrogel showing **(A)** Swelling properties; **(B)** Drug release profile; **(C)** Gelation pattern; **(D & E)** Degradation profile.

Highly stable metallic nanoparticle-semiconductor hetero structures via click chemistry for photoelectro/ photocatalytic applications

Arun Prakash Upadhyay,
Dilip Kumar Behara,
Gyan Prakash Sharma
Indian Institute of Technology, Kanpur

Guide
Dr Sri Sivakumar

Arun Prakash Upadhyay, Dilip Kumar Behara, Gyan Prakash Sharma are Research Scholars at IIT Kanpur. Arun is working on the assembly of nanoparticles for PEC applications, Dilip is researching on hydrogen production from solar cells/ photo-electrochemical cells and Gyan is exploring the use of silicon nanomaterials for PEC applications.

Harvesting and conversion of solar energy through photo electrochemical water splitting provides an efficient way for generation of chemical energy from solar energy. Semiconductors, as photocatalyst, play a central role in solar harvesting devices, and there have been many efforts to improve their performance including band gap tuning to increase photon absorption cross sections, adding sensitizers to enhance charge carrier lifetimes by decreasing electron-hole separation to improve surface redox reaction rates.

In the present work, a generic "chemical" approach for fabricating highly stable electrochemically/photocatalytically active monolayer/tailored multilayered azide/alkyne modified gold/TiO2/SiO2 nanoparticles on alkyne/azide modified Si, ITO, TiO2, stainless steel and glass substrates via click chemistry has been undertaken. The stability, ohmic properties, electro/photo electrochemical and photocatalytic properties of the interface have been demonstrated via photo electrochemical water splitting, methanol oxidation and photocatalytic degradation of Rhodamine B (RhB) dye. The results suggest that the proposed approach can be extended for large-scale fabrication of highly stable hetero structure materials centric electrochemical and photo electrocatalytic devices.


100
miclins
100
miclins

Biomimicked polymer surfaces exhibiting superhydrophobic and anti-reflective properties

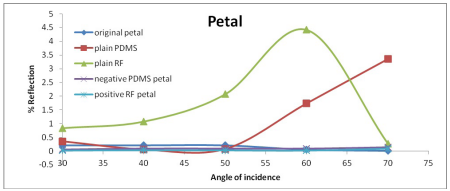
Srinadh Mattaparthi
Indian Institute of Technology, Hyderabad

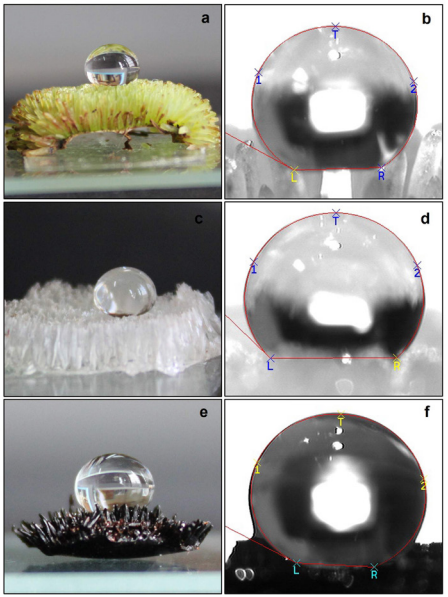
Guide
Prof. Chandra Shekhar Sharma

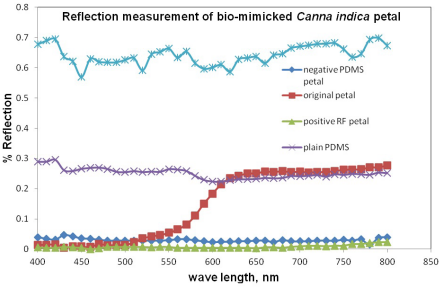
Srinadh Mattaparthi (M. Tech., Ph. D. pursuing, IIT Hyderabad) is researching on nature-inspired functional surfaces. The present work forms part of his post graduate thesis.

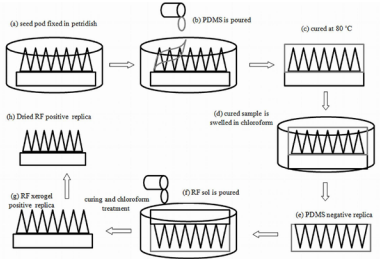
The structure of seedpod, petal and leaf of Canna indica L. was biomimicked using various polymers and then studied for their wettability characteristics. The biomimicked polymer surfaces were found to exhibit superhydrophobicity. The superhydrophobic nature of the seedpod with high aspect ratio and hierarchical patterns having much larger surface area were not only preserved but also slightly improved in the RF gel replica.

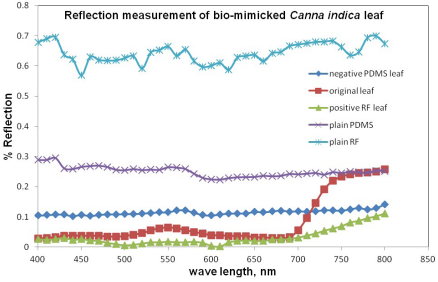
The petal and leaf biomimicked polymer surfaces with multi-scale surface patterns were further studied for their antireflective properties. The biomimicked high aspect ratio micron features as found in Canna indica petal and leaf demonstrated near zero reflection for a wide range of wavelength and incidence angle of light. This property may be used to prepare solar cells with higher efficiency. Also, the fabrication of micron size features is easier than sub-micron. The fabrication of superhydrophobic as well as antireflective polymer surface using this low cost simple biomimicking technique opens possibilities of use in a variety of applications like solar cells, self-cleaning materials, microfluidics and energy storage devices.

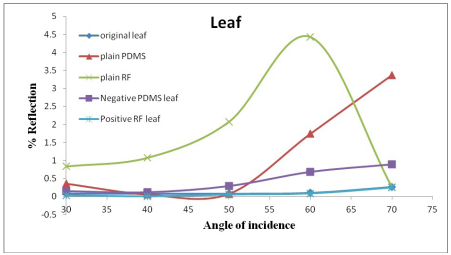


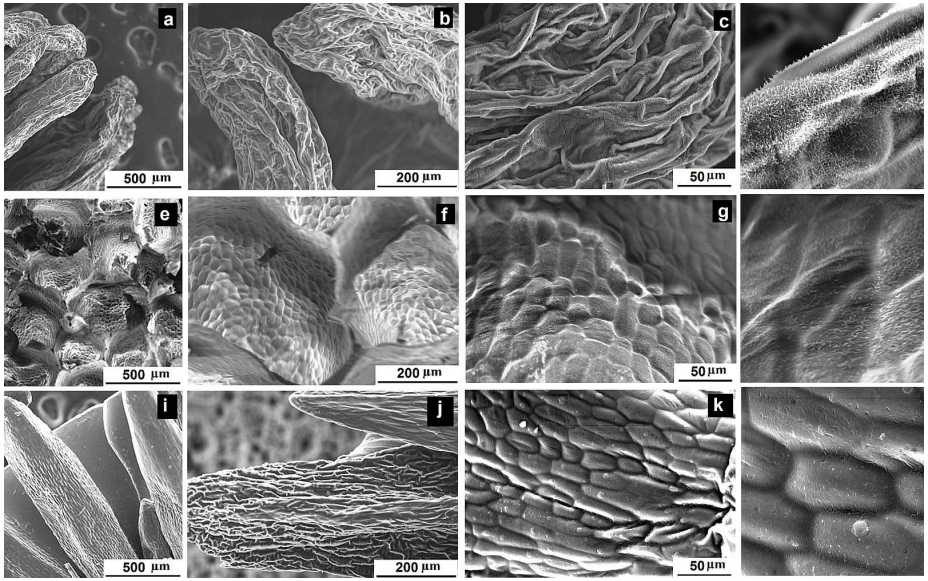





(a) seed pod fixed in petridish
(b) PDMS is poured
(c) cured at 80 °C
(d) cured sample is swelled in chloroform
(e) PDMS negative replica
(f) RF sol is poured
curing and chloroform treatment
(g) RF xerogel positive replica
(h) Dried RF positive replica


Reflection measurement of bio-mimicked Canna indica leaf
% Reflection
wave length, nm
negative PDMS leaf
original leaf
positive RF leaf
plain PDMS
plain RF


Leaf
% Reflection
Angle of incidence
original leaf
plain PDMS
plain RF
Negative PDMS leaf
Positive RF leaf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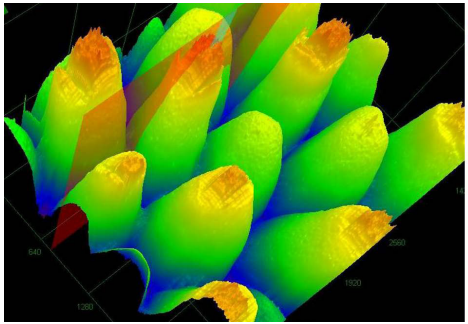
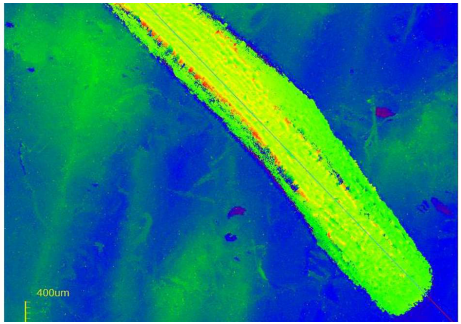



400um

Indramani Dhada [B. E. (Civil) Biju Patnaik Univ. of Tech.; M. Tech. (Env. Eng. & Mgmt.), IIT Kanpur] is currently undertaking his research work at IIT Kanpur. He had earlier worked with Tata Consulting Engineers Ltd and Water Resources Department, Govt. of Odisha.

Pavan Kumar Nagar [B.E. (Agri), College of Technology and Engineering, Udaipur; M. Tech. (Env. Eng. & Mgmt.), IIT Kanpur] is also a research scholar at IIT Kanpur. He had earlier worked with the UPL Environmental Engineers Ltd for a couple of years.

Development and pilot testing of nano-sized TiO2 based Photocatalytic Oxidation technology for controlling VOCs

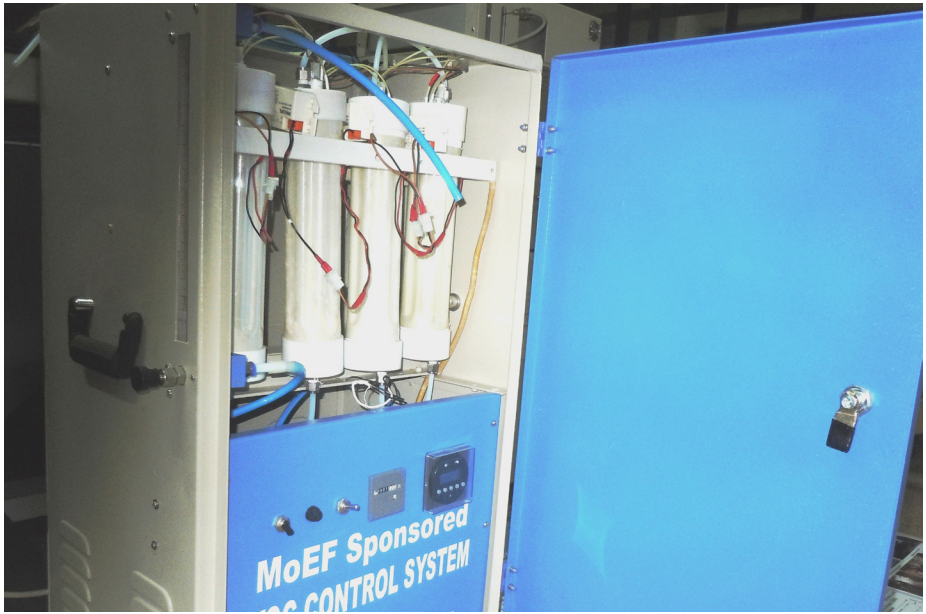
Indramani Dhada,
Pavan Kumar Nagar
Indian Institute of Technology, Kanpur

Guide
Prof. Mukesh Sharma

Volatile Organic Compounds (VOCs) are harmful air pollutants and affect skin, central nervous system, kidney and liver. The half life period of these VOCs in the atmosphere is about six years. It thus becomes necessary to reduce VOCs concentration at source and in the atmosphere as well. While much research has been going on TiO2 based Photocatalytic Oxidation (PCO) of VOCs, its commercial application has remained a challenge.

A Photocatalytic Oxidation (PCO) technology for industrial use for controlling VOCs at source and in situ ambient air using nano-semiconductor catalysts (TiO2) and ultraviolet (UV) radiation (external source and/or solar UV radiation) has been developed.

Anatase phase, nanosized TiO2 catalysts with high surface roughness and BET surface area were synthesized over borosilicate glass substrate. The photocatalytic activity of the coating was evaluated by gas phase degradation of volatile organic compounds (VOC) in presence of UV light. A carbon balance was carried out with the help of meathanizer for the continuous reactor system to ensure quality of experimental work. The developed continuous reactor was effective in degrading VOCs, within a short retention time of seven minutes. IIT Kanpur, through a Ministry of Environment and Forests (MoEF) sponsored project and Aarti Industries Limited, Vapi, Gujarat, has developed a pilot testing set-up for industrial application of the technology. The technology has achieved an overall



efficiency of 61 and 77 per cent with one and two reactors (in series).

Ramchander Chepyala

Satyendra Kumar

Narendra Kumar

Bhanu Prakash

Microfluidic immunosensor

Ramchander Chepyala,
Satyendra Kumar,
Narendra Kumar,
Bhanu Prakash

Indian Institute of Technology, Kanpur

Guide

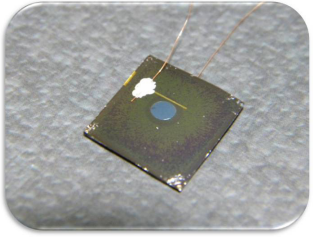
Prof. Siddhartha Panda

Ramchander Chepyala (B. Tech, NIT Warangal; M. Tech, IIT Madras) has recently submitted his Ph. D. to the Department of Chemical Engineering at IIT Kanpur.

Satyendra Kumar (Ph. D. Jamia Milia Islamia, New Delhi) is a Post-Doctoral Fellow in the Department of Chemical Engineering, IIT Kanpur.

Narendra Kumar (PG in Laser Science & Applications, Devi Ahilya University, Indore) is a Research Scholar in Materials Science Programme at IIT Kanpur.

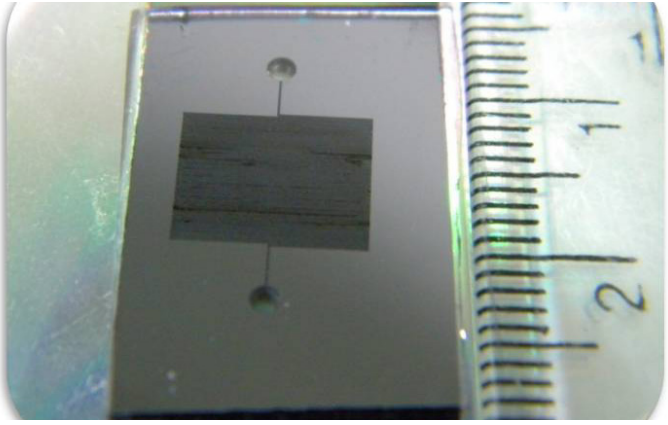
Bhanu Prakash [B. Sc. (Hons.) Physics, University of Delhi] completed his M. Sc. Physics from IIT Kanpur.

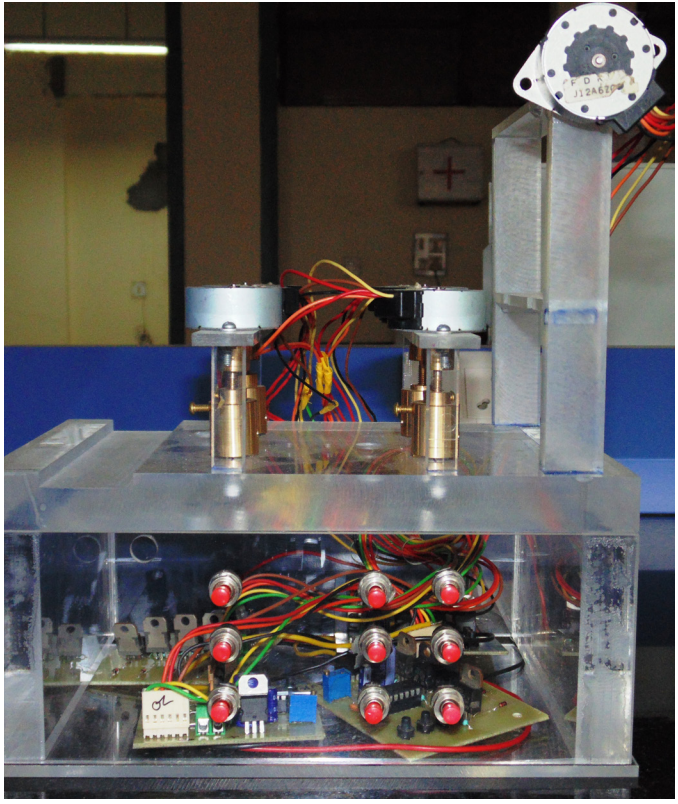


Much research has been ongoing to develop diagnostic biochips that can be used to efficiently analyze least amount of sample in a short period of time. The available devices do not have many integrated sensors, and have issues like cross contamination, unstable temperature of the substrate/reagents, non re-usability of the microchips etc.

The present invention relates to a lab-on-a-chip (LOC) device and provides an Electrolyte Insulator Semiconductor (EIS) based Microfluidic Immunosensor, which

measures the changes in surface potential between the electrolyte (desired analyte) and the sensing insulator by a shift in capacitance–voltage (C–V) curves. This shift is a direct representation of sensitivity of the device from which quantification of a particular disease marker (present in the sample) can be obtained. This device provides a reliable detection of different biomarkers, specifically cancer, and for other diseases, including a possibility to use for multianalyte detection of test samples. After successful lab/clinical trials, this miniaturized, integrated EIS Microfludic Immunosensor would enable a substantial cost reduction paving the way for a range of new applications.





