Honey Bee Network

SRISTI

2017

GYTI

Gandhian Young Technological Innovation Awards

TECHNOLOGICAL INNOVATION

Festival of Innovation, Rashtrapati Bhavan New Delhi

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GANDHIAN YOUNG TECHNOLOGICAL INNOVATION AWARDS

GYTI 2017

INTRODUCTION

The Indian technological renaissance strongly rests on the promotion of originality, reinforcement of innovative spirit, and forging of social, industrial, ecological connect among technological youth. Without breaking or transcending disciplinary and institutional boundaries, meaningful solutions to the persistent social problems may not emerge easily. The idea of pooling student projects emerged way back in 2001-2 but took concrete shape at SRISTI in 2009. In the spirit of open reciprocal innovation pioneered by Honey Bee network more than 28 years ago, Society for Research and Initiatives for Sustainable Technologies and Institutions (SRISTI) has pooled together at techpedia.in or techpedia.sristi.org around 200k projects pursued by over half a million technology/engineering students from over 600 Indian institutions. Continued low ranking of India on global innovation index may be the result of the structural weaknesses in Indian innovation ecosystem. But it also shows that the index does not take into account grassroot innovations and also student projects.

If a million-strong tech student community takes up projects based on unmet social needs of 650,000 villages, urban slums, small enterprises, public services, local bodies etc., as a subject of their course work or final-year projects, the quality of life of the common people can be improved in no time. But we are conscious of the fact that such a radical change in mindset of young tech youth and their institutional guides may take quite some time. But if we don't start, it may take even longer.

We also realised that future jobs for young people will be largely generated by small scale industries and innovation based start-ups because large corporations are experiencing almost jobless growth. Many of these small industries may not have an R & D wing or have the capacity for hiring technology experts. Unless tech students work with them, their productivity and efficiency may not increase much. If that doesn't happen, new jobs are unlikely to grow rapidly.

SRISTI, the institutional backbone of the Honey Bee Network, has been trying to create a knowledge network and inclusive innovation ecosystem to spawn collaborative creativity and innovation. Apart from promoting originality and social and ecological connect, links among academia, industry and civil society are also vital for future development of student led enterprises or start-ups. Use of open, reciprocal and responsible innovation platform may help in issuing challenge awards (also see sif.sristi.org) for generating extremely affordable products and services. A unique ecosystem for innovation was developed through a close cooperation with the Gujarat Technological University (GTU), so that studentsget credit for identifying the problems and get further academic credit for trying

to solve these problems in their final year. The Punjab Technical University (PTU) made it obligatory for students to upload the final-year projects before they can get degrees. The PTU had also offered 50 fellowships of ₹25,000 per month to each of the students who set up enterprises after their graduation.

The National Innovation Clubs set up in Central Universities, State Universities, NITs, IITs, IISERS and other institutions, under the guidance of Honourable President of India will encourage the students to search, spread and celebrate innovations and sense and solve unmet social needs. These clubs may help in bridging the gap between unmet social, ecological and industrial needs of society and the tech youth. SRISTI started organizing summer school every year to develop solutions to reduce the drudgery of weaker sections of the society. Initially, it was organised in 2013, with the support of International Labour Organisation (ILO), to develop prototypes to eliminate child labour and/ or increase the income of their parents and reduce the risk in work. Later, SRISTI has also received support from UNICEF for the purpose.

SRISTI is transferring three grassroots technologies to Kenya, Africa under the "Feed for the Future" initiative of USAID for agricultural purposes by marginal farmers in addition to generating the solutions for Santi (a three-wheeled tiller), to be adopted in the hilly terrain of Kenya. SRISTI has also linked children creativity camps with summer schools so that wherever feasible, the ideas of children could be worked upon by the college students. Indian leadership in this area is getting widely recognised though most global indices on innovation do not take into account the grassroots innovations in the informal sector yet.

To harness the creative potential of millions of young students and celebrate their creativity, Gandhian Young Technological Innovation (GYTI) Awards are given to the innovative students annually. GYTI 2017 by SRISTI has set a new benchmark for scouting and appreciating outstanding innovations by young students across universities in UG, PG and PhD level. The GYTI Awards were set up to inspire: a) Technologies on the edge or cutting edge innovation, b) Those having greater social impact or socially relevant innovations and c) MLM (More from Less for Many) i.e. frugal innovations.