Ranabir Dey

Shantimoy Kar

Paper-and-pencil' micro fluidic device for Point-of-Care diagnostics

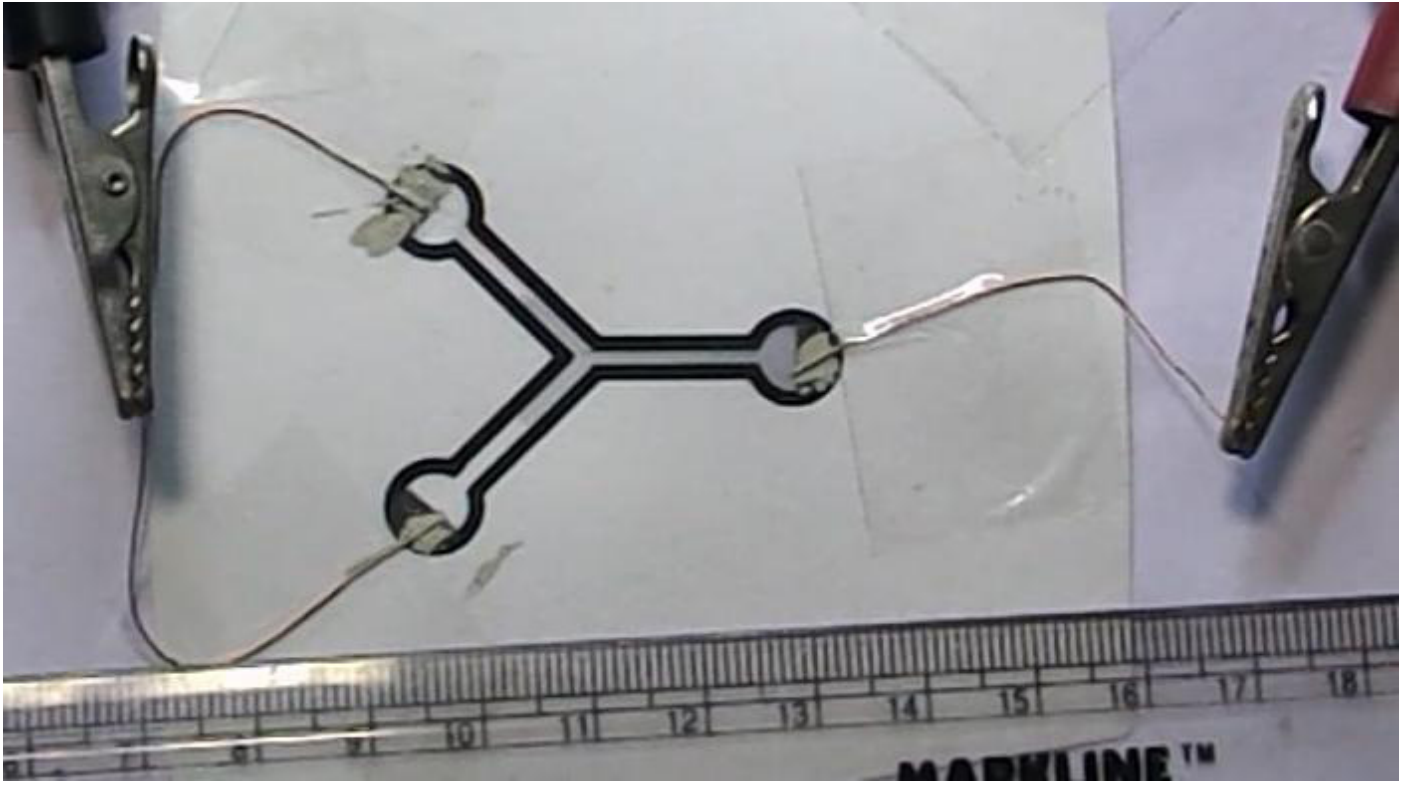
Ranabir Dey,
Shantimoy Kar
Indian Institute of Technology, Kharagpur

Guide
Prof. Suman Chakraborty

Ranabir Dey and Shantimoy Kar, both, are research scholars at IIT, Kharagpur

Rapid Diagnostic Test (RDT) kits are not commonly available for many diseases prevalent in developing countries like ours. Even for such kits, the test procedures can be labour and time intensive, requiring expert supervision all the time. The present 'paper-and-pencil' diagnostic device is low-cost miniaturized (due to the innovative fabrication methodologies) and efficient (high throughput rate and multiplexable) device, which does not require an elaborate infrastructure and trained on-field pathologists through the implementation of colorimetric quantitative detection techniques (unlike the majority of the available RDT kits which are qualitative in nature).

The proposed 'point-of-care' diagnostic device can be used for quantitative detection of a wide variety of biological analytes. Studies for detection of glucose (for diabetes) and bilirubin (for jaundice) have been undertaken. A stethoscope-shaped ('Y'-shaped) 'paper-and-pencil' device is used. The pad at the end of one of the arms of the 'Y'-section is spotted with a specific reagent for glucose detection (diabetes), while the pad at the end of the other arm is spotted with the pertinent reagent for bilirubin detection (jaundice). The sample (blood serum) is placed on the pad at the end of the leg of the 'Y' channel. The applied electric field augments the liquid flow through the paper channel to the respective test pads, where it reacts with the reagents; thereby turning the paper pad into different colors). The level of glucose or bilirubin can be quantitatively estimated by matching the respectively obtained colors with the pertinent color keys/calibration charts. The electrically-mediated flow through the paper channel significantly improves the repeatability, controllability and response time of the low-cost device. The researchers have also standardized an even more economic and simpler methodology for fabricating such 'paper-and-pencil' devices by using normal inkjet printing.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Performance enhancement of microthruster using nano-engineered MEMS structure for long term space mission

Pijus Kundu
Indian Institute of Technology, Kharagpur

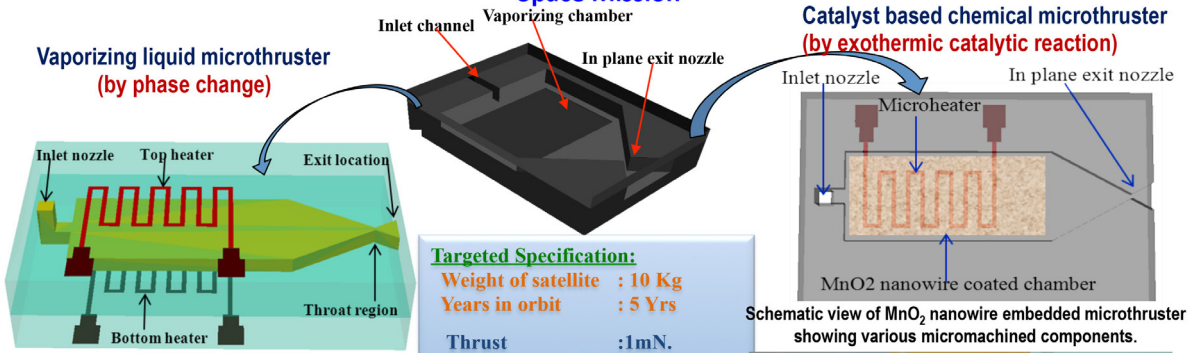
Guide
Prof. T. K. Bhattacharyya
Prof. Soumen Das

Pijus Kundu [B. Sc. (Hons.) Physics, M. Sc. (Electronics and communication), Ranchi University, Ranchi; Ph. D. IIT, Kharagpur] is a Postdoctoral Research Fellow at the National Tsing-Hua University, Taiwan. His research area includes NEMS/MEMS based sensors and actuator, nanostructure and nanomaterial, micromachining technology, thin film characterization and microfluidic analysis for lab chip.

Micro/nano satellites for future space missions require miniature propulsion systems for precise and accurate control of space craft. The microfabrication technology of MEMS (microelectromechanical systems) has been successfully employed to batch-fabricate micro-propulsion systems or micro-thrusters capable of producing extremely small thrusts in the range of micronewton to millinewton. Combining silicon micromachining technology with a simple low-cost nanotechnology synthesis process Vaporizing Liquid Microthruster (VLM) and catalyst based chemical microthruster have been designed and developed. The thrusters achieve high thrust force and specific impulse with minimum electrical power.

Superior performance of VLM thruster in terms of thrust and specific impulse generation as compared to the available literature reports by incorporating two heater configuration and synchronous propellant flow with input power and first time reported MnO2 nanowires and CNTs catalyst based silicon MEMS chemical monopropellant thruster are the major achievements in the present work.

Performance Enhancement of Microthruster using Nano-engineered MEMS Structure for Long Term Space Mission

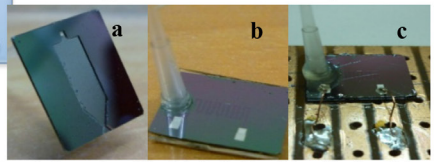


3D schematic view of complete MEMS microthruster sandwiched between top and bottom microheaters.

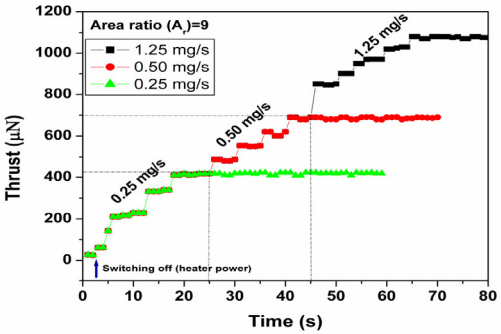
Schematic view of MnO_2 nanowire embedded microthruster showing various micromachined components.

Targeted Specification:

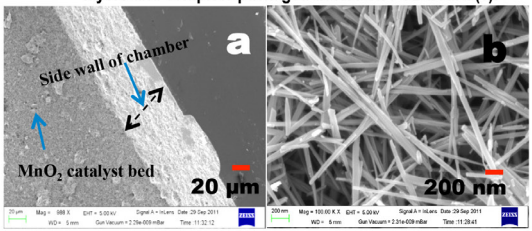
Weight of satellite	: 10 Kg
Years in orbit	: 5 Yrs
Thrust	:1mN.
Chamber pressure	: 1.0 bar
Propellant	: H_2O_2 & H_2O



Microphotographs of the fabricated top (a) and bottom (b) layers and complete packaged device on PCB board (c).



Measured thrust output for a microthruster with hydrogen peroxide delivered at various flow rates by syringe pump.



FESEM Images of MnO_2 Nanowires of various magnifications embedded in Different locations of microthruster chamber.

Saket Choudhary

Pradip Gatkine

Sushanth Poojary

A low cost cardiovascular diagnostic instrument for rural healthcare

Sushanth Poojary,
Pradip Gatkine,
Saket Choudhary
Indian Institute of Technology, Bombay

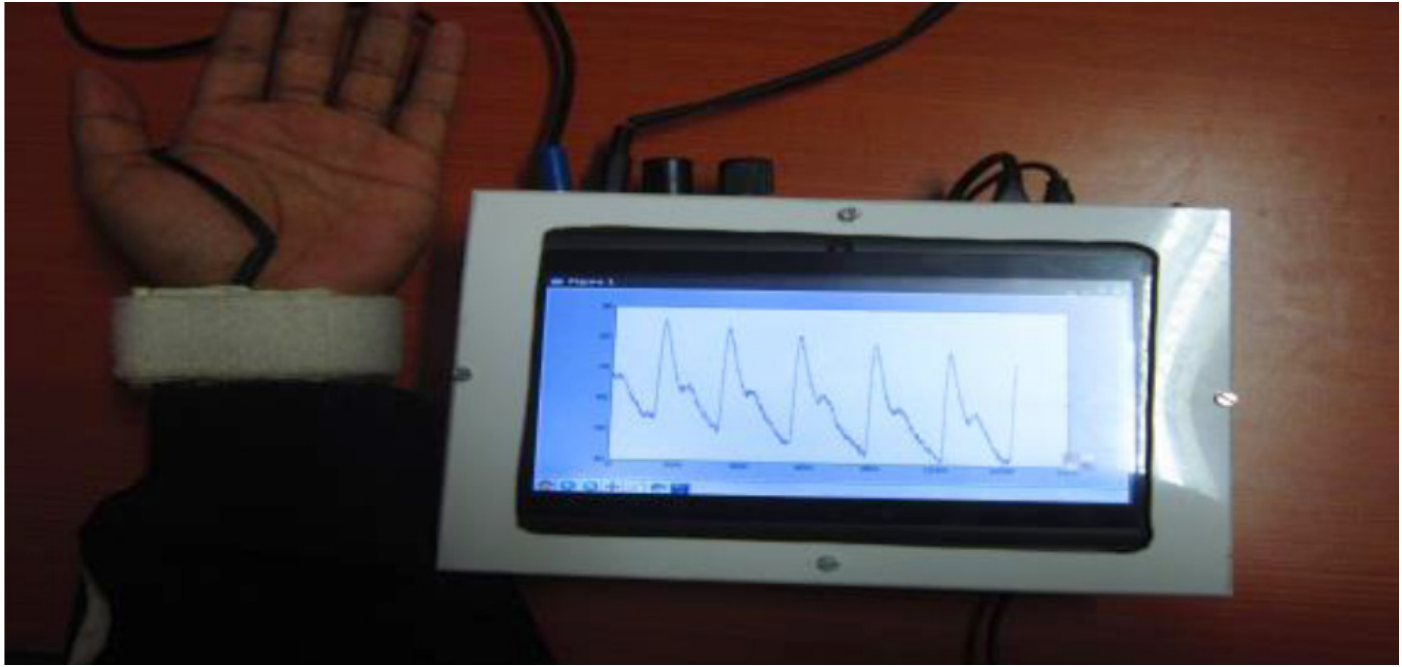
Guide
Prof Santosh Noronha

Pradip Gatkine , who has expertise in electronics, played a key role in development of the diagnostic engine and conceptualisation of the device. Sushanth Poojary worked on the system integration and helped in getting the device validated whereas Saket Choudhary worked on the coding for the diagnostic engine.

Public Health Centres in developing countries generally lack medical expertise and access to diagnostic devices for cardiovascular diseases. Commercially available arterial pulse analyzers are costly and not portable. Arterial pulse analysis of radial and brachial artery can be used to observe an early indication, if any, of cardio vascular diseases. A low-cost portable arterial pulse analyzer has been developed, which records the pressure waves at radial and brachial arteries non-invasively using piezoelectric ceramic plate sensors. This analyzer provides real time display of arterial pulse waveforms during the test and the analysis of waveforms in digitally storable format.

Using this instrument, the parameters analyzed are SPTCD points, Augmentation index, pulse-wave velocity, 2nd derivative analysis for arterial ageing index, Pulse rate variability and Power Spectrum of Pulse rate variability. The setup simply and consists of two straps, one each for radial and brachial artery, with sensors mounted on them. Signal processing and analysis is done using Python on a Tablet PC.

Cardiovascular diseases are a major public concern and one of the most common causes of deaths the world over. The device aims to automate the process to enable medical camps and mobile medical vans to diagnose cardiovascular diseases early and easily in a rural setup.



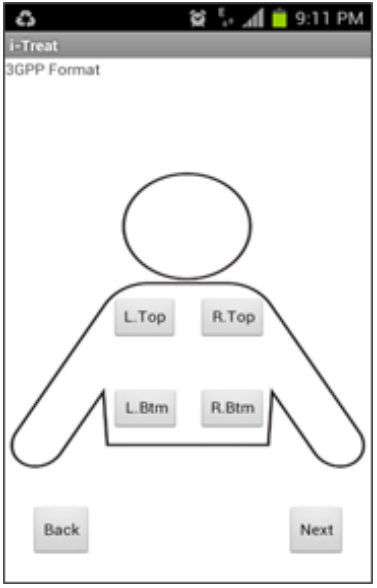
Low-cost diagnosis of pneumonia

Abhishek Khanolkar,
Kartik Shandilya
Indian Institute of Technology Madras

Guide
Prof. Vikram Shete

Both, Abhishek Khanolkar and Kartik Shandilya, are pursuing Masters in Chemical Engineering from IIT Madras.

Using the emerging technique of 'Respiratory Sound Analysis', a unique diagnostic mobile based application (i-Treat) has been developed, which is capable of preliminary diagnosis of pneumonia. The application captures the respiratory sounds of the infant through the mobile's microphone and checks for patterns in the respiratory sounds peculiar to pneumonia and the analysis of the same. The result greatly improves the chances of survival of infants in rural areas.



Laser light based fully computerized automated breast cancer and muscle screening system development

Samir Kumar Biswas
Indian Institute of Science, Bangalore

Guide
Prof. K Rajan

Dr. Samir Kumar Biswas [B.Sc. (Phy), Presidency College, Kolkata; M.Sc. (Phy), IIT Mumbai; Ph.D., IISc, Bangalore] is currently doing his postdoctoral research at University of Twente, Biomedical Photonic Group. His research interest is Biomedical Instrumentation and Imaging, and disease detection.

A simple low cost laser light based automatic optical imaging system for diagnosing breast cancer and imaging composite tissue. Optical encoder and MATLAB interface detect the position of source and detector. The software dynamically changes source-detector positions to irradiate the tissue surface and collects photon exit data from different tissue surface positions for the automated optical imaging. The developed master software package does system control, data acquisition, data organization, data calibration and reconstruction of tissue image.

Ex-vivo and In-vivo imaging of composite animal tissues and human muscle tissue has been undertaken using this automated optical imaging system.

Figure 2: Photograph of invented optical imaging system for tissue diagnosis (S K Biswas @ IISc).

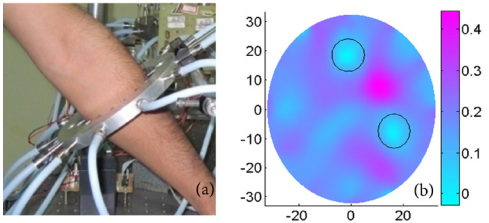


Figure 3: (a) Photograph of tissue scanning optical imaging system, (b) Reconstructed light diffusion coefficient distribution image of hand muscle. The diffusion of light through bones is almost zero and shows the location of bones (S K Biswas @ IISc).

Parita Mordadiya is a research scientist in F & D Dept. at Priti Industries.

Dr. Nirav Patel is a DST Inspire faculty in the Dept. of Pharmaceutical Science, Saurashtra University, Rajkot.

Dr. Vaishali Thakkar is the H.O.D. of Pharmaceutics Department of Anand Pharmacy College, Anand.

Development and evaluation of women friendly vaginal in situ hydrogel for sperm immobilisation

Parita Moradiya,
Dr. Nirav Patel,
Dr. Vaishali Thakkar
Anand Pharmacy College, Anand

Guide
Dr. Tejal R. Gandhi

Curcumin based an efficient thermosensitive in situ gelling mucoadhesive system for contraception. The in situ vaginal gel of curcumin was prepared using poloxamer gelling agent (temperature based mechanism) containing bioadhesive polymers for longer retention of dosage form.

The optimized formulation maintained various physicochemical parameters within the prescribed limits. Ex- vivo study on human ejaculate showed significantly decreased sperm viability. The sperms were found to be nonviable after 2 min when treated with the in situ gel at a dose of 5 ml. This spermicidal in situ gel may, thus, be used as a contraceptive to control population explosion, prevent unintended pregnancy, and vaginal infections. This may be developed into a commercially sustainable product to solve the problem of women and improve quality of their lives.

All the three, Sritam, Aditya and Himanshu are the students of IIT (BHU), Varanasi. While Sritam and Aditya are studying metallurgical engineering, Himanshu is undergoing his course in applied physics. They are techno-enthusiasts whose hobby is to do something new and innovative.

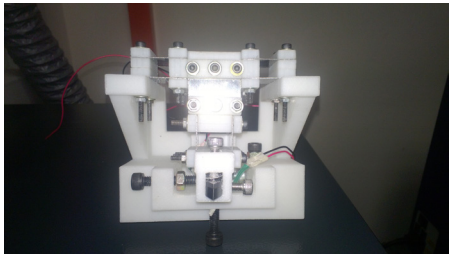
Touchpad for malignant tumour (epithelial) detection and imaging

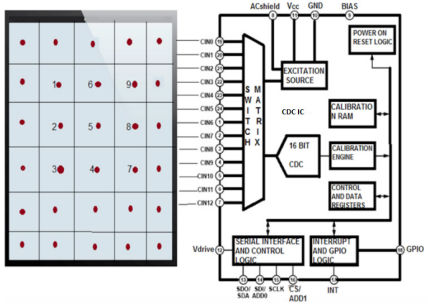
Sritam Parashar Rout,
Aditya Garg,
Himanshu Gangwar
IIT BHU

Guide
Mr. Anoop Jayaram

The system is a non-invasive and highly portable method of malignant (cancerous) tumour detection (differentiating it with benign tumours) without biopsy within a few seconds. Studies suggest that malignant tumour cells have less potassium ions and more sodium ions. Hence there is a difference in the conductivity/dielectric properties between cancerous and non-cancerous tumours. This device compares the conductivity and dielectric properties of the tumour with the normal cells and by analysing the difference in dielectric properties determines whether the tumour is cancerous or not. Initially a touch probe was planned, but later the design was modified for a projective capacitive touchpad. An imaging system is also proposed using a matrix of electrodes for easier visualization.

The facilities for MRI, Electrical Impedance Tomography, Biopsy, etc are not available in rural areas. Early diagnosis may result in arresting the growth of the cancer. Hence, this low cost and non-invasive method could make the difference in case of tumours of neck, skin, breast, mouth etc.





M. Ramesh Nachiappan

Vishnu Padmanaban

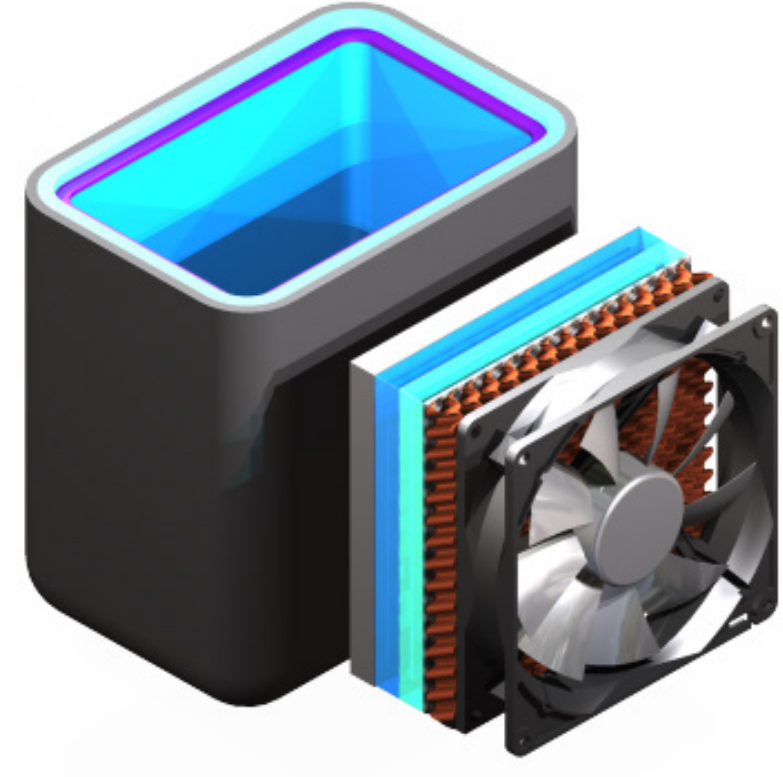
Cost effective vegetable chiller for rural small farmers

Vishnu Padmanaban,
M. Ramesh Nachiappan
Amrita School of Engineering, Coimbatore

Guide
Dr. M. Elangovan

Vishnu and Ramesh are pursuing their Bachelor's degree in Mechanical Engineering at Amrita School of Engineering, Coimbatore. Their primary research interest is development of sustainable technology to establish synergy between the clean energy resources and the transportation sector.

Large cold storage facilities for storage of vegetables are out of reach and unaffordable for the small and marginal farmers. The chiller is a cost effective and ultra-low energy consuming storage device and consists of three units –evaporative cooler, sub cooler and a food storage cabin. It uses Phase Change Material (PCM), which acts as an effective medium of passive cooling system, absorbing heat until it reaches its melting point and changes its phase from solid to liquid. The device consumes power only for charging the liquid PCM i.e. converting it back into solid state, which can be done during night times (off-peak) within 1-2 hours. Thus such food chillers can efficiently operate in regions of interrupted grid power supply as well.



Amruta Anant Bhave

Jayesh Manohar Sonawane

Development of microbial fuel cells with improved performance

Jayesh Manohar Sonawane,
Amruta Anant Bhave,
Ratikanta Nayak,
Saket Bhardwaj,
Prajakta Sonkusare

Indian Institute of Technology, Bombay

Guide

Prof. Prakash Chandra Ghosh

Prajakta Sonkusare

Ratikanta Nayak

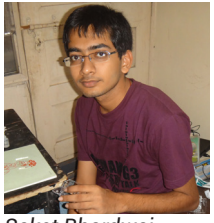
Jayesh Manohar Sonawane is Research Scholar in the Dept. of Energy Science and Engineering, IIT Bombay.

Amruta Anant Bhave is Junior Research Fellow, Proteomics Laboratory, Department of Biosciences and Bioengineering, IIT Bombay.

Ratikanta Nayak is Research Scholar, Dept. of Energy Sciences and Engineering, IIT Bombay

Saket Bhardwaj is a B. Tech. student in the Dept. of Chemical Engineering, IIT Bombay

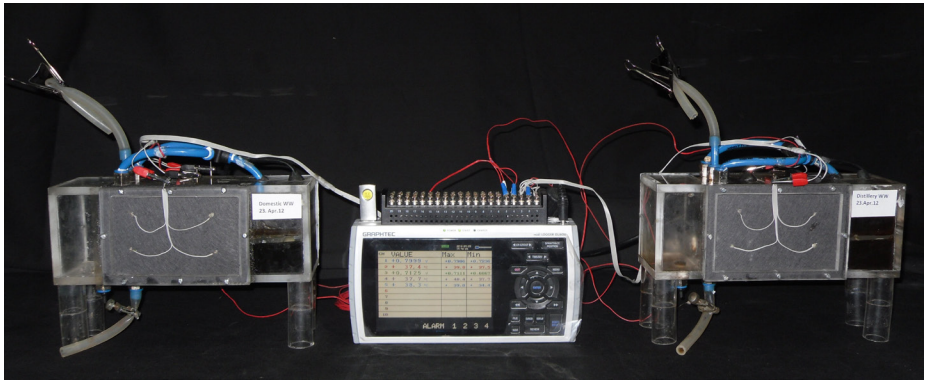
Prajakta Sonkusare is a B. Tech. student in the Dept. of Chemical Engineering, IIT Bombay.

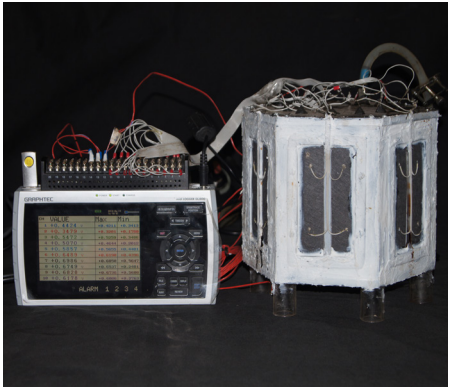


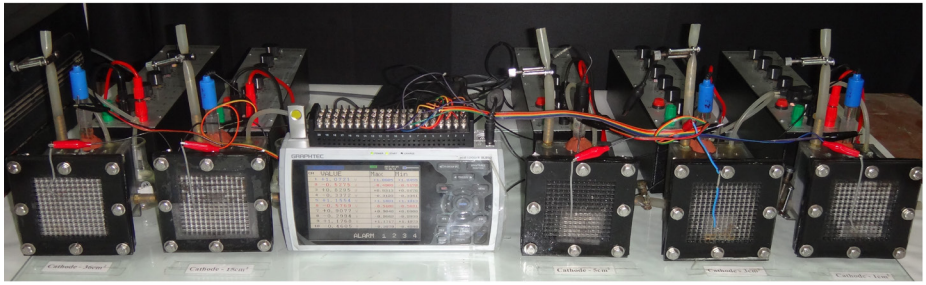
Saket Bhardwaj

The use of biological fuel cells offers a solution to the energy crisis by harvesting energy from organic wastes and renewable biomass. Microbial fuel cell is capable of directly converting chemical energy present in the organic materials to electricity using microorganism as catalyst. However, poor microbial metabolic as well as electrode kinetics result in low performance. High power output using optimized system architecture and mixed population of microbial consortia from

natural habitat has been tried. Efforts are being made to enhance bacterial kinetics by developing metabolic activators, reduce activation losses by improving electrode design to enhance power density, and improve the design to minimize charge transports losses by introducing turbulence in the flow.







A transceiver for satellite based communication during emergency using TV white spaces

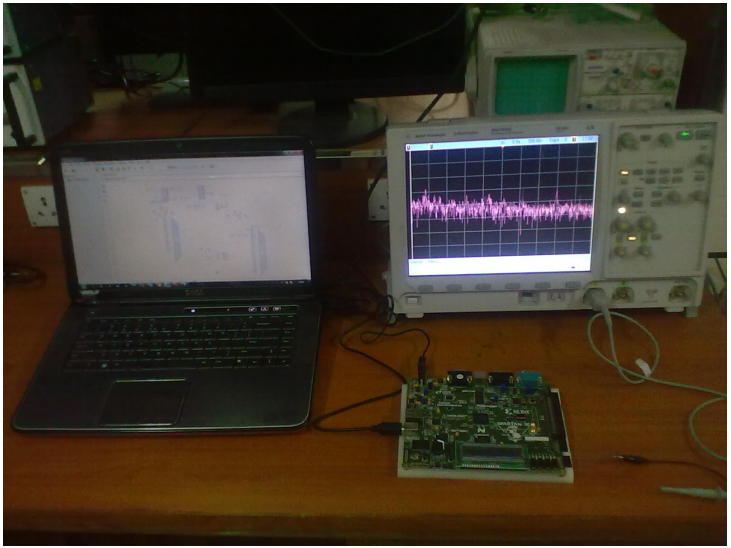
Rajan Kapoor
Indian Institute of Technology, Patna

Guide
Dr. Preetam Kumar

Rajan Kapoor is a final year B. Tech. student in Dept. of Electrical Engineering at IIT Patna. His interest lies in designing software and hardware solutions for cognitive radio technologies.

In telecommunication, white spaces are unused bands of frequency. Every channel is assigned rights to broadcast over certain frequency bands. Many TV channels do not broadcast the whole day and hence their bandwidth and time is available. The present innovation is a Field-Programmable Gate Array (FPGA) IC based hardware transceiver, which uses such white spaces for satellite based communication during emergencies like natural disasters when the terrestrial communication may fail. This technology may also be used to deliver video lectures to remote villages of the country.

Similarly, medical consultations can also be made available to rural people.



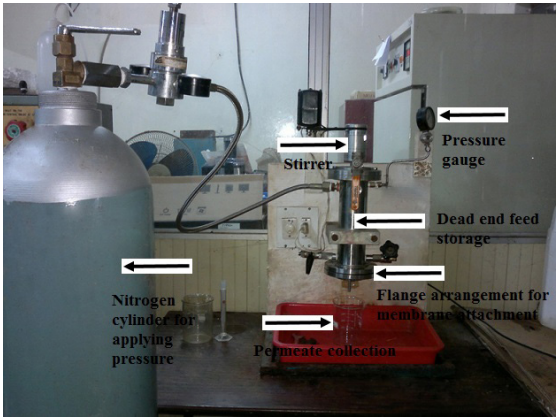
Adsorptive removal of phenolic compounds using mixed matrix membrane of cellulose acetate phthalate and alumina nanoparticle

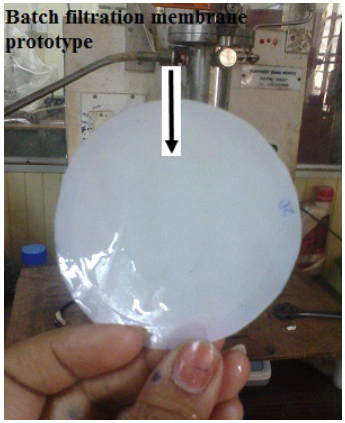
Raka Mukherjee
Indian Institute of Technology, Kharagpur

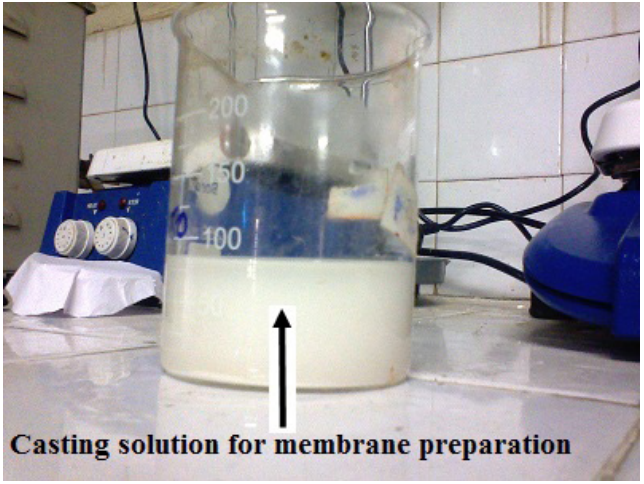
Guide
Prof. Sirshendu De

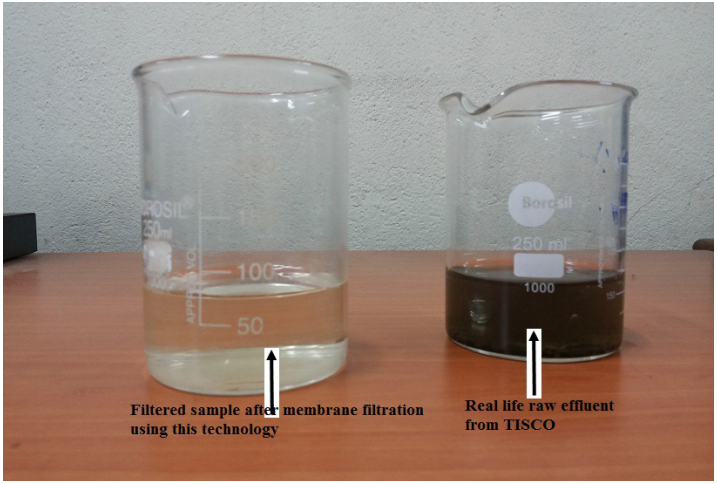
Raka Mukherjee [B.E. (Chem. Eng.), Jadavpur University; M.Tech. IIT Kanpur] is pursuing her research at IIT Kharagpur on the application of mixed matrix membrane for waste water treatment.

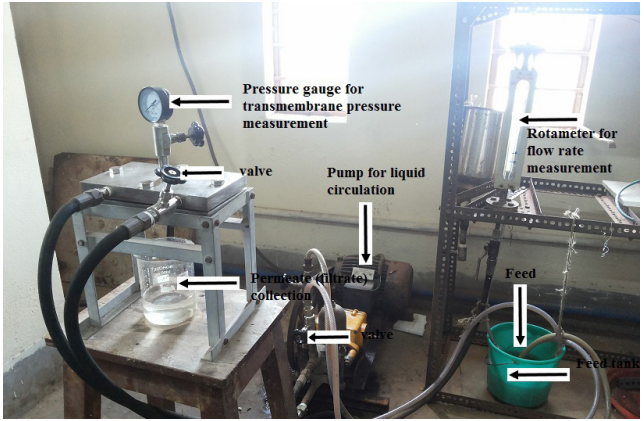
Phenolic compounds are abundantly found in effluent stream of various chemical, petrochemical and steel industries. Existing technologies like solvent extraction, adsorption, chemical oxidation, biological treatment, distillation are not cost effective and are time consuming as well. As an alternative, effluent treatment using Mixed Matrix Membrane (MMM) of cellulose acetate and alumina nanoparticle was undertaken. This special type of MMMs were prepared using alumina nanoparticles and cellulose acetate phthalate (CAP) by varying concentration of nanoparticles in the range of 10 to 25 wt%. The addition of nanoparticles increased the porosity and permeability of the membrane up to 20 wt% of alumina.