We are thankful to hundreds of faculty members in India and abroad, executives from leading tech companies for reviewing 2,715 nominations from 308 Institutions & Universities, belonging to 27 states & two Union Territories in India with 54 different subject disciplines. This time 22 innovations are selected for award and another 17 for appreciation. We hope all 39 student teams winning the award and appreciation will resolve to work together and make India more innovative and inclusive. Under the BIRAC-SRISTI program, 15 GYTI awardees in medical & biotech innovations category are getting a grant of ₹15 lakhs, to further develop their prototypes/proof of concepts and another 100 students/others, for grassroots innovations and/or socially

relevant solutions get a grant of ₹1 lakh. Surat based Hari Om Ashram has also endowed, in collaboration with NIF, a fund to provide ₹50,000 each to eight innovators; three named as Dr. C. T. Patel Challenge Award and five as Dr. Amulya - K. N. Reddy GYTI Award.

Dr. R. A. Mashelkar, Chairperson, NIF and the Chair of the Advisory Committee of AASTIIK and SRISTI, will chair the award function and inspire students along with Dr. K. Vijay Raghavan, Secretary, DBT, Dr. Anil Sahasrabuddhe, Chairman, AICTE, Dr. Renu Swarup, MD, BIRAC. We have a globally renowned, very distinguished guest of honour at GYTI awards this year. Dr. Francis Gurry, Director General, WIPO, Geneva will give away the awards and also share his vision about what makes some nations great in innovation race while others get left behind.Dr. Mashelkar will inspire the students to make a transition from 'more from less for money' to 'more from less for many'. He encourages the students to build upon each other's ideas to come out with extremely affordable solutions for the masses.

The frugal engineering, also called as Gandhian engineering, has created worldwide awareness about Indian leadership and potential in this regard. 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 intellectual property rights (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 seamlessly and without too many constraints or conditions and (d) Help students set up companies to take their ideas forward in both economic and social markets through in situ incubation.

A SRISTI Social Innovation Fund (sif.sristi.org) has been set up with contributions from some of us and other 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.sristi.org 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 heart, large enough to assimilate the aspirations and generosity of the students. Let the students be a bit more open, bit more inclusive, and bit more amiable and compassionate towards creativity at grassroots.

Prof. Anil Gupta

Highlights of BIRAC-SRISTI GYTI 2017 Award & Appreciation

There were around 800 entries across 19 subject areas of medical devices and biotechnology. Seventeen BIRAC GYTI Award and seven GYTI Appreciation Awards are being given under this category. Out of 24 technologies, five deal with water and sanitation, two for image processing, three for antimicrobial & sterilization and rest are either diagnostic devices or at cutting edge level of futuristic research, as evident from the fact that two awardees have publications in the journal 'Nature'.

Five technologies related to water are concerned with either potable water or demineralised water or removal of pollutants (chemical, heavy metal or textile dye). These are based on photometric sensing; polymer coated optical fibre sensing; hollow membrane for micro & ultra-filtration; compact cascaded membrane system and a hybrid of hydrodynamic cavitations & hydro gels packed bed adsorption. Microbial / Pathogen count is taken care by silver nano-particle decorated coconut charcoal in geo-specific bottle conceptualised by Ramesh Kumar from IIT Madras whereas bacteria specific antibody functionalised on polyanaline coated silica core optical fiber by Sutapa Chandra of IIT Mumbai. Demineralised water is produced at 40 -60 L/h capacity at an operating cost of 5 paisa per liter by Madupathi Madhumala of IICT Mumbai.Technological improvement in microscopy; Digital Holographic Microscopy and Digital Infrared Thermal Imaging have paved the way for Blood quality assessment of Blood Bank by Mandeep Singh of IIT Delhi and Early Detection of Oral Cancer by Manashi Chakraborty of IIT Kharagpur.

RGB Emitting Carbon Quantum Dots from Vegetables/Fruits extracts are highlighted in the paper published in 'Nature' journal by Vikram Singh of IIT Madras. It has application as fluorescent probes for live/fixed cell imaging and as specific chemo sensors for bioanalytes. RGB emitting carbon quantum dots (CQDs) are used as an alternative of quantum dots and organic dyes due to their less toxicity, stable fluorescence, good biocompatibility and water soluble behaviour.

The investigation of microcracks and pull-out strength of cortical-bone screws in drilled holes by Vishal Gupta at IIT Delhi compared conventional surgical bone drilling (CSBD) with rotary ultrasonic bone drilling (RUBD), a novel approach employing ultrasonic vibration with a diamond-coated hollow tool. Scanning electron microscopy was used to observe microcracks and surface morphology.

Disease detection is slowly becoming a handy tool with the aid of many point-of-care diagnostic devices. We had around 50 plus entries in these categories. One each in Oral cancer, Cervical Cancer, Dengue, Diabetes and Alzheimer's has made it to the final

list of Awards & Appreciations.

Search for novel antimicrobial is always in forefront of drug research due to ever increasing resistance. Rapid Antimicrobial Susceptibility Assays developed at IIT Kharagpur by Shantimoy Kar, utilising the micro fluidics based paper kit giving results in six hours of incubation in humidified environment instead of 18-24 hrs by currently prevalent technique. Emergence of drug resistance in bacteria is a major cause of infection and mortality. Shivangi Sachdeva and team at IIT Hyderabad identified that E. coli outer membrane protein Wzi that acts as an anchor for capsular polysaccharide (CPS) onto the bacterial surface (viz., a lectin). It also exhibits a bidirectional passive water conduction property (viz., a porin). When the osmotic pressure becomes high due to the surface accumulation of CPS, water is transported from inside the bacteria to outside to dilute and spread the concentration of CPS and avoid the rupturing of the cell. The optimal concentration of CPS can be maintained through osmo-regulation character of Wzi. This paper is also published in the Nature journal.

A highly suitable solution for sterilization of medical equipments in rural area is developed by Saugandha Das at Institute of Chemical Technology, Mumbai using Flash Freeze Elixir (FFE). It comprises of a low-cost antimicrobial agent, and a combination to form a cryogenic liquid. The individual non-toxic components used in the mixture possess biocidal properties and when combined in a specific ratio could provide enhanced killing effect.

A novel nano patterning technique- Electro lithography by Santanu Talukder and team at IISc Bangalore is based on discovery that electric current assisted by joule heating can induce long range flow of material on thin metal films, such as Cr. Using this technique, best resolutions achieved are of 9 nm on the polymer, and 40 nm on transferring the pattern to another material. Micro matching has medical importance for bioactive implant materials for hip, knee and maxillofacial applications.

A fully automated handheld device to detect melamine from milk was developed by Dhiraj Indana at IISc Bangalore with integrated milk pre-processing by using chemical dried cotton.

Virtual Reality (VR) together with haptics offers immersive, flexible, and cost-effective platform for training doctors in medical procedures. In this project, Shanthanu Chakravarthy at IISc Bangalore has developed a VR-based endoscopy simulator together with force-feedback system for endoscopy simulator together with force-feedback system for endoscopy training to medical students.

NeuroBuds is a brain wave mapping smart earphones developed by Nitin Vasanth at Cochin University of Science &

Technology, which has specially designed & fabricated carbon nanotube based sensor electrodes to detect brain waves via the ear canal of the users. Smartphone based processor is used to run bulk of the calculation, thereby minimising the hardware requirement and hence the cost.

Mallikarjunachari G. at IIT Madras aims to design a nano-mechanical device which can be utilised for both diagnosis as well as plaque removal. The primary objective of this research work was nano-mechanical characterisation of polymer thin film on polymer substrate of different interfacial strengths. Nano-indentation and nano-scratch techniques were applied in this work to find out the mechanical response of polymer-polymer interfaces

In the area of drug delivery and bioavailability, Ashish K. Agrawal and team at NIPER, Mohali have characterised Smart Nanocarriers for Oral Insulin Delivery. Polyelectrolytes stabilised liposomes (layersomes) were hypothesised and assumed to protect the insulin entrapped within the layersomes. Furthermore, layersomes were functionalised by using folic acid (FA) as targeting ligand and were hypothesised to follow additional receptor mediated endocytosis uptake mechanism for enhanced bioavailability. Efficacy testing in Sprague-Dawley rats showed that subcutaneous insulin exhibited severe transient hypoglycemia while oral insulin solution was practically inactive as no blood glucose reduction was observed

ACKNOWLEDGMENT

We congratulate all the winners and complement those even more who may not have been awarded but who have shared their ideas with us and the world at large through Techpedia.sristi.org platform. Without such a spirit of open innovation, we will not be able to create a vibrant spirit compatible with Indian dream to become an economically developed, compassionate and collaborative society. Honey Bee Network wishes the winners all the strength in their future endeavours.

I must thank all the colleagues who worked day and night to pursue GYTI review process and helped in timely announcement of awards. In particular, I must particularly mention Dr. Nirmal Sahay who guided the entire process and coordinated with various stakeholders most amiably. Other team members for GYTI include Arun Kumar, Sagar Panchal, Chetan Patel, Hiral Shastri, Divisha Rajput, Gauri Paliwal, Tautik Das, Dinesh Awasthy, Srinivas Bollam, and Amol Mahulkar. In addition, many volunteers have also helped in the process including process including Krunal Panchal, Jay Shah, Unnati Saraph, Manish Doshi, Bhaktdasi Patel and Himanshu Patoliya. I also thank our NIF colleagues Dr. Vipin Kumar, Mahesh Patel, Rakesh Maheshwari, Tushar Garg and the team.