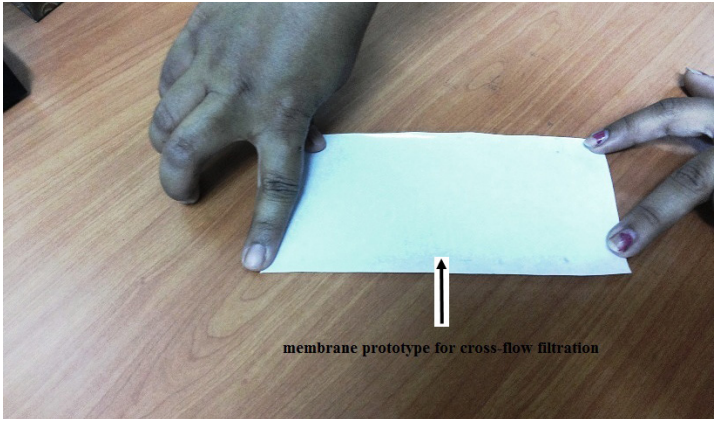





Casting solution for membrane preparation


Filtered sample after membrane filtration using this technology
Real life raw effluent from TISCO


Pressure gauge for transmembrane pressure measurement
valve
Pump for liquid circulation
Rotameter for flow rate measurement
Permeate (filtrate) collection
Feed
Feed tank


membrane prototype for cross-flow filtration

Inhalable multiparticulate carrier systems for sustained and targeted delivery of isoniazid

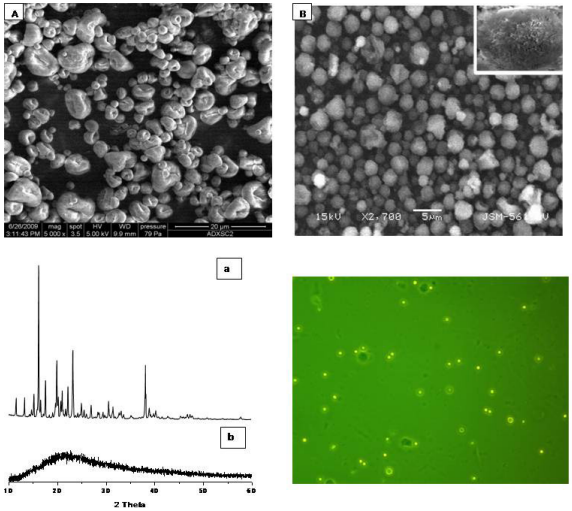
Dr. Sanjay Tiwari
Indian Institute of Technology, BHU, Varanasi

Guide
Dr. B. Mishra

Dr. Sanjay Tiwari (B. Pharm. U.P. Technical University, Lucknow; M. Pharm. and Ph.D. Department of Pharmaceutics, Institute of Technology, BHU, Varanasi) has published widely and has been the recipient of JRF and SRF of ICMR.

Inside lungs, the tuberculosis bacteria are taken up by the dust cells (alveolar macrophages), which are unable to digest the bacteria due to its unusual lipid rich cell wall. The bacteria multiply within the macrophage. The alveolar macrophages possess mannose (a protein) specific membrane receptors which can recognize and facilitate the internalization of carriers bearing mannose residues.

Mannose decorated carrier systems for selective targeting to the alveolar macrophages have been developed. The results demonstrate that such carrier systems were efficiently phagocytosed by alveolar macrophages thereby delivering a higher payload of drug in comparison to the conventional dosage forms.



Concept of β breaker dipeptides and its application in Alzheimer's amyloid disruption

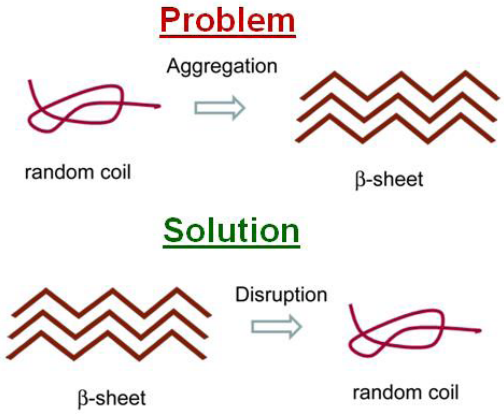
Nadimpally Krishna Chaitanya
Indian Institute of Technology, Guwahati

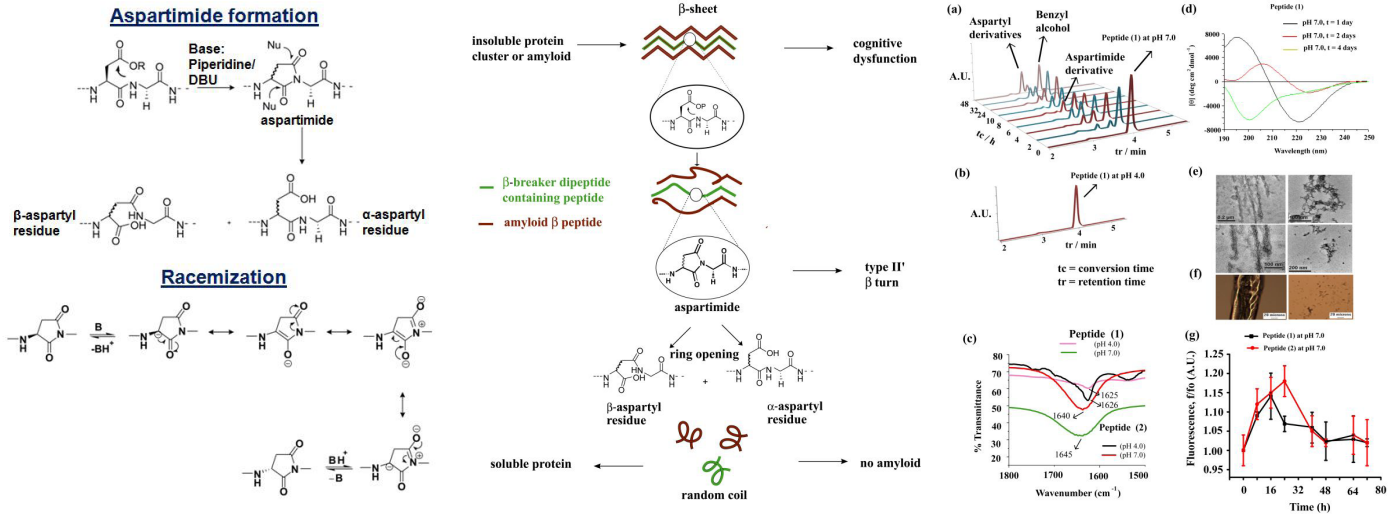
Guide
Dr. Bhubaneswar Mandal

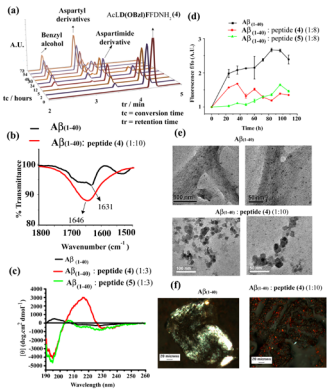
Dr. Nadimpally Krishna Chaitanya holds a Doctorate degree from IIT Guwahati.

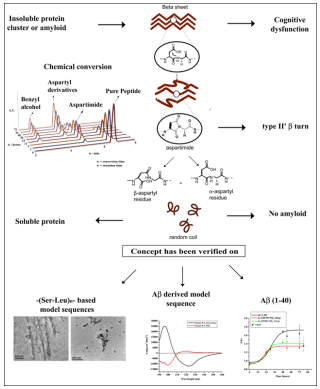
Reversion of protein or peptide aggregation is important in various domain of research at the interface of chemistry, nanoscience, and medicine. A novel class of dipeptides, termed as β-breaker dipeptides (BBDP), has been identified. The BBDP can be incorporated into the self-recognizing sequences to generate a novel class of conformational switch, which forms β-sheet at an initial stage and then converts in a controlled manner to random coil at specific condition. Such conformational switches may be used to study aggregation/disaggregation process and may find many biomedical applications relevant to aggregation related disorders.

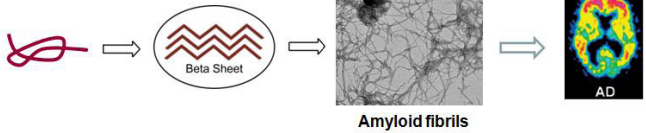
Incorporation of BBDPs in a well designed amyloidogenic peptides generates a special class of β-sheet breaker peptides those undergo a chemical change at physiological condition generating a breaker element in situ. These β-breaker peptides are shown to first incorporate into the amyloid and then disrupt it. This may be important for drug design against various amyloidoses. The reversion of peptide aggregation using chemical tricks may find application in material chemistry as well.

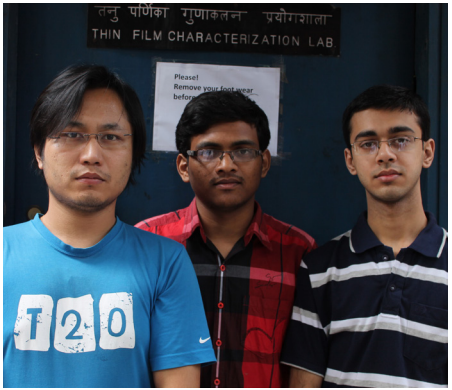



Aspartimide formation
Base: Piperidine/ DBU
aspartimide
β-aspartyl residue
α-aspartyl residue
Racemization
β-sheet
insoluble protein cluster or amyloid
cognitive dysfunction
β-breaker dipeptide containing peptide
amyloid β peptide
type II' β turn
aspartimide
ring opening
β-aspartyl residue
α-aspartyl residue
soluble protein
no amyloid
random coil
Aspartyl derivatives
Benzyl alcohol
Peptide (1) at pH 7.0
Aspartimide derivative
A.U.
tr / min
Peptide (1) at pH 4.0
tc = conversion time
tr = retention time
Peptide (1)
(pH 4.0)
(pH 7.0)
% Transmittance
Wavenumber (cm-1)
Peptide (2)
Fluorescence, f/fo (A.U.)
Time (h)
Wavelength (nm)


Aβ(1-40)
Aβ(1-40); peptide (4) (1:10)
Aβ(1-40) : peptide (4) (1:3)
Aβ(1-40) : peptide (5) (1:3)
Wavenumber (cm-1)
Time (h)


Insoluble protein cluster or amyloid
Beta sheet
Cognitive dysfunction
Chemical conversion
Aspartyl derivatives
Benzyl alcohol
Aspartimide
Pure Peptide
type II' β turn
β-aspartyl residue
α-aspartyl residue
Soluble protein
No amyloid
random coil
Concept has been verified on
-(Ser-Leu)n- based model sequences
Aβ derived model sequence
Aβ (1-40)


Beta Sheet
Amyloid fibrils
AD



Fabrication of organic thin film transistor using single drop of organic or hybrid insulator, conductor and semiconductor materials

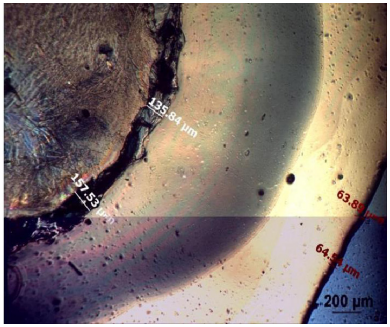
Gunda Manideep,
Ankit Nagar,
Mridul Boro,
Saumen Mandal
Indian Institute of Technology, Kanpur

Guide
Dr. Monica Katiyar

Dr. Saumen Mandal holds a Doctorate degree from IIT Kanpur. Mridul Boro, Gunda Manideep and Ankit Nagar are B. Tech. students at IIT Kanpur.

Organic thin film transistors (OTFTs) have been envisaged as a promising technology for their unique qualities such as flexibility, light-weight and low-cost fabrication. Its potential applications include flexible displays, smart cards, RFID tags, electronic paper and other consumer electronics. Different techniques such as inkjet, flexographic, gravure, offset and screen printing are used to manufacture OTFTs currently.

Here a novel technique based on a drop-cast/ inkjet process is proposed, which uses only 3 drops (distinct liquid in each drop), dispensed (and printed) in succession to manufacture OTFTs. An organic semiconductor when mixed with certain solvents tends to form a coffee ring like structure. When a water soluble conductor ink is dropped over the hydrophobic semiconductor, some part of it gets trapped inside the well (ring) and the rest forms a ring just outside the well, which later can be used as source and drain contacts.



Paper-pencil based self-pumping and self-breathing fuel cell

Ravi Kumar Arun
CSIR-Central Mechanical Engineering Research Institute, Durgapur

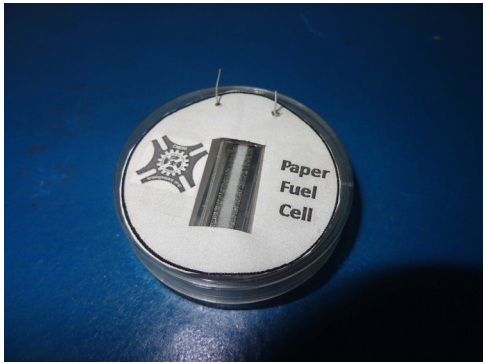
Guide
Dr Nripen Chanda

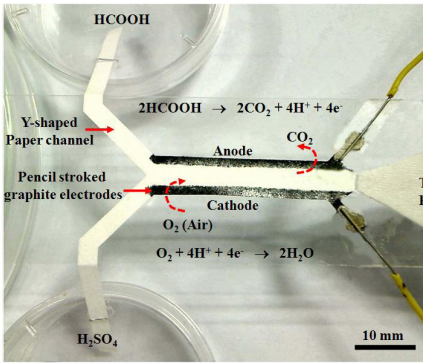
Ravi Kumar Arun [B. Tech. - M. Tech. (Dual Degree), Chem. Eng. IIT Kanpur] is a scientist at CSIR-CMERI and is also pursuing his doctorate from AcSIR, New Delhi. His area of research involves microfluidic fuel cell, application of nanoparticles in microchannels for disease diagnosis through lab on chip devices.

A paper based fuel cell, which uses capillary driven pumping (because of porous fibre network present on its surface) to pump the fluids. Unlike traditional fuel cells, the paper based fuel cell works on self-pumping and self-breathing mode with low consumption of the liquid fuel and electrolyte to generate energy for very long time.

The novelty of this device is that the fuel flows through capillary transport mechanism without use of an external pump and the oxygen is obtained through the porous pencil stroked graphite electrodes from quiescent air.

The developed micro-fuel cell produces power density of 32 mW/cm2 with potential upto 330 mV. The miniaturized paper fuel cell is reusable and can have several potential applications having low energy requirements.





Prarthana Gowda

Ultra-High Actuation in a Carbon Nanotube Actuator

Prarthana Gowda,
Praveen Kumar,
Rahul Tripati
Indian Institute of Science, Bangalore

Guide
Prof Abha Misra

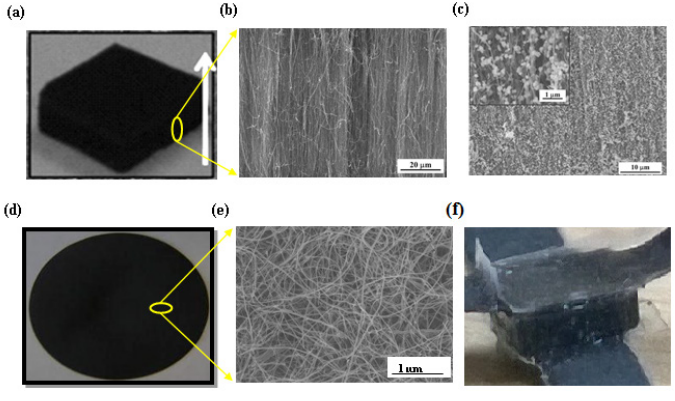
Praveen Kumar

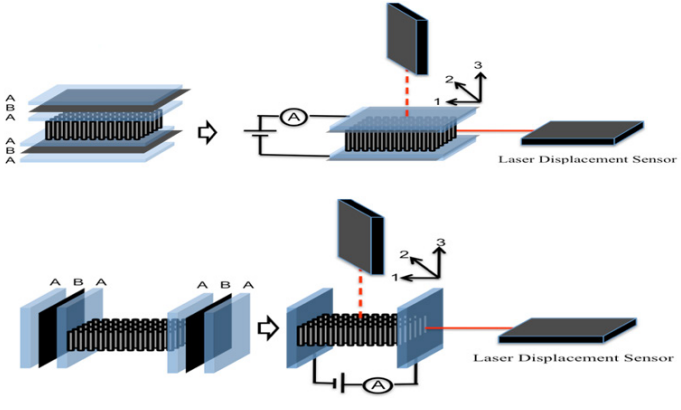
Prarthana Gowda [M. Tech. (Biomed. Instrmntn., RV College of Engineering, Bangalore] is doing her doctorate at the Department of Instrumentation and Applied Physics, IISc, Bangalore. Her research interests include studying the novel nanomaterial based actuators, sensors and detectors for practical applications.

Dr. Praveen Kumar [M. S., Ph.D. (Mech. Eng.), University of Southern California, Los Angeles] is Assistant Professor, Dept. of Materials Engineering, IISc, Bangalore.

Rahul Tripati [M. Sc. (Physics), Presidency college, Kolkata) interned at IISc.

Many actuators have the limitation of high operating voltage, low actuation force, low mechanical energy density, low conversion efficiency, etc. Ultra-high actuation in bulk carbon nanotube (CNT) mat at a very low applied electric field has been demonstrated. The induced strain in this mat has been found to be ~14%, which is many order higher as compared to the existing materials. It can further be enhanced up to ~30% by impinging copper oxide nanoparticles. The ultra-high actuation under low electric field with robustness and durability promises that CNT may be a future material for actuators. These actuator devices can be used for many novel macrosystem applications like gripper, switches, active diaphragm, robot arms, loudspeaker, dust-wiper etc.


(a)
(b)
(c)
(d)
(e)
(f)
20 μm
10 μm
1 μm


A
B
A
A
B
A
1
2
3
A
Laser Displacement Sensor
A B A
A B A
1
2
3
A
Laser Displacement Sensor

Amsler Grid Test Android App

Nagarjun Pola
R V College of Engineering, Bangalore

Jagjeet Singh
Harsha Vardhan Pokalla
Indian Institute of Technology, Guwahati

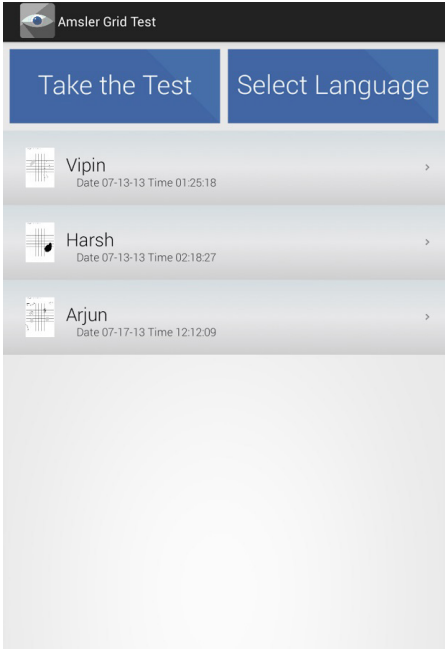
Parul Joshi
National Institute of Design, Bangalore

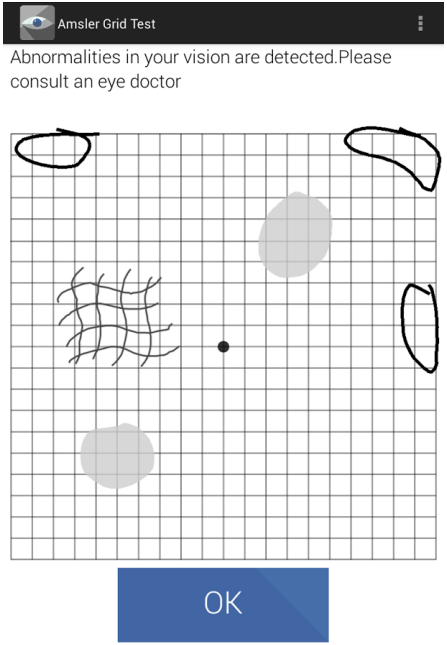
Guide
Dr Anthony Vipin Das

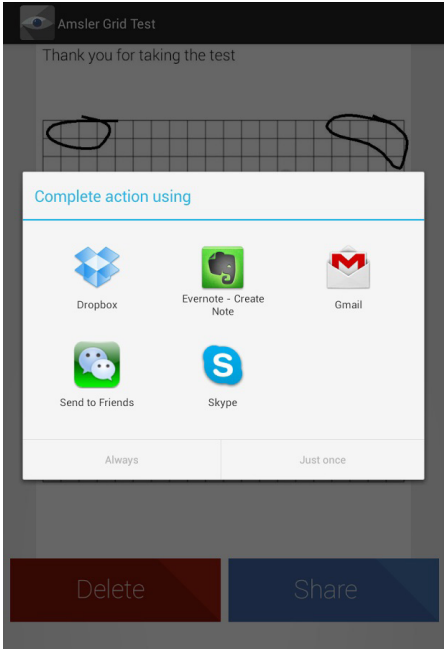
Nagarjun Pola is pursuing his engineering course at R V College of Engineering, Bangalore. Jagjeet Singh and Harsha Vardhan Pokalla are studying at IIT Guwahati whereas Parul Joshi is undergoing her studies at the National Institute of Design, Bangalore.