I thank Ramesh Patel, Chintan Shinde, Anamika Dey, Bhumi Shah, Tejal Dhabi, Sumitra Patel, Alka Raval, Bhavesh Pandya, Mahesh Parmar, Keyur Panara, Ankit Doshi, Hardik Patel, Ramesh Parmar, and all other colleagues in SRISTI for facilitating a congenial environment for GYTI team to work day and night energetically.

CONTENTS:

Vikram Singh

White Light Emission from Vegetable Extracts

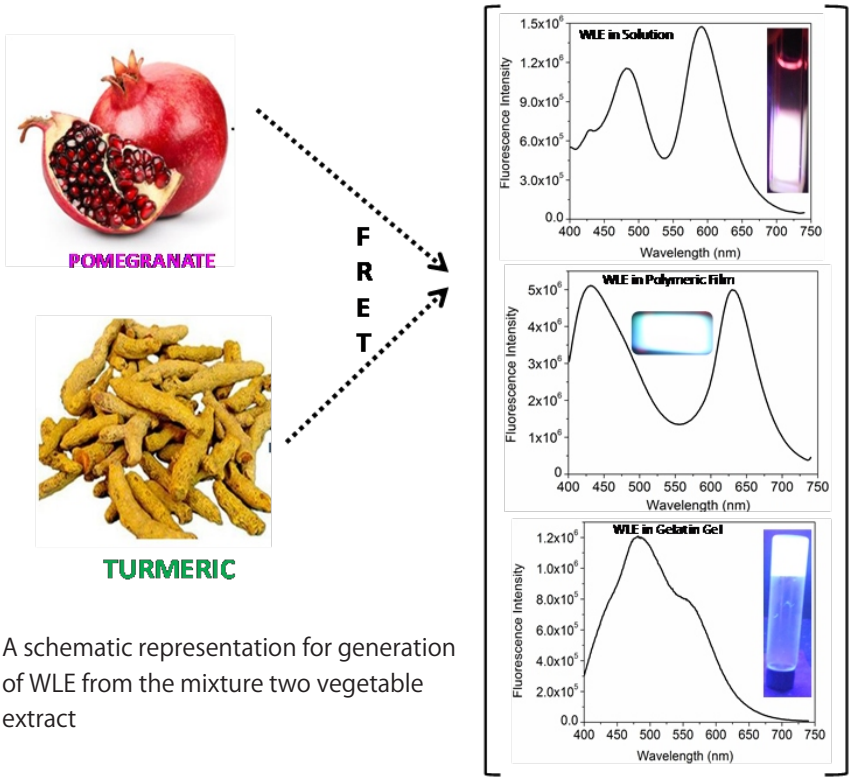
Dr. Vikram Singh
Indian Institute of Technology, Madras

Guide :
Prof. Ashok Kumar Mishra

White light emission (WLE) is generated from natural dyes extracted in the laboratory using a green and simple procedure. The optimized mixture of two suitably chosen plant extracts using acidic ethanol, aided by a FRET cascade from polyphenolics to curcumin to anthocyanins, generates almost pure white light, with CIE values of (0.35, 0.33) in solution, (0.26, 0.33) in gelatin gel and (0.33, 0.25) in PVA film. The colour temperature of the WLE is conveniently tunable by simply adjusting the concentrations of the component emitters. The primary emitting pigments responsible for contributing to WLE are polyphenols and anthocyanins from pomegranate, and curcumin from turmeric. WLE from such cheap and nature friendly resources could be important in the context of lighting and sensing application.

It would be interesting to see if such system can be used as dyes for tunable dye laser applications.

Given the vast number of excellent natural fluorescent dyes obtainable from renewable biosources, approaches similar to the present could lead to a more extensive range of low-cost and efficient WLE biomaterials with ease of adjusting colour temperature, which will obviate more expensive alternatives currently being pursued.



A schematic representation for generation of WLE from the mixture two vegetable extract

Prior Art Search:

To the best of knowledge, this is the first time low cost, biocompatible (edible) natural dyes have been a part of white light emitting system This work was published in Nature: V. Singh and A.K. Mishra, White Light Emission from Vegetable Extracts, Scientific Reports, 2015, 5, 11118.

Shanthanu Chakravarthy

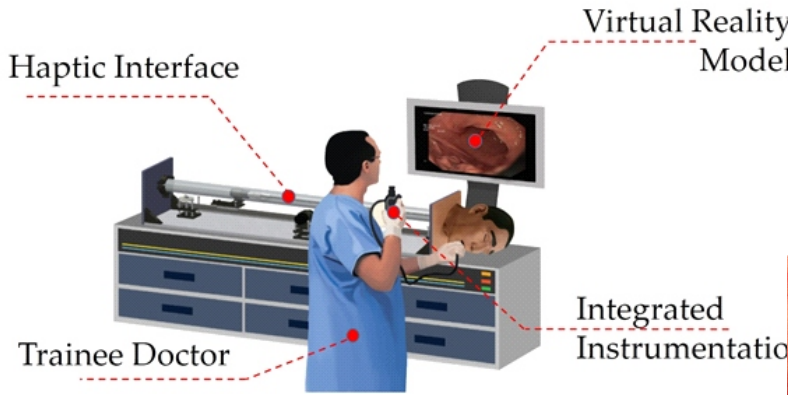
A Virtual Reality (VR)-based Immersive Simulator for Endoscopy Training

Shanthanu Chakravarthy
Indian Institute of Science, Bengaluru

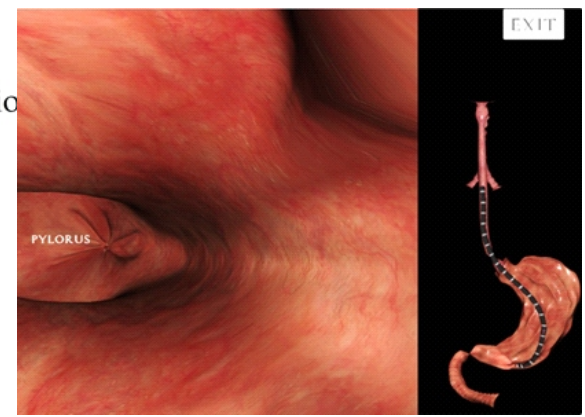
Guide :
Prof. G. K. Ananthasuresh

Virtual Reality (VR) together with haptics offers an immersive and flexible platform for training doctors in medical procedures. In this project, a VR-based endoscopy simulator together with the force-feedback system is developed.

Endoscopy is minimally invasive and is used as an important diagnostic tool to detect abnormal tissues, ulcers, tumours, polyps, cancers, etc. Gastrointestinal (GI) endoscopy, including colonoscopy, is a complex procedure involving a high degree of hand-eye coordination. These procedures are generally carried out by highly skilled clinicians. In order to practice endoscopy safely, a training system that does not involve patients is deemed important. VR-based training system developed in this work has many advantages. It is economical over a long run and usable any number of times; the training model can be changed and designed as per requirements including the incorporation of in-situ cases. It can be used for quantitatively assessing skill as recorded training sessions can be used for identifying mistakes. The developed endoscopy simulator also has many novel features. It consists of a three Degree of Freedom (DoF) haptic device, force models for real-time interaction, computer graphic models for visualization, and an instrumented endoscope for realistic interactions. All the units of the simulator are uniquely integrated to provide immersive endoscopy simulation. The device is kinematically designed to mimic real endoscopy. Furthermore, the endoscopy simulator developed in this project has the potential for extension to other interventional procedures such as colonoscopy, bronchoscopy, and endovascular training.



Conceptual design for the Endoscopy Simulator



A snapshot of the interactive simulation window

Prior Art Search:

1. E. Huang and J. Marks, "The diagnostic and therapeutic roles of colonoscopy," Surgical endoscopy, vol. 15, pp. 1373-1380, 2001. **2.** D. Greenwald and J. Cohen, "Evolution of endoscopy simulators and their application," Gastrointestinal endoscopy clinics of North America, vol. 16, pp. 389-406, 2006. **3.** A .S. f. G. E. (ASGE), "Endoscopic simulators: Report on emerging technologies," Gastrointestinal Endoscopy, vol. Volume 73, 2011. **4.** Lionel Flaction, Evren Samur, Pascal Maillard, "Haptic Interface for Simulator, Such as a Colonoscopy Simulator", WO2011027329A2, July 2012. **5.** Shanthanu, Ashwin M Rao, G. K. Ananthasuresh, "A Device for Simulating Endoscopy and a System Thereof", WO2016005959, July 1015