Age related macular degeneration affects over 25 million people worldwide and results in loss of vision partially with no consistent means of diagnosing its occurrence on time. The loss in vision is a result of the damage caused to the central part of the retina. Amsler Grid Test is the easiest and quickest way to spot macular degeneration. Amsler Grid is like graph paper with a dot at the centre. Person focuses on the central dot and marks on the paper wherever he sees distorted or blurred lines. Such results, however, are difficult to maintain in a database or compare.

This android app for taking Amsler Grid Test provides an interactive and efficient medium for diagnosing the disease. It can store database of the results, share it with the doctor, and also enables the user to draw distinguished patterns for different types of distorted areas apart from providing audio and text assistance while using the app.


Amsler Grid Test
Take the Test
Select Language
Vipin
Date 07-13-13 Time 01:25:18
Harsh
Date 07-13-13 Time 02:18:27
Arjun
Date 07-17-13 Time 12:12:09


Amsler Grid Test
Abnormalities in your vision are detected.Please consult an eye doctor
OK


Amsler Grid Test
Thank you for taking the test
Complete action using
Dropbox
Evernote - Create Note
Gmail
Send to Friends
Skype
Always
Just once
Delete
Share

3D model generation from 2D X-Ray images

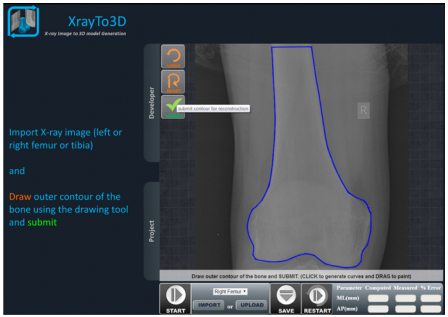
Vikas Dhruwdas Karade
Indian Institute of Technology, Bombay

Guide
Prof. B. Ravi

Vikas Dhruwdas Karade (B. Tech., M. Tech., IIT Bombay) has just completed his doctorate from IIT Bombay.

A software/algorithm, which can generate 3D model of bone shapes from its 2D X-ray image. It is an alternative to the conventional method of building 3D models from CT scans, which has 200 times more radiation than normal 2D X-ray. The application involves 3D surgery planning, implant design, surgery training etc.

The algorithm has been tested with simulated as well as real X-ray images of knee joint bones, using MATLAB based codes. The results showed acceptable accuracy within the reconstruction time of a minute. Using this method, it is expected that the health risks due to CT scan radiations can be reduced along with the cost.



Laser technology detects hidden materials: applications to security and medicine

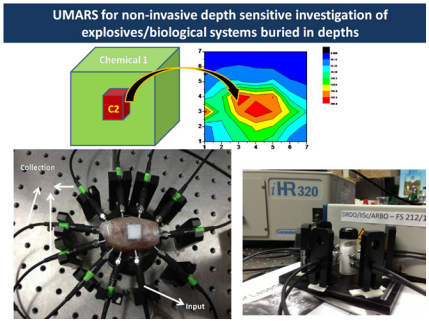
Sanchita Sil
Indian Institute of Science, Bangalore

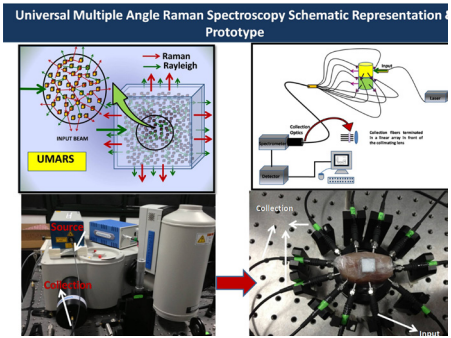
Guide
Prof Siva Umapathy

Sanchita Sil is a doctoral researcher at the IISc., Bangalore.

Universal Multiple Angle Raman Spectroscopy (UMARS) is a new technique that works on the multiple scattering principles, collection angle independent, and can probe any type of scattering samples at varying depths. A novel Raman based instrumentation for non-invasive depth sensitive detection of layered materials located at depths exceeding 15 mm underneath top layer has been developed.

The UMARS technique developed employs the principle of (a) deep penetration of photons and diffusion using non-absorbing media employing multiple scattering and (b) detection of signals from all the observable angles. UMARS is a geometry independent, flexible, robust, non-invasive technique having potential to be used in various fields of science spanning from materials to biology as well space exploration.





Arun Prakash Upadhyay

Prasenjit Sadhukhan

Fabrication of stable Liquid Crystal based biosensor

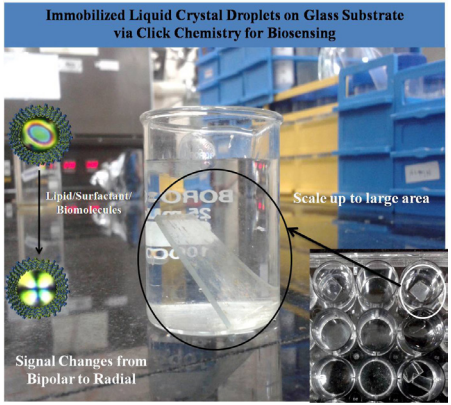
Arun Prakash Upadhyay,
Prasenjit Sadhukhan
Indian Institute of Technology, Kanpur

Guide
Dr Sri Sivakumar

Both Arun Prakash Upadhyay and Prasenjit Sadhukhan are post gradutates students at IIT Kanpur.

High sensitivity of Liquid Crystalline (LC) materials make them important constituent in bio/chemical sensors, micro fluidics chips, interfacial and optoelectronics applications. The performance and efficiency of LCs based devices relies mainly on sensitivity of LCs to molecular events, orientation of LCs, and the stability of LCs in aqueous medium. The fabrication challenges include consideration of long term stability of such devices in aqueous medium and the quantitative analysis of molecular event with individual LCs droplets.

The present work demonstrates a processing technique that uses copper catalyzed azide/alkyne cycloaddition click reaction (CuAAC) to bind polymer-coated LCs droplets to a planar glass substrate, which is very prominent constituent of bio/chemical sensors, microfluidics chip, display and optoelectronics devices. Pattern immobilization of polymer-coated LCs droplets on glass substrate has also been demonstrated. The ease of processing and highly stable performance of the prepared immobilized polymer-coated LCs droplets suggest that the proposed method can be used for immobilization of different oil droplets over large area of planar substrate for fabricating various devices/ components.



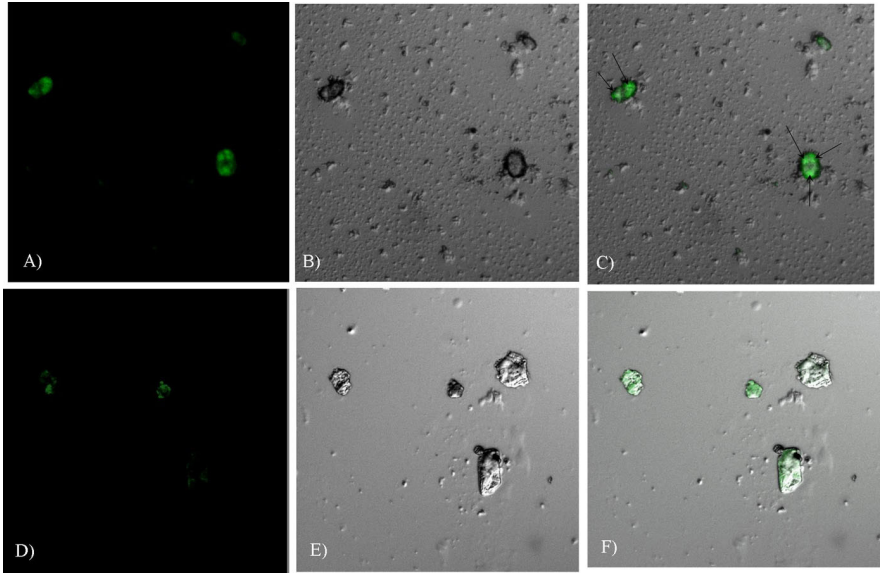
Macrophage-specific targeting of mannose-functionalized biodegradable polymeric nanoparticles of some anti-leishmanial drugs- Development, characterization and efficacy evaluation

Pramila Chaubey
Indian Institute of Technology (BHU), Varanasi

Guide
Prof. Brahmeshwar Mishra

Pramila Chaubey is a Senior Research Fellow at IIT, BHU, Varanasi and has been researching on formulation of functionalized nanoparticle of various anti-leishmanial drugs.

Macrophage targeted mannosylated chitosan nanoparticles (mCNPs) of two Anti-leishmanial drugs (ALDs) Rifampicin (RIF) and Curcumin (CUR) using circumscribed central composite factorial design (CCD) were developed. Antileishmanial activity was assessed in vitro using a macrophage (J774A.1 cell line) model of Leishmania donovani infection and in vivo by comparing the parasite load of hamsters. mCNPs had significantly greater antileishmanial efficacy than free drugs without any significant cytotoxic effects. mCNPs may be considered as promising carrier for selective delivery of ALDs to macrophages for effective management of virus load.



Dr. Shital Munde is a MD Pathology student, Shantanu Pathak is B. E. in Electronics and Communications and is a PGD IPR student, Makrand Kate is Computer Engineering student and Dr. Vaishali Korde is Senior Gynaecologist, MIMER Medical College, Talegaon, Pune. Science for Society is a social organization comprising academics who work towards taking innovations to society at large.

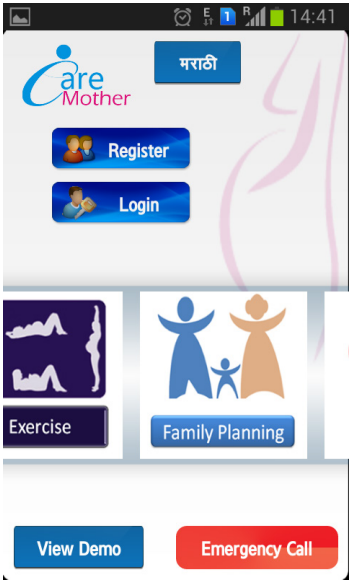
Care Mother - mobile pregnancy care

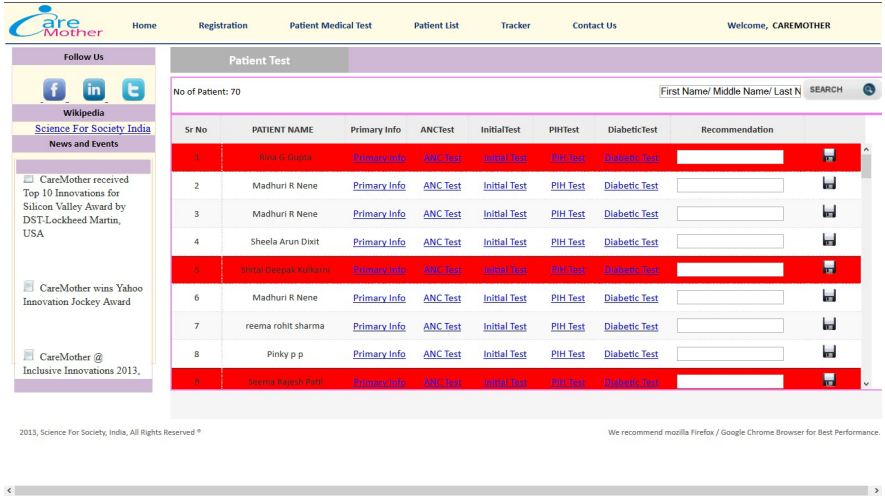
Shantanu Pathak,
Dr. Shital Munde,
Makrand Kate,
Gaurav Khatale,
Dr. Vaishali Korde
Science for Society, Mumbai

Guide
Prof. Vaibhav Tidke

Care Mother is mobile pregnancy care integrated end to end solution, which provides remote and regular healthcare access at doorstep. It predicts and identifies high risk pregnancies, and connects with doctor before complications occur through an innovative operating model.

The system comprises portable solar powered integrated non-invasive kit for digital tests for Hb, blood pressure, urine protein, urine sugar, foetal heart rate, weight, height, fundal height etc., a mobile application to record test data, educate and engage pregnant women and an integrated web application for doctors to analyse patient from/at a remote location.




Home
Registration
Patient Medical Test
Patient List
Tracker
Contact Us
Welcome, CAREMOTHER
Follow Us
Wikipedia
Science For Society India
News and Events
CareMother received Top 10 Innovations for Silicon Valley Award by DST-Lockheed Martin, USA
CareMother wins Yahoo Innovation Jockey Award
CareMother @ Inclusive Innovations 2013,
Patient Test
No of Patient: 70
First Name/ Middle Name/ Last N
SEARCH
Sr No
PATIENT NAME
Primary Info
ANCTest
InitialTest
PIHTest
DiabeticTest
Recommendation
1
Rina G Gupta
2
Madhuri R Nene
3
Madhuri R Nene
4
Sheela Arun Dixit
5
Shital Deepak Kulkarni
6
Madhuri R Nene
7
reema rohit sharma
8
Pinky p p
9
Seema Rajesh Patil
2013, Science For Society, India, All Rights Reserved ®
We recommend mozilla Firefox / Google Chrome Browser for Best Performance.


are
Mother

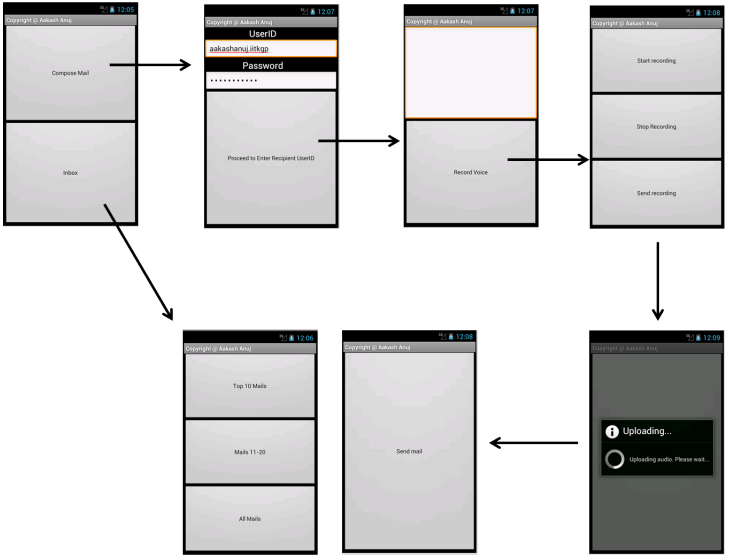
Open source e-mailing system for the visually impaired

Aakash Anuj,
Tirthankar Dasgupta,
Manjira Sinha
Indian Institute of Technology, Kharagpur

Guide
Prof Anupam basu

Aakash Anuj is in the 4th year of his dual degree program (B. Tech. – M. Tech.) in the Department of Computer Science and Engineering, IIT Kharagpur. He likes developing apps and software and contributing to the pool of open source software.

While computer based accessibility systems for the visually impaired are available globally, a large section of such people in developing countries do not benefit much the language limitations of such systems. Using this Voice Mail system architecture a visually challenged person can send and receive voice based e-Mail messages in his native language with the help of a computer or a mobile device.



Sivagurunathapandian

Shivaraman Ilango

G. Sundaraganesh

M.Shreenath

Wireless communication and security system embedded safety helmet

M. Sivagurunathapandian, Shivaraman Ilango, G. Sundaraganesh, M.Shreenath

Easwari Engineering College, Chennai

Guide

Dr. N. S. Bhuvaneswari

M. Sivagurunathapandian, Shivaraman Ilango, G. Sundaraganesh, M.Shreenath, are students of Easwari Engineering College and carried out the research work at BHAVINI, India's first prototype fast breeder reactor.

This is a device designed to be used in hazardous as well highly protected environment. The device integrates communication and security systems using wireless technology through free band (commonly called citizen band) and licensed band in various establishments in particular, where the wireless technology is employed in the form of a device integrated on any person or on any moving object. It has three phases, a) authentication using RF signal for security purpose, b) camera section for tracking down the intruder's movement, and c) instrument based on versatile wireless full duplex voice communication without using satellite.

Kodali Prakash [B. Tech. (Elect. and Comm. Eng.) NEC, JNTU; M. Tech. IISc., Bangalore] is pursuing his doctoral research at the IISc., Bangalore in the area of energy harvesting and flexible displays. His research interests include desalination of seawater using low power, device modeling and flexible electronics development.