Dr. Vishal Gupta

Rotary ultrasonic Bone Drilling

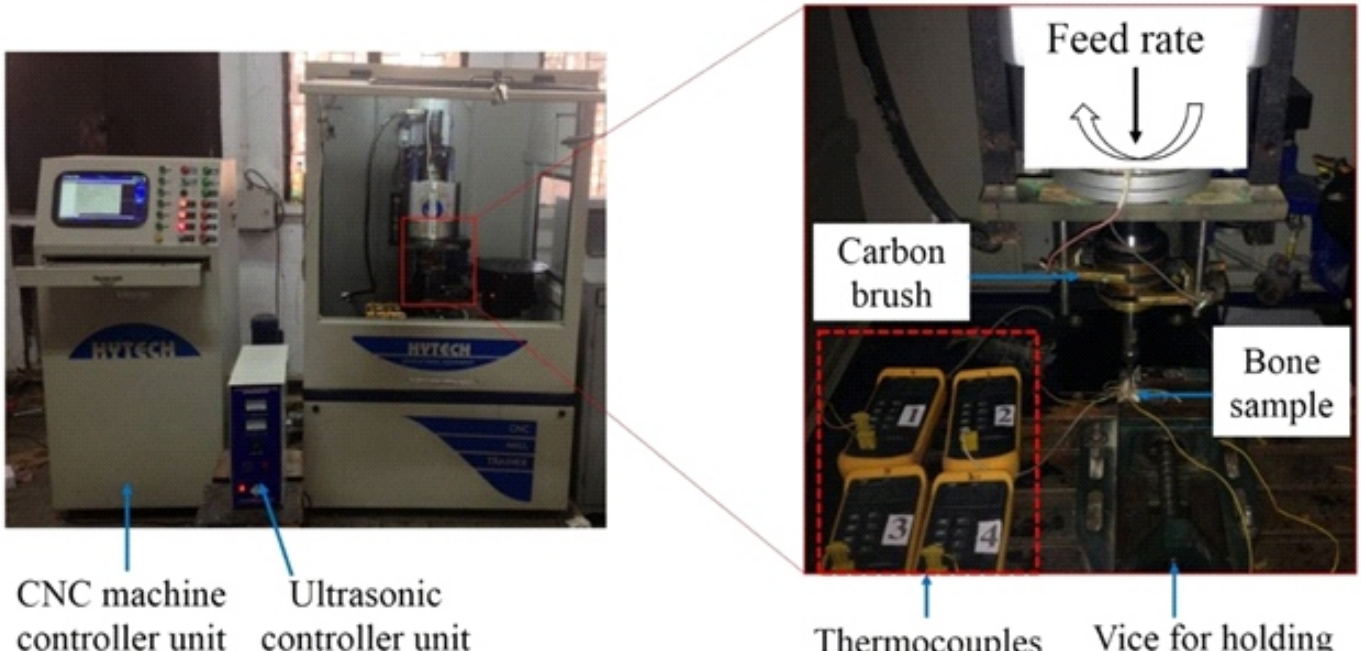
Dr. Vishal Gupta
Indian Institute of Technology, Delhi

Guide :
Prof. Pulak Mohan Pandey

There is always a necessity to minimize the magnitude of drilling force and torque during the bone drilling process. Thus, to minimize the rise in temperature, force and torque during surgical bone drilling process for more efficient and successful orthopaedic and trauma surgery. To attain the aforesaid, a new noble bone drilling method has been introduced recently named as RUBD.

In the present research, a novel bone drilling technique i.e., rotary ultrasonic bone drilling named as RUBD has been successfully attempted to minimize the forces, torque temperature and microcracks during bone drilling. In order to perform the experimental investigations to find out change in temperature, force, torque, temperature and microcracks with RUBD using diamond coated hollow tool on bone, rotary ultrasonic tool assembly was designed and fabricated in house.

The drilling experiments were planned and carried out on porcine bones using design of experiments (Response Surface Methodology). Analysis of variance (ANOVA) was carried out to find the effect of process factors such as rotational speed, feed rate, drill diameter and ultrasonic vibrational amplitude on the force and torque. Statistical models were developed for the force and torque with 95% confidential interval and confirmation experiments have been carried out to validate the models. The results of microcracks by SEM revealed that RUBD process offered a lower force, torque, temperature and minimum microcracks, making it a potential process for bone drilling in orthopaedic surgery. It was also found that RUBD generated a much lower temperature, force and torque as compared to the CSBD.



Prototype

Prior Art Search:

No patent or published article is found.