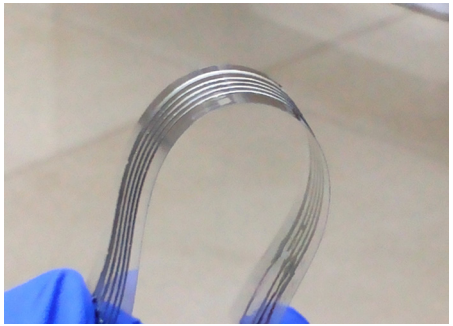
Rahul Gawande [B. E. (Elect. and Comm.), LNCT, Bhopal] is pursuing M. E. in Microelectronics system in at IISc, Bangalore and working on Flexible electronics

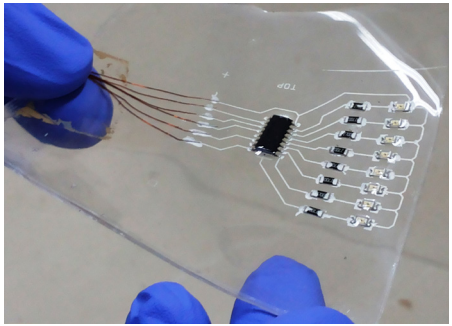
Integrated Circuit (IC)-based Flexible Electronic Devices and Displays (ICFEDD)

Prakash Kodali,
Rahul Gawande
Indian Institute of Science, Bangalore

Guide
Prof. Sanjiv Sambandan

Compared to conventional electronic devices, flexible circuits have an edge because of their applications in bio-medical and other commercial applications. Flexible electronic devices can be wrapped around the body for recording body functions like pulse rate, heart beat. Flexible programmable display can be made using highly reliable and power-efficient LEDs. Flexible circuitry has been obtained by screen printing of solder paste on flexible substrates, followed by mounting of the integrated components.





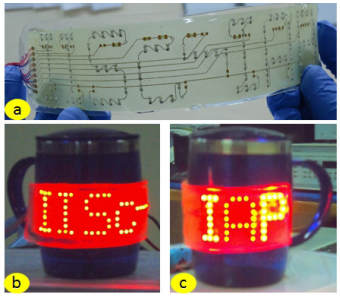
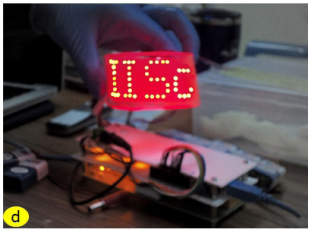
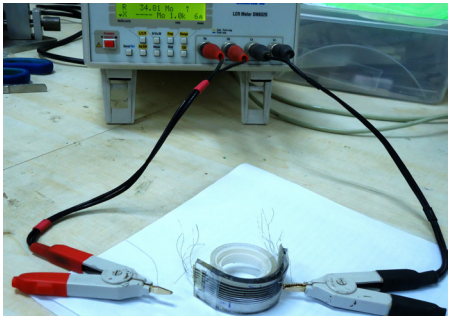


Fig1 (a). Flexible Display which shows the characters of institute name IISc and dept., title as IAP.
(b) & (c). The flex-display wrapped around the coffee cup.
(d) Flexible display driver circuit implemented using arduino board.





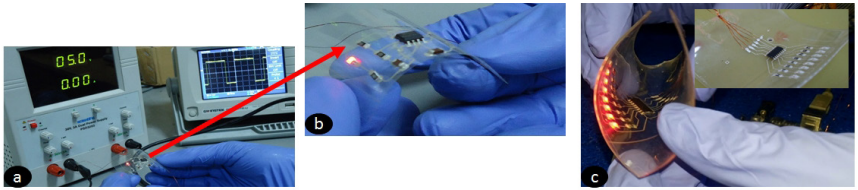


Fig2 (a). 555 timer circuit as an Astable Multivibrator. (b). Expanded view of the flexible circuit used for 60% duty cycle wave generation. (c). Tested and verified data Shift register circuit on a flexible substrate.

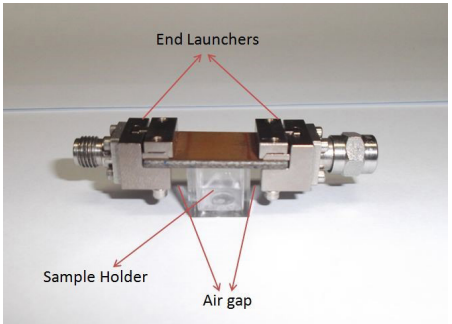
Shaji M has a M. Tech. in Electrical Engineering with the specialization in RF, Microwave and Photonics from the IIT Kanpur.

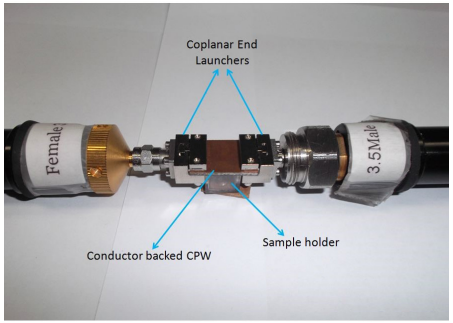
Microwave coplanar sensor system for detecting contamination in food products

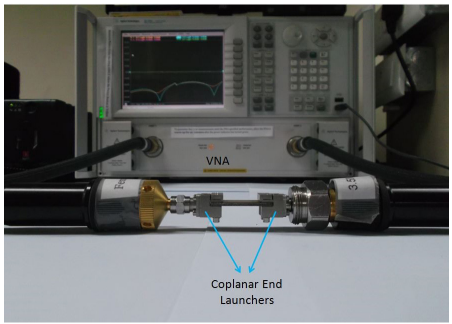
Makkattary Shaji
Indian Institute of Technology, Kanpur

Guide
Dr. M J Akhtar

This is a novel microwave coplanar sensor system for detecting contamination in food products such as milk and oil etc. It is a fully non-invasive and non-destructive system, which uses radio frequency to measure the scattering coefficients of the test fluid over a designated frequency band. The values obtained are compared with those of the standard samples in order to find the level of contamination. In the scope of the work, eatables are also being tried to be included.







A. Ramesh

K. T. Venkatesan

R. Pavin Kumar

S. Vidya Sagar

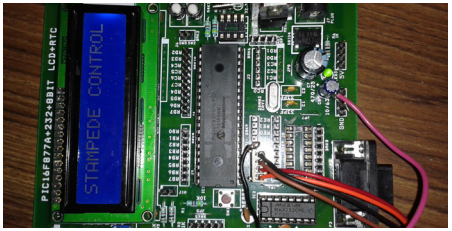
Stampede control using image analysis technology

S. Vidya Sagar,
R. Pavin Kumar,
A. Ramesh,
K. T. Venkatesan
Kongu Engineering College, Erode

Guide
Prof D. Leela

S. Vidya Sagar, R. Pavin Kumar, A. Ramesh, K. T. Venkatesan are B. Tech. Electronics and Communication Engineering in Kongu Engineering College, Erode with an interest in image processing and embedded systems.

Loss of human life due to stampedes is common the world over. While crowd managers are deployed at identified locations, sometimes it becomes difficult for them to reach another location where commotion may be arising resulting in jostling and spreading of panic. This system uses live video coverage and processes it frame by frame, identifying potential areas where crowd surge or visible commotion may be there. Thus the crowd managers can be directed to these identified spots to manage the crowd. The system uses MATLAB image processor and sends message alerts using PIC microcontrollers.



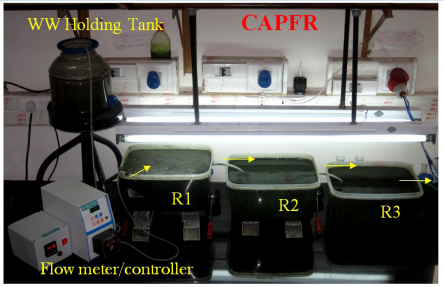
Durga Madhab Mahapatra [B. Tech (Biotech), MITS, Rayagadh, Orissa] is pursuing doctoral research at the Centre for Sustainable Technologies, IISc, Bangalore. His research interests are sustainable wastewater treatment, algal bio-fuels, applied phycology and bioprocess engineering.

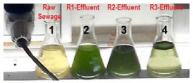
Novel algal bioreactor for waste water treatment and biofuel (lipid) production

Durga Madhab Mahapatra
Indian Institute of Science, Bangalore

Guide
Dr. T V Ramachandra
Dr. H N Chanakya

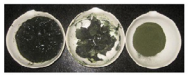
A continuous bioreactor for treating waste water with nutrient recovery and biofuel production. This technique works on bioremediation principle with appropriately chosen algal consortia. The algal bioreactor is based on the three phase plug flow design and is optimised to work at variable flow rates. It results in over 90 per cent of nutrient removal and almost complete pathogen removal. The uniqueness lies in the reactor configuration, and selection of algal species adapted to various redox environments (-250mV to 100mV). Additionally, the rapid harvest of the reactor by-product (valorised algal biomass) yields bio-diesel with quality fatty acids (C16-C18).





1. Water Purification

2. Biodiesel Production



3. Nutrient Recycle

Rajiv Ranjan [B. Sc. (hons.) Chem. Magadh University, Gaya; Masters in Marine Biotechnology, Goa University] is presently pursuing research for his doctorate at the CSIR- CFTRI. His research interest is focused on bioluminescence based biosensor development for a variety of applications in food hygiene and sanitation.

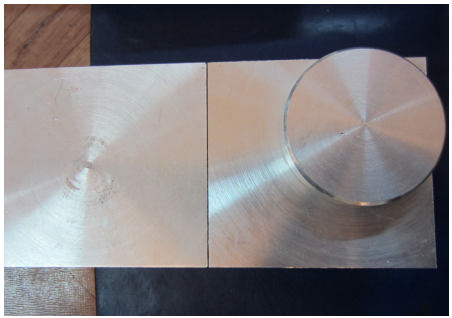
Jaivik Prakash (Biophotonics): A simple tool for detection of hazardous materials and sanitary condition at rural level

Rajeev Ranjan
CSIR-Central Food Technological Research Institute, Mysore

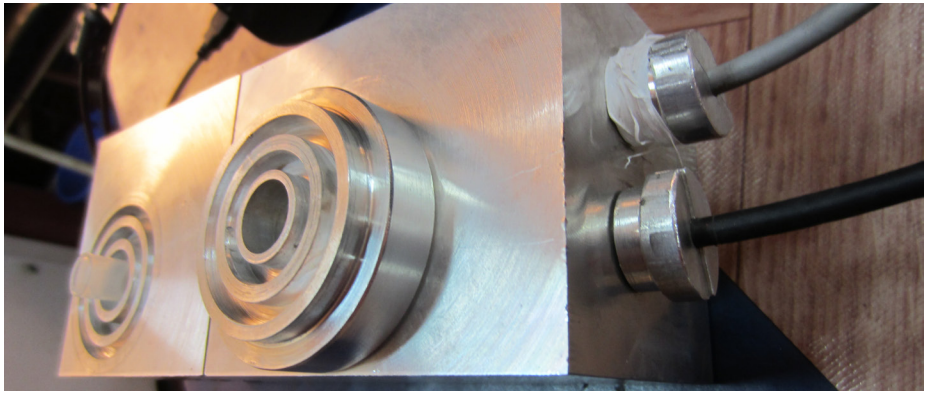
Guide
Prof. M.S. Thakur

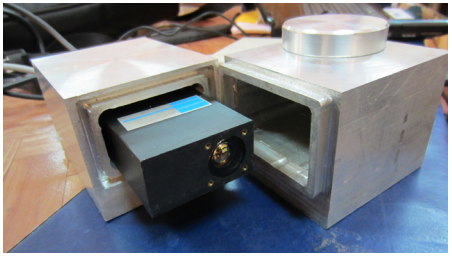
The present innovation deals with construction of immobilized robust biophotonic bead using P. leiognathi, a marine luminescent bacterium isolated from Indian coast for their application in monitoring of environmental toxicants. These biophotonic beads were used as a rapid and reliable optical biosensing tool for the detection of heavy metals [Hg(II), As(V) or Cd(II)] and pesticide [2,4-dichlorophenoxyacetic acid (2,4-D)] in water systems. The concentration range for the detection of Hg (II), As(V), Cd(II) and 2,4-D was 2–32 ppm, 4–128 ppm, 16–512 ppm and 100–600 ppm, respectively, while corresponding sensitivity threshold was 2.0 ppm, 4.0 ppm, 16.0 ppm and 100 ppm. The time taken for the detection of heavy metals and pesticide was less than 30 min.

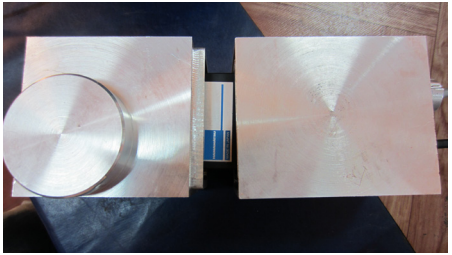
A highly sensitive and portable bioluminometer has also been developed for the determination of microbial contamination in food and water. It can detect upto 100 (CFU/ml) bacteria

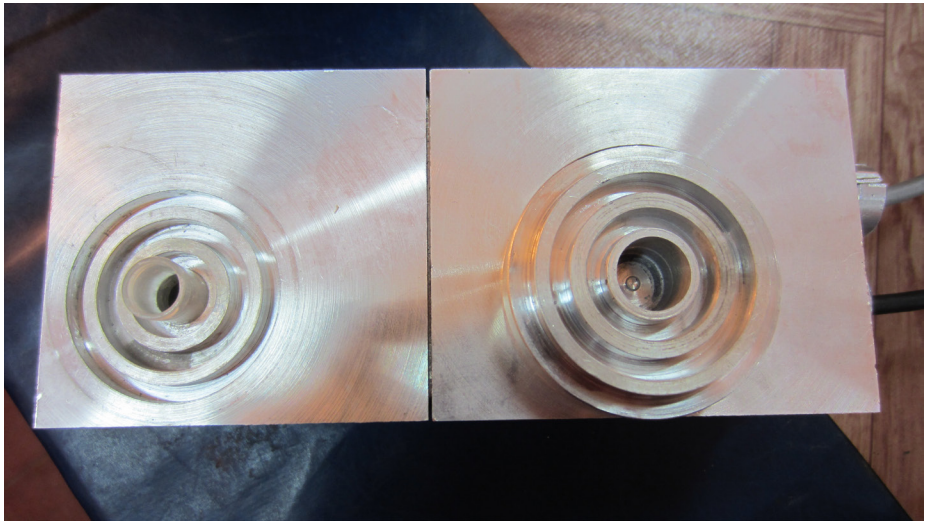


in any food sample such as milk, dal, fruit juice etc. The instrument can also detect surface hygiene of kitchen slabs, surgical instruments and could pre-screen hazardous nature of any compound present in a water/food sample. The bioluminometer could also be used in many other sectors such as hospitals, airport, fish/meat/dairy processing industries, soil fertility, probiotics, sanitizer formulation etc.









Anand TS is a student of IIT Madras and a member of the Rehabilitation Research and Device Development (R2D2) group in the Department of Mechanical Engineering. The group focuses on the development of indigenously engineered, functional and affordable assistive devices, especially for people with locomotor disability.

Synthesis and design of indigenous polycentric knee for transfemoral prosthesis

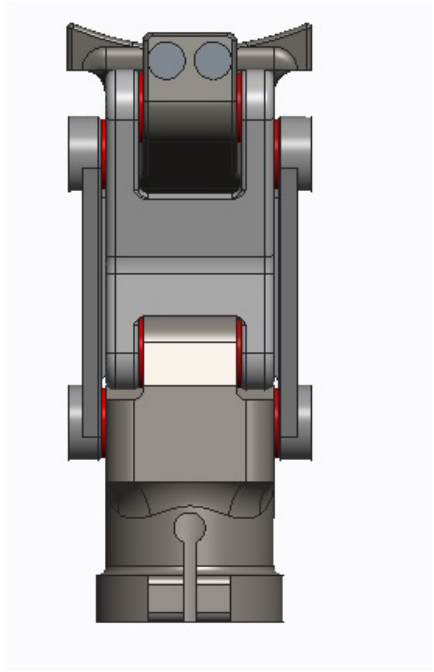
Anand TS
Indian Institute of Technology, Madras

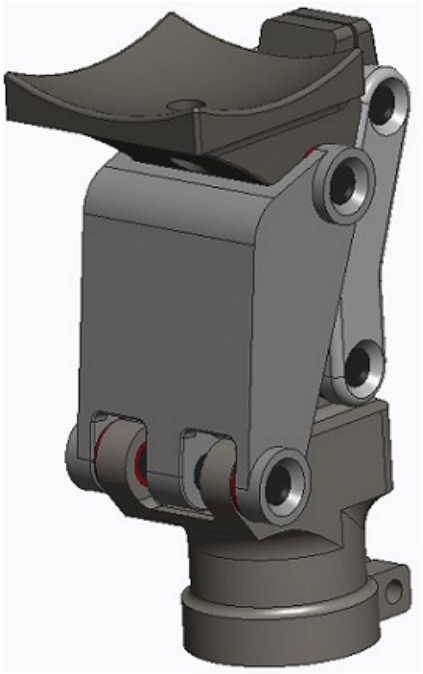
Guide
Dr. Sujatha Sreenivasan

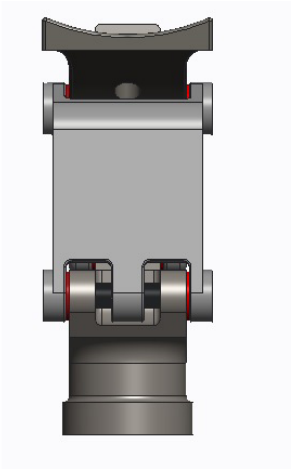
Trans-femoral or above-knee (A/K) amputation, which occurs through the thigh, is one of the most common types of amputation in the world. A person who undergoes an A/K amputation requires an artificial limb/ prosthesis to stand and walk. Existing indigenous prosthetic knees use a simple hinge joint which typically stays locked during walking to provide stability on the uneven surfaces. However, this requires users to expend greater effort while walking since the complete leg has to be swung forward from the hip. A polycentric knee has many advantages over a hinge joint knee because of multiple axes of rotation can allow the user to control the knee better with their remaining musculature and provide more toe clearance than a single-axis knee.

In the present work, a completely indigenous polycentric knee has been developed that takes into account the dual needs of stability and greater floor clearance to prevent stumbling on uneven surfaces. The design also incorporates a

simple frictional swing control to provide a smooth swing and adjustability for various walking speeds. Built using high strength aluminium and stainless steel, the knee is designed to meet the stringent norms of ISO10328, which is the standard for prosthetic knees the world over.







Voice activated safety mobile app

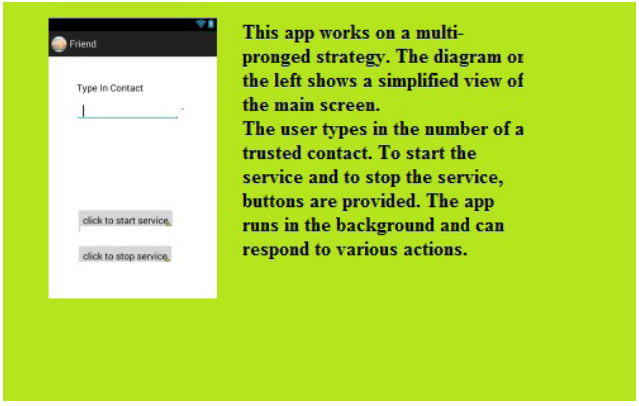
Mithila Harish
Vellore Institute of Technology, Vellore

Guide
Prof. Monica Subashini M

Mithila Harish is a student of Engineering and Economic, and passionate about speech signal processing and image processing- digital and interactive media.

The objective of this mobile app is to provide enhanced safety and security to people, in particular women. The app, once installed, is always active and has been designed to perform two broad functions a) sense/ listen – to pick up a particular/ pre-defined spoken word, which would trigger subsequent actions and b) inform – sending GPS coordinates to predefined numbers, call predefined numbers or click/send pictures of the area.

The mobile solution broadly spans situation sensing, situation recording, and situation broadcasting. Such a tool aims at both the obvious and simple (GPS tracking) and the more subtle and complex (phrase recognition). A small library for IP based tracking using Hidden Markov Models has also been incorporated to take over when GPS is unavailable.



Akhil Aggarwal

Rajan Nagpal

Shubham Jindal

Siddharth Garg

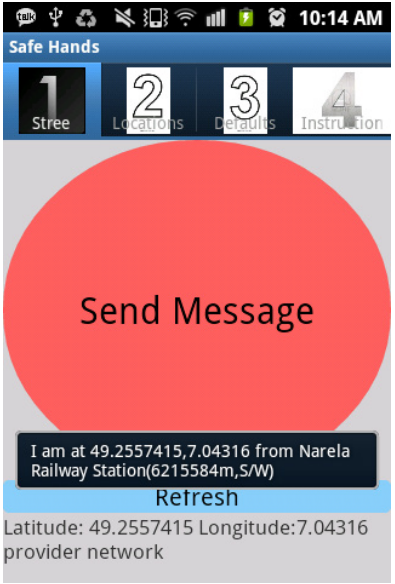
Akhil Aggarwal, Shubham Jindal, Siddharth Garg, Rajan Nagpal are students of IIT Delhi wanting to make a difference to people's lives. A student organization "Stree" works to eliminate gender violence from society and they operate under the umbrella of NSS IIT Delhi. The project is one of the activities of the `Stree' team.

Android application for women safety

Akhil Aggarwal,
Shubham Jindal,
Siddharth Garg,
Rajan Nagpal
Indian Institute of Technology, Delhi

Guide
Dr. Rajesh Prasad

An android application, which helps a person in sending distress message to chosen contacts, has been developed. The app uses GPS to identify exact location, calculates distance from nearest landmark (whose position data is already available) and sends message in simple English. For example 'I am 100 meters towards north from Hauz Khas Metro Station'. The project has been discussed with the Delhi Police and app distribution drives have been undertaken. The app would be upgraded after ascertaining user feedback.



Identification of safest path using crime records

Puneet Singh, Vasu Sharma
Indian Institute of Technology, Kanpur

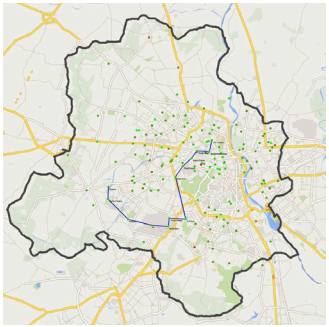
Rajat Kulshreshtha
Indian Institute of Technology, Guwahati

Nishant Agrawal
IIIT, Hyderabad

Akshay Kumar
Vellore Institute of Technology Chennai

Guide
Prof. Bhiksha Raj,
Prof. Rita Singh

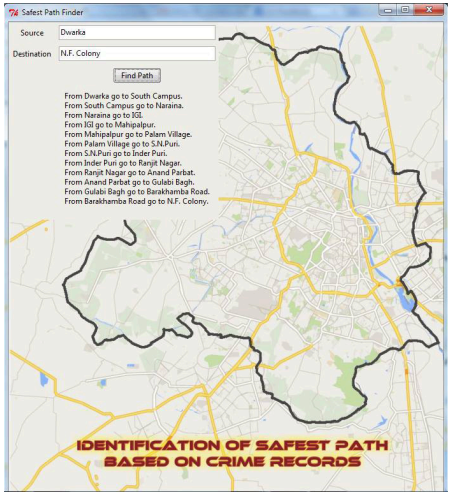
Puneet Singh and Vasu Sharma are students of Indian Institute of Technology, Kanpur, Rajat Kulshreshtha is from Indian Institute of Technology, Guwahati, Nishant Agrawal is from International Institute of Information and Technology, Hyderabad and Akshay Kumar is from Vellore Institute of Technology Chennai.



A method to find the safest path between two locations, based on geographical models of crime intensities. The police First Information Reports (FIRs) and news articles form the basis for calculations. The news feeds update the crime intensity record, which forms the basis of the suggestion of the safest path. The system informs the user of crime sprees and spurt of crimes in a particular area thereby ensuring that user avoids these crime hotspots.

To predict the safest path between two points in Delhi, Dijkstra's Algorithm, which is used to find the shortest path between two points in a network, was modified.

reported per area.



Honey Bee Network

Honey Bee Network, a new social movement pioneered open innovation culture much before the term became popular. For the last twenty five years, it has been at vanguard of protecting the knowledge, and resources rights of knowledge rich-economically poor people. It aims at i) cross-pollination of ideas, promoting lateral learning among creative individuals and communities, ii) overcoming anonymity of the grassroots innovators and other knowledge holders, ensuring that whatever is done with their knowledge is shared with them in local language and iv) if any profit or income is generated using their knowledge, a fair and just share should go back to the people. It has been promoting creativity and green grassroots genius in over 75 countries. It has facilitated documentation of over two lakh ideas, innovations and traditional practices besides student projects through volunteers. (Honey bee Network) has incubated a series of institutions to support green grassroots innovators and others. It has given birth to SRISTI, GIAN, NIF and inspired many national and international innovation policies. It is a global platform where like-minded individuals, innovators, farmers, academicians, policy makers, entrepreneurs and non-governmental organizations (NGOs) come together to respect, recognise and reward grassroots innovations. Various volunteers associated with the network help in scouting innovators, supporting them, mentoring them and provide help in disseminating the innovations as well.

The key areas of engagement are:

- Scouting, spawning, and supporting innovations and outstanding traditional knowledge at grassroots. It links formal and informal science, tries to validate and add value in sustainable innovative technologies, promotes creativity among children, and also pursues learning from grandparents particularly centenarians about viable and green traditional knowledge.
- Promoting innovations and creativity among grassroots farm and non-farm workers, communities and women's groups engaged with culture, folk art, school and college technical education, institutions (particularly common properties or community managed) for conservation of biodiversity and natural resources.
- Mentoring individual innovators in various sectors and linking them with each other and informal sector innovators.

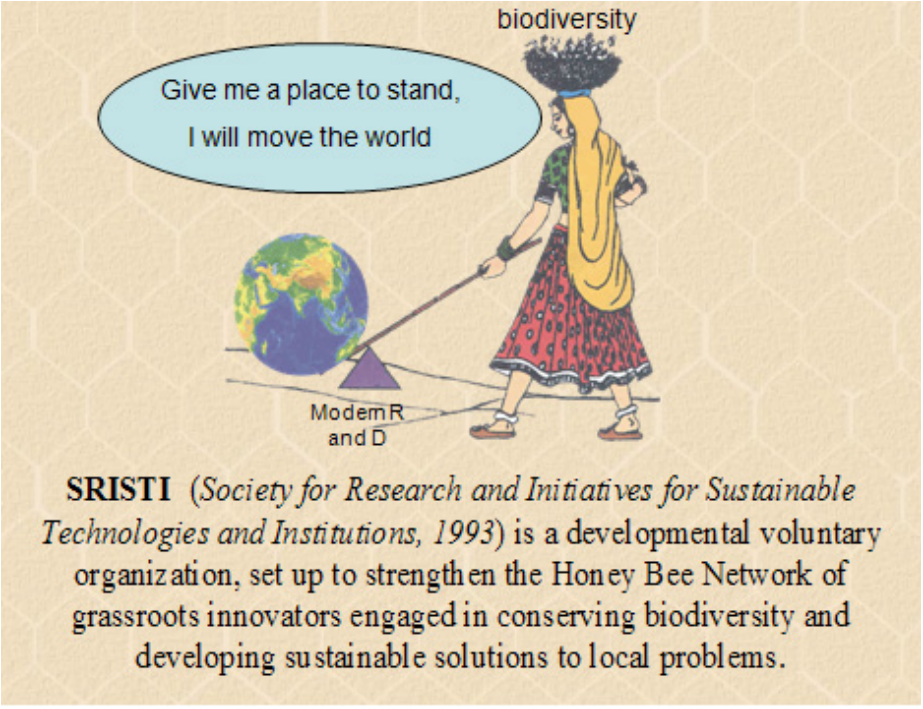
- Lobbying for policy and institutional changes in support of grassroots creativity and innovations at regional, national and international level
- Supporting knowledge and intellectual property rights of economically poor people, young inventors and encouraging them to share their knowledge with other self-employed people as a part of Technology Commons. The transfer of people's knowledge to Firms is facilitated on fair and just licensing terms with benefit sharing.
- Linking innovators with formal R & D institutions, market and communication institutions and networks, media etc., so that more and more people are inspired to find solutions to problems with which our society has been living with, for long, unfortunately.
- Supporting National Innovation Foundation (www.nifindia.org) which is part of Department of science and technology now and helps take HBN goals to much larger level but focuses only on technological innovations at grassroots and among school children. The SRISTIwww.sristi.org and GIAN www.gian.org provide institutional support to the Network along with other volunteers.
- HBN is mainly a voluntary movement supported by large no of volunteers. It has a very strong network in China (CHIN -TUFE President and SRISTI have signed an agreement).
- Linking technology students with small industry entrepreneurs and informal sector through Techpeida.in and facilitating Gandhian young tech innovation awards by SRISTI
- Creating world's largest open access pool of sustainable solutions developed by people without outside help, accessible to communities worldwide
- Bringing out Honey Bee Newsletter, unique voice of creative and innovative people at grassroots in different languages
- Motivating commercial organizations and public systems to become more empathetic in providing extremely affordable service and products to common people

SRISTI

SRISTI (Society for Research and Initiatives for Sustainable Technologies and Institutions), which means creation, was born in 1993, essentially to support the activities of the Honey Bee Network to recognize, respect and reward creativity at the grassroots. The objectives were: systematic documentation, dissemination of, and value addition in grassroots green innovations, providing them intellectual property rights protection and risk capital support besides helping in the in situ and ex situ conservation of local biodiversity and associated knowledge system. SRISTI is devoted to empowering the knowledge rich but economically poor people by adding value in their contemporary creativity as well as traditional knowledge. Linking formal and informal science was one of the major objectives. It has helped to establish GIAN, NIF, MVIF and AASTIIK in support of innovators and their innovations. SRISTI created the Honey Bee database of innovations, and supports the publication of the Network's newsletter in nine languages. These are: Honeybee (English), Gujarati (Loksarvani), Hindi (Sujh-Bujh, Aas Paas Ki), Tamil (Nam Vazhi Velanmai), Kannada (Hittalagida), Telugu (Palle Srujana), Malayalam (Ini Karshakan Samsarikkatte), Oriya (Aama Akha Pakha) and Marathi (Mrudgandh).

SRISTI is now focusing in more concerted ways on hitherto neglected domains like women's knowledge systems, value addition through a Sadbhav-sristi-sanshodhan, a natural product laboratory, and innovations in education, culture and institutions. However, ethical fulcrum of its activities can be captured by eight E's (Ethics, empathy, equity, efficiency, excellence, environment, education and entrepreneurship) –the values that are central to the existence of Honey Bee Network. SRISTI organises Shodh Yatra (Journey of Exploration) twice a year, Traditional food festival, Recipe competition, Biodiversity competition and maintains the database of Innovations and Traditional Knowledge. SRISTI has been advocating for the last twenty five years [protecting knowledge right of creative communities and individuals. SRISTI had organised several consultative sessions with the private sector, scientists, activists and development workers for discussing various issues related to the access to bio-diversity and associated knowledge rights. It has also organised worldwide contest for scouting and rewarding innovations at Grassroots with IFAD, Rome. Techpedia.in, another initiative of SRISTI, aims at putting the problems of micro, small and medium enterprises, informal sector, grassroots innovators and other social sectors on the agenda of the young technology students across the country. SRISTI is

providing a platform for the industry and academic institutions to collaborate, co-create and foster distributed innovations and promote horizontal learning and sharing. To promote a culture of innovation among the young minds of the country, SRISTI has established three categories of national awards for innovative student/ faculty projects in engineering, pharmacy, biotechnology, basic science and other applied technologies in the form of Gandhian Young Technological Innovation Award (GYTI) since 2012. SRISTI Samman is given periodically to outstanding social change agents. SRISTI is trying to build an online Sanctuary of social, technological and institutional Innovations through blend of open innovation, collaborative design, crowd-funding, incubation, e-commerce and challenge awards. Volunteers and collaborators are invited.



National Innovation Foundation-India

towards a creative, compassionate and collaborative India

The National Innovation Foundation – India (NIF) set up in 2000 by the Department of Science and Technology, building upon the Honey Bee philosophy[1], has taken major initiatives to serve the knowledge-rich, economically poor people of the country. It is committed to making India innovative by documenting, adding value, protecting the intellectual property rights of the contemporary unaided technological innovators, as well as of outstanding traditional knowledge holders on a commercial as well as non-commercial basis.

With major contribution from the Honey Bee Network, NIF has been able to build up a database of more than 1, 85,000 technological ideas, innovations and traditional knowledge practices (not all unique, not all distinct) from over 555 districts of the country. NIF has till date recognised more than 600 grassroots innovators and school students at the national level in its various award functions. Through the collaborations with various R&D and academic institutions, Agricultural and Veterinary Universities and others, NIF has helped in getting thousands of grassroots technologies validated and value added. It has also set up a Fabrication Laboratory (Fab Lab) with the help of MIT, Boston, for product development apart from strengthening in-house research and development facilities for the initial validation of herbal technologies. Pro bono arrangement with patent firms has helped NIF to file over 650 patents (including eight filed in USA and twenty seven PCT applications) on behalf of the innovators and outstanding traditional knowledge holders of which thirty six patents have been granted in India and five in the USA. It has also filed applications for twenty one farmers' developed plant varieties at the PPV&FR Authority. Micro Venture Innovation Fund (MVIF) at NIF with the support of SIDBI has provided risk capital of over Rs 3.2 crores to 187 projects, which are at different stages of incubation. NIF has received over six hundred product inquiries from around fifty five countries for various technologies,

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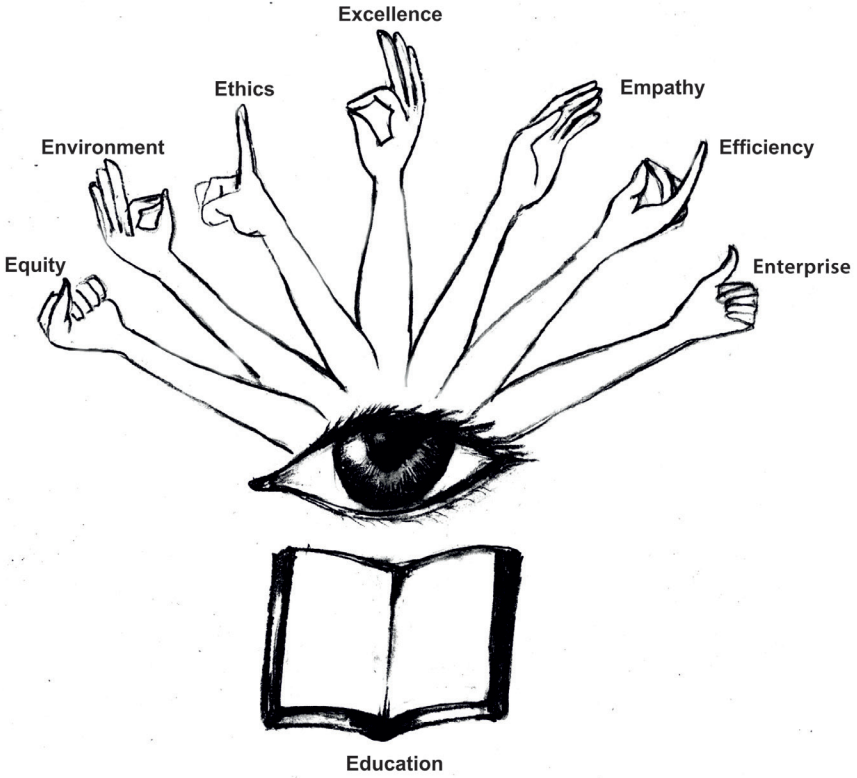
[1]*The Honeybee collects pollen from the flowers and in the process links one flower to another enabling cross-pollination. Similarly, the Honey Bee Network strengthens people-to-people contacts, learning and networking by pooling the solutions developed by individuals across the world in different sectors and sharing in local language. The network acknowledges the innovators, knowledge producers and communicators so that they do not remain anonymous. It also tires to ensures that a fair share of benefits arising from commercial exploitation of local knowledge and innovations reaches the innovators and knowledge providers.*

NIF has succeeded in commercialising products across countries in six continents apart from being successful in materialising seventy cases of technology licensing to eighty licensees with the help of partner agencies.

NIF has proved that Indian innovators can match anyone in the world when it comes to solving problems creatively, where they perform better than rest is in generating greater sustainable alternatives by using local resources frugally. The Grassroots to Global (G2G) model that NIF is propagating is all set to change the way the world looks at the creativity and innovations at grassroots.



Techpedia (www.techpedia.in)

Techpedia.in, an initiative of SRISTI aims at putting the problems of micro, small and medium enterprises (MSMEs), informal sector, grassroots innovators and other social sectors on the agenda of the young technology students across the country. For over last sixty years, India has not utilized much the technological outputs of millions of students. But this apathy will continue no more. Can a knowledge society really afford to ignore the huge talent distributed in thousands of polytechnics, diploma and degree colleges of engineering, pharmacy, medical science, agriculture etc.? SRISTI is providing a platform for the industry and academic institutions to collaborate, co-create and foster distributed and horizontal frugal innovations.