Bhaskar Bethi

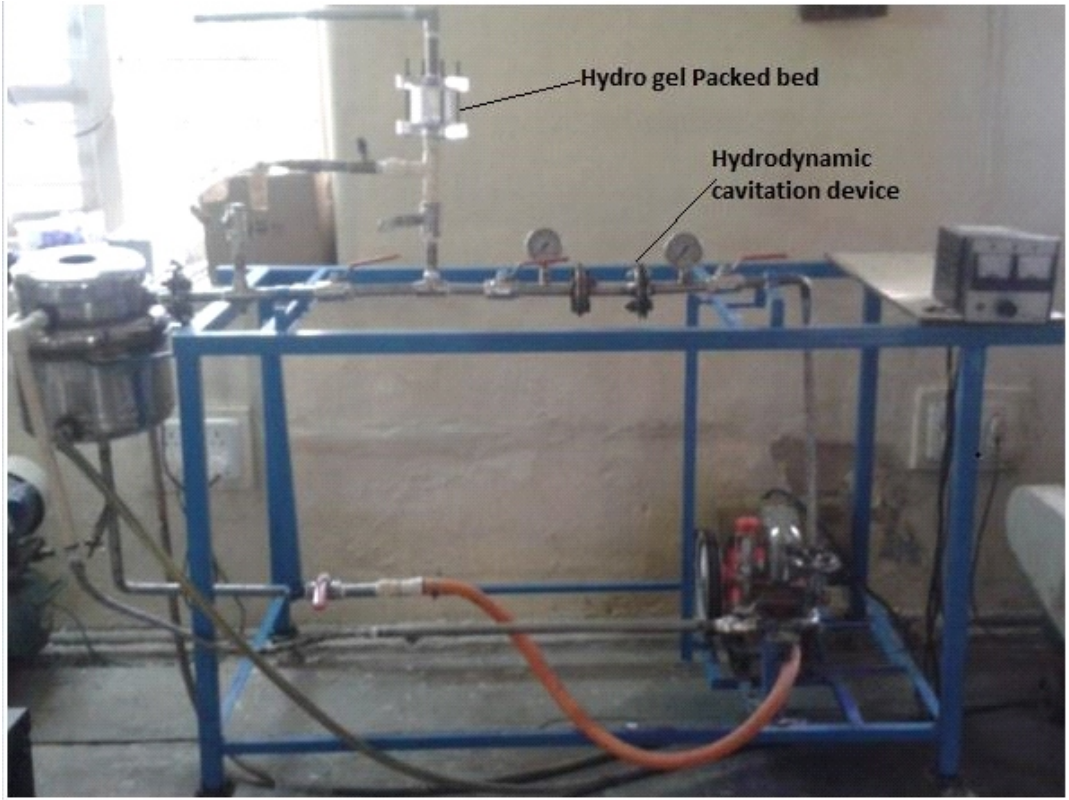
A Novel Hybrid System for Textile Dye Waste Water Treatment

Bhaskar Bethi
National Institute of Technology, Warangal

Guide :
Dr. Shirish Hari Sonawane

In this project, Ultrasonic irradiation is used to initiate the emulsion polymerization to form hydro gel through the generation of free radicals as well as the uniform distribution of clay across the hydro gel polymer matrix. Recently, some attempts have been made to modify the properties of polymeric hydrogels by the incorporation of nano- or micro-particles of inorganic materials, such as montmorillonite, kaolin, mica, bentonite into the polymer networks. Hydro gels loaded with dispersed clays are a new class of composite materials which combine elasticity and permeability of the gels with high ability of the clays to adsorb different substances.

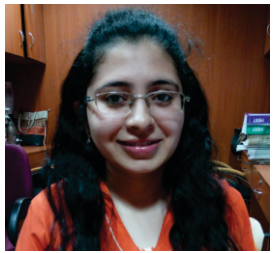
The developed hybrid system for the treatment of dye waste water can be easily scaled up to industrial scale for the treatment of bulk volume of textile wastewater. It is due to its simplicity in design, less cost of material construction, low cost of operation and higher cavitation yield compared to the ultrasounic cavitation. The developed technology will be efficient for the removal of dye from aqueous medium with in short duration of operating time compared to the most of the conventional treatment techniques such as biological wastewater treatment as well as the single treatment techniques include adsorption, coagulation etc. This innovative technology mainly involves unique feature of both the degradation and subsequent absorption of dye organic pollutants from the waste water in a single set of unit.



Laboratory hybrid wastewater treatment system

Prior Art Search:

No patent or published article is found.