Goals of techpedia :

- Promotion of originality among technology students by making it impossible for them to do what has been done before. This will be possible only when they can find out what has been done before. Techpedia.in already has 1.8 lac technology projects done by about six lac students from more than 600 colleges in India.
- Connecting the technical students with the problems of informal unorganized sector and grassroots innovators.
- Putting the technical problems of MSMEs on the agenda of students so that affordable solutions can be generated in a real time.
- To harness collaborative potential of students across disciplines and colleges to solve persistent problems of our country in formal and informal sector .
- Explore kho kho model (relay) of product development. Idea here is that if one student group has brought the solution of a particular problem to a specific stage, then next group within that department or somewhere else should be able to build upon it to take it forward.
- To pose challenges to students to address unsolved problems of our society. Gandhiji had announced an award of 7700 pounds, (approx Rs one lac) to redesign charkha-spinning wheel. Today the value of this prize will be more than

Rs 10 crores. Industry association, government and others can offer attractive prizes for solving those problems which have remained unsolved so long.

- Developing high tech capabilities through network platforms so that India becomes a hub for high tech outsourcing for the world in future and does not serve only the low tech needs.

- Promoting both IPR protected and open source technologies and eventually develop techpedia.in into an online virtual sanctuary of innovations and not just an incubator.

- Creating real-time online NMN (National Mentoring Network) to harness skills, insights and experience of senior tech experts for mentoring young students. Also promote reverse mentoring by young start-ups and students.

- Encourage some of the innovations through SRISTI Social Innovation Fund set up recently to promote frugal and extremely affordable socially useful ideas.

- Leverage policy and institutional changes to make innovation eco-system more responsive to societal needs and aspirations of young talent

- Organise summer schools on address specific social challenges so that young students can try to overcome institutional inertia by coming out with new prototypes for removing child labour, enhance women safety, or supporting autonomy of physically challenged people etc.,

- Build global linkages so that collaborative open innovation model pioneered by Honey Bee Network is further diffused among student communities worldwide

GYTI -2012 Winners

S. No.	Project Title	Student Team	Supervisor	University	College
1	LPG Based Refrigerator	Jainil Bhatt, Dhruvinkagdi, Tirthjani, Kunjaljadav	Prof. Tushar Patel	GTU, Gujarat Technological University	LDRP Institute of Technology and Research, Gandhinagar
2	Domestic Refrigerator With Water Heater	Dhruv Patel	Prof N.M.Bhatt	GTU, Gujarat Technological University	Gandhinagar Institute Of Technology, Gandhinagar
3	LPG Based Refrigerator	Chintan Patel, Mayank D Patel, Mayank I Patel Biren Patel	Prof YI Raol, Prof Ab Patel	GTU, Gujarat Technological University	Laljibhai Chaturbhai Institute Of Technology, Mehsana
4	Vardaan: Stair Climbing Wheelchair	Shanu Sharma	Dr. J. Ramkumar, Shatrupa Thakruta Roy, Dr. Satyaki Roy.		Indian Institute of Technology, Kanpur
5	Incense Stick Maker	Keshav G	Dr Murali Damodaran		Indian Institute of technology, Gandhinagar

S. No.	Project Title	Student Team	Supervisor	University	College
6	Multi Desire Wheelchair	Pratik Gandhi , Chintak Dholakia ,Sumit Shatwara, Bhargav Desai, Priyesh Rajnikant, Vanraj Kamliya	Prof. B H.parmar	GTU, Gujarat Technological University	L.D.college of Engineering, Ahmedabad
7	A Tsunami Warning System Using Ionospheric Measurements	Jhonny Jha ,Deepika Thakur, Tushar Jadhav, Sanyam Mulay	Professor. Krishna Sudhakar		Indian Institute Of Technology Bombay
8	Ultra Sensitive, Low Cost Hand Held Explosive Detector System	Neena Avinash Gilda ,Sandeep S, Seena V, Sheetal Patil	Prof V Ramgopal Rao, Prof Dinesh K Sharma, Prof Maryam S Baghini		Indian Institute Of Technology Bombay
9	Smart Grid Forecasting Technique	V S K Murthy Balijepalli			Indian Institute Of Technology Bombay

S. No.	Project Title	Student Team	Supervisor	University	College
10	Tiles Measurement And Grade Classifying Equipment	Deep M. Bhimani ,Dulari K. Kothari, Khyati K. Kotecha, Jasmin Nandaniya, Chirag P. Patel	Dr C. H. Vithalani	GTU, Gujarat Technological University	Government Engineering College, Rajkot
11	Image, Speech Recognition And Speech Synthesis For Physically Disabled	Saurabh Saket ,Rahul Ranjan	Inderdeep Singh Grewal	Punjab Technical University	Bhutta College Of Engineering
12	Jeevan Dhara Handpump With Integrated Filtering System	Kirti Ranjan ,Sankhya Mohanty			Indian Institute Of Technology , Kharagpur
13	Design, Synthesis & Evaluation Of Novel Steroidal Aromatase Inhibitors In Breast Cancer	Dr. Prafulla M. Sabale		Gujarat Technological University,	Parul Institute Of Pharmacy, Limda, Vadodara
13	Automobile Air Conditioning Using Engine Exhaust	Harish Umashankar Tiwari ,Prof. Dr. G.v. Parishwad,	Prof. Dr. G. V. Parishwad	Pune University	College of Engineering Pune

GYTI-2013 Winners

Awarded Innovators 2013

S. No.	Project Title	Student Team	Supervisor	University	College
1	Apparatus For Making Silk Fiber Based Lamellar Biomaterials To Solve Problem Of Lower Back Pain	Maumita Bhattacharjee	Dr. Sourabh Ghosh. Prof. Alok R Ray		Indian Institute Of Technology, Delhi
2	Electronic Support System For Physically Disabled(deaf & Dumb)	Margie Ashok Joshi ,Vishal Patel, Chirag Patel, Jay Patel	Ms. Dipti Patel	Gujarat Technological University	C.K.Pithawalla College of Engineering ,Surat
3	Reactor & Catalyst Development For Oxygen Evolving Step In Sulfur-iodine Cycle For Hydrogen Production	Kishore Kondamudi	Dr. Sreedevi Upadhyayula		Indian Institute of Technology, Delhi
4	The Third Eye	Naveen Kumar Rai	Dr. Amit Sethi		Indian Institute Of Technology, Guwahati
5	Clubfoot Orthosis	Kanwaljit Singh	Dr. P.m. Pandey (Dept Of Mechanical Engineering, Iit Delhi)		Indian Institute Of Technology, Delhi

Awarded Innovators 2013

S. No.	Project Title	Student Team	Supervisor	University	College
6	She- Society Harnessing Equipment	Manisha Mohan ,Rimpi Tripathi		SRM University , Chennai, Main Campus	SRM Univeristy , Chennai
7	Vajra(vessel Desk)	Raghunath P Lohar		The Aeronautical Society Of India	Ganesh Institute Of Engineering
8	Chetna - Celebrate Your Pregnancy	Keyur Sorathia ,Amit Ranjan, Jagriti Kumar	Prof Keyur Sorathia		Indian Institute Of Technology ,Guwahati
9	Automatic Fish Scaling Machine	M.rajesh Kanna ,C.mathan, M.V. krishna -moorthy, Mahesh Mithilesh	Dr.Prajesh Kanna		Velammal College Of Engineering And Technology, Madurai
10	Spectral Eye	Sai Vijay Gole ,Saket Choudhary, Yashesh Gaur	Dr.Prajesh Kanna		Sai Gole- IIT Madras, Saket Choudhary- IIT Bombay, Yashesh Gaur- DAIICT
11	Vision For The Blind Using Ultrasonic Sensors	Santosh Kumar Bhandari ,Amrita Pattnaik , Vinod K		SRM University	SRM University

Awarded Innovators 2013

S. No.	Project Title	Student Team	Supervisor	University	College
12	E-diagnoser: An Advanced Low Cost Patient Monitoring Watch	Libin Varghese, Pillai Sareesh, Shibin Joseph, Adarsh .S, Chithira Jacob, Nithya Merin, Anoop.P	Asst.prof.reshmi.v	Mahatma Gandhi University,kottayam	Amal Jyothi College Of Engineering
13	Ultra Low Cost Tunable Nano Scale Patterns	Nandini Bhandaru	Dr. Rabibrata Mukherjee		Indian Institute Of Technology Kharagpur
14	Novel Stand-alone 1-phase Ac Generator For Rural Electrification Using Renewable Energy	Sandeep Vuddanti	Prof. S.s. Murthy & Prof. Bhim Singh		Indian Institute Of Technology ,Delhi
15	Laser Ignited Internal Combustion Engine	Kewal Dharamshi	Prof. Avinash K Agarwal		Indian Institute Of Technology Kanpur
16	A Portable And Efficient Electronic Filter For Sub-micron Particles From Fluids	Aswathi R Nair	Sanjiv Sambandan		Indian Institute of Science

Awarded Innovators 2013

S. No.	Project Title	Student Team	Supervisor	University	College
17	Highly Gas Impermeable Elastomeric Rubber-rubber Blend Nano Composites	Ajesh K Zachariah	Prof.(dr.) Sabu Thomas	Mahatma Gandhi University	Mar Thoma College
18	Multifunctional Nano-in-micro Alginate Microspheres For Biosensing, Drug Delivery And Mri	Rashmi Dilip Chaudhari ,Abhijeet Joshi	Prof. Rohit Srivastava		Indian Institute Of Technology Bombay
19	Digital Pen	Kalpesh Wani ,Vivek Bavishi, Venkat Rao		VNIT Nagpur	Visvesvaraya National Institute Of Technology, Nagpur
20	Nanofinishing Of Freeform Surfaces Of Prosthesis Knee Joint Implants	Sidpara Ajay Muljibhai	Prof. V. K. Jain, Prof. V. K. Suri, Prof. R. Bala -subramanian		Indian Institute Of Technology Kanpur
21	Hydro-operated Square-bottom Paper And Jute Bag Making Machine	Anirudh Thakur		Punjab Technical University	LLRIET Moga

Awarded Innovators 2013

S. No.	Project Title	Student Team	Supervisor	University	College
22	Saral Parikshan - An Advancement In Cutting Edge Technology For Rural Area To Detect Vitamin B12 For Pernicious Anemia	L. Sagaya Selva Kumar ,Prof. M.s. Thakur	Prof. M.s. Thakur	Mysore University	Council Of Scientific & Industrial Research-central Food Technological Research Institute (csir-cftri).

Appreciated Innovators 2013

S. No.	Project Title	Student Team	Supervisor	University	College
23	Self-cleaning Functional Molecular Material	M. B. Avinash ,T. Govindaraju, Carsten Schmuck, Elisabeth Verheggen	T. Govindaraju	JNCASR	JNCASR
24	High Performance Cooking Stove	Mayur Rastogi	Prof. S Ray		Indian Institute Of Technology Khargpur
25	Robotic Dredger	Amit Dinanath Maurya ,Digvijay Maheshwari	C. Amarnath		Indian Institute Of Technology Bombay

Appreciated Innovators 2013

S. No.	Project Title	Student Team	Supervisor	University	College
26	Comprehensive Protection From Electrocution	Ramdas M U ,Sonu Unnikrishnan K, Ashfaq Muhammed T, Shahin.t.a, Sreelakshmy Suresh And Sruthy	Dr. Sudha Balagopalan And Ms. Mary P Varghese	University Of Calicut	Vidya Academy Of Science And Technology, Thrissur
27	Cross Linked Antibaterial Hydrogel	Mr. Chakavala Soyeb Rafikbhai ,Ms. Vaishali Thakkar	Dr. Nirav V Patel, Dr. Tejal R. Gandhi	Gujarat Technology University	Anand Pharmacy College
28	Graphics Model For Power Systems In Cim Framework And Design Of Online Web-based Network Visualizations And Integration Of Control Center Applications	Gelli Ravikumar	Prof. S. A. Khaparde		Indian Institute Of Technology, Bombay

Appreciated Innovators 2013

S. No.	Project Title	Student Team	Supervisor	University	College
29	Snippets-memory Aid For People With Disability	Devender Goyal, Aditi Srinivasan (bangalore), nirali Savla(mumbai)	Kshitij Marwah (Mit- Media Labs)	University Of Calicut	Indian Institute Of Technology Hyderabad
30	Design Of A Smart Automotive Ventilation System For Parked Vehicles	Gaurav Kumar Jaiswal ,Mohit Gandhi, Sanket Phalgaonkar, Harshal Upadhyay, Ankit Agrawal	Dr. Vasudevan R.	VIT University	Vellore Institute Of Technology, Vellore
31	Hybrid Classifier For Marine Vessel Based On Propulsion	Piyush Aggarwal	Ms. Mukta Goyal		Jaypee Institute Of Information Technology University, Noida
32	Saree Cutting Machine For Mat Making Handlooms	Alap Kshirsagar ,Abhijit Patil, Vikalp Jambhulkar	Prof. Suhas Joshi		Indian Institute Of Technology, Bombay
33	Development Of A Geo-hazard Warning Communication System	Devanjan Bhattacharya	Dr. Jayanta Kumar Ghosh, Dr. Narendra Kumar Samadhiya		Indian Institute Of Technology Roorkee

Appreciated Innovators 2013

S. No.	Project Title	Student Team	Supervisor	University	College
34	Prognosis Of Pre-diabetes And Type 2 Diabetes Based On The Non-invasive Estimation Of Blood Glucose Using Infrared Thermography Against The Bio-marker	Sivanandam S ,B. Venkatraman, Menaka M, Sharath D	Dr. M.anburajan		SRM University
35	Cow Dung Based Microbial Fuel Cells (cdfcs) To Light Up Indian Villages	Vishnu Jayaprakash ,Prof.T.S Natarajan	Prof T S Natarajan , IIT Madras	University Of California, Berkeley, USA	University Of California At Berkeley
36	Semi-automatic Rubber Tapping Machine	G.r.malarmannan ,S.emmanuel Richards	Dr.p.rajeshkanna	Anna University ,Chennai	Velammal College Of Engineering And Technology, Madurai
37	Target Oriented Niosome Based Delivery Of An Antitubercular Drug, Development And Charecterisation	Gyanendra Singh ,A.k. Srivastava	Prof. Shubhini Saraf	Banaras Hindu University	Department Of Pharmaceutics Indian Institute Of Technology Banaras Hindu University, Varanasi
38	Mosquitocidal Endotoxin From Vellore Poultry Farm Wastes	Bishwambhar Mishra ,Abhishek Gupta	Dr. Suneetha Vuppu, Associate Professor	VIT University, Vellore	VIT University, Vellore

Appreciated Innovators 2013

S. No.	Project Title	Student Team	Supervisor	University	College
39	Sancharak: A Cell-phone For Blind People	Rohit Bharatkumar Singh, Hitarth Narsi Patel, Navnath Bhimrao Mane, Tanmay Vinay Shinde, Rahul Dilip Kapoor	Dr. K.T.V.Reddy	Mumbai University	Padmabhushan Vasantdada Patil Pratishthan\'s College Of Engineering
40	Development Bamboo-epoxy Nanocomposites For Manufacturing Of Helmets And Other Structural Applications	Vivek Kumar	Dr. Sanat Mohanty		Indian Institute Of Technology, Delhi
41	Re-arranging Unused Contacts In Mobile Phones For Quick Access	Bala Vishnu R ,T. Kartick Kumar, P.gowtham Raj , M.murali Prasnth	P.Natesan		Kongu Engineering College
42	Ambulatory Health Network App	Jayesh Vrujlal Khasatiya	Ankita Shah	Gujarat Technological University	Narnarayan Shastri Institute Of Technology, Jetalpur

Gandhian Young Technological Innovation Awards (GYTI) 2015

SRISTI (Society for Research and Initiatives for Sustainable Technologies and Institutions) has established three national awards for innovative student projects in engineering, pharmacy, science and other applied technologies. These will be given away by Dr. R.A.Mashelkar, Chairperson, and NIF at IIM-Ahmedabad in March 2015. The awards will be given to young innovators in the following category:

Gandhian Young Technological Innovation Awards, 2015

- **MLM (More from less for Many) award**
- **Sristi socially relevant technological innovation award**
- **Strategic innovation and /or technological-edge award**

Student projects which address an important social, environmental or technological problem faced by masses or disadvantaged people/sectors/spaces or micro and small enterprises, or have the potential to impact a pressing national need are invited. The applications may be made by the past or present students of technical institutions/universities.

On behalf of the students who have already passed out and left the Institute/ University, the faculty member, who supervised the project, can also apply.

A: MLM (More from less from Many) Award: This award will be given to the innovations which use significantly less material/energy to create sustainable solutions. Frugality and creating value for many by using lesser material, energy, and resource could be the key focus while bench-marking such innovations.

B: SRISTI social technological Award: The best student's projects which have a demonstrable proof of concept/ prototype having significant amount of novelty and social applications are eligible for this award. Any projects completed in or after 2012 can be submitted by the students or their faculty supervisors on their behalf.

*Techpedia (www.techpedia.in) at **SRISTI** invites entries for these three awards by **31st January 2015.***

C: Strategic innovation/technological edge Award: A breakthrough or a significant technological advance in any field of engineering, pharmacy, medical, agricultural, or other disciplines will entitle a student to qualify for this award.

The full project report of the shortlisted projects will be needed for final evaluation. **Last date for submission of entries is 31st January, 2015.**

All the shortlisted entries will be displayed by winners at the annual exhibition at IIM-Ahmedabad in March 2015 .The submitted entries will be included in www.Techpedia.in database with due acknowledgement of the name of the team members, supervisor, college, department and any contact information provided. The exhibition will be visited by leading policy makers and practitioners of the country. The prototype may be retained to be displayed in a permanent exhibition likely to be developed soon at the national level with due acknowledgement of innovators, supervisors and the concerned institution. The nominations have to be submitted at http://www.techpedia.in/award and only abstract of the content submitted along with innovator's detail would be published at the site or shared otherwise. if the student wish to have incubation support, they should clearly indicate the same in their nomination form. For those interested in IPR support, assistance from a network of pro bono attornies can be mobilised at concessional term.

Gandhian Young Technological Innovation Awards

The GYTI Awards are an initiative by Techpedia.in and SRISTI. Techpedia.in aims at putting the problems of micro, small and medium enterprises, informal sector, grassroots innovators and other social sectors on the agenda of the young technology students across the country. Techpedia.in provides a platform for the industry and academic institutions to collaborate, co-create and foster distributed and horizontal innovations.

We have to create a collaborative culture so that problems of small enterprises, informal sector and local communities in disadvantaged regions can be solved in a time bound manner. Every time a student solves a real life problem, he/she does not merely become a better technologist but also a better human being. The GYTI and Techpedia.in are an aggregator of aspirations of young students to make India creative, collaborative and compassionate society.

SRISTI www.techpedia.in

Honey Bee Network

NIF

सत्यमेव जयते

JSW