Shivangi Sachdeva

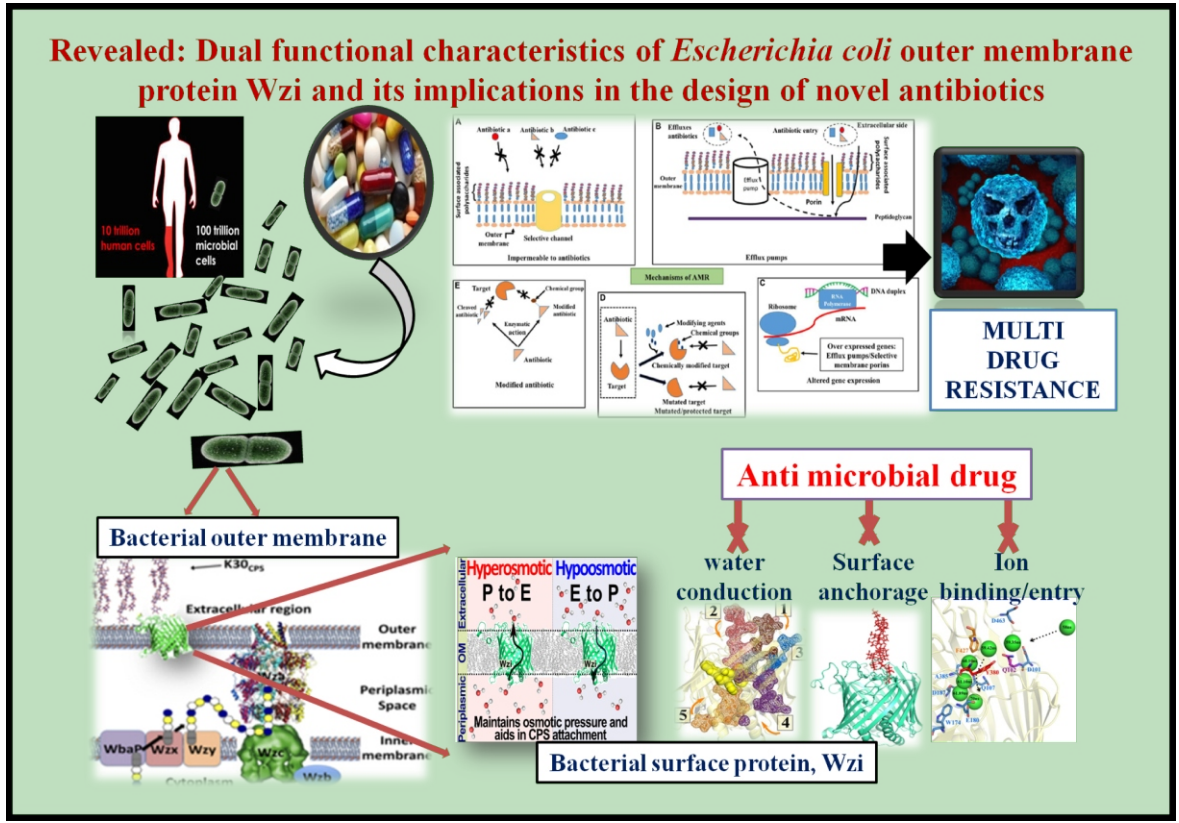
Narendar Kolimi

Revealed: Dual Functional Characteristics of Escherichia Coli Outer Membrane Protein Wzi And Its Implications In The Design Of Novel Antibiotics

Shivangi Sachdeva, Narendar Kolimi
Indian Institutes of Technology, Hyderabad

Guide :
Dr Thenmalarchelvi Rathinavelan

The emergence of multidrug resistance in bacteria is a major cause of infection and mortality worldwide. In Gram-negative bacteria, polysaccharide layers are one of the major virulent determinants that are involved in the evasion of host immune response as well as offers impermeability to antibiotics. Thus, inhibiting the capsular polysaccharide (CPS) biogenesis or surface exportation or its attachment to the bacterial surface may be an attractive strategy to generate avirulent Gram-negative bacterial strains. Here, the focus is on multidrug resistant Gram-negative Escherichia coli (E. coli), which is a common cause for urinary tract infections (including infections in the kidney), bloodstream infection, intra-abdominal infections such as peritonitis, skin and soft tissue infections, neonatal meningitis, diarrhea and food borne infections. An E.coli outer membrane protein Wzi that acts as an anchor for CPS onto the bacterial surface (viz., a lectin) also exhibits a bidirectional passive water conduction property (viz., a porin). Such a dual functional role of Wzi was not realized earlier due to the occluded pore, a property that can be used to treat E. coli infections. It is observed that three water specific entry points across extracellular face regulate the water diffusion involving different mechanisms and a luminal hydrophobic plug governs water permeation across the channel. Thus, a drug molecule that can either interfere with the water conduction by Wzi or the attachment of CPS to Wzi may aid in reducing the bacterial virulence and make them susceptible to antibiotics or host immune response.



Prior Art Search:

Sachdeva S et al, 2016. Key diffusion mechanisms involved in regulating bidirectional water permeation across E. coli outer membrane lectin. Scientific Reports 6

Sonali Singh Doharey

Rahul Pratap Singh

Poornima Agrawal

Targeted Theranostic Nanomedicines for Brain Cancer Therapy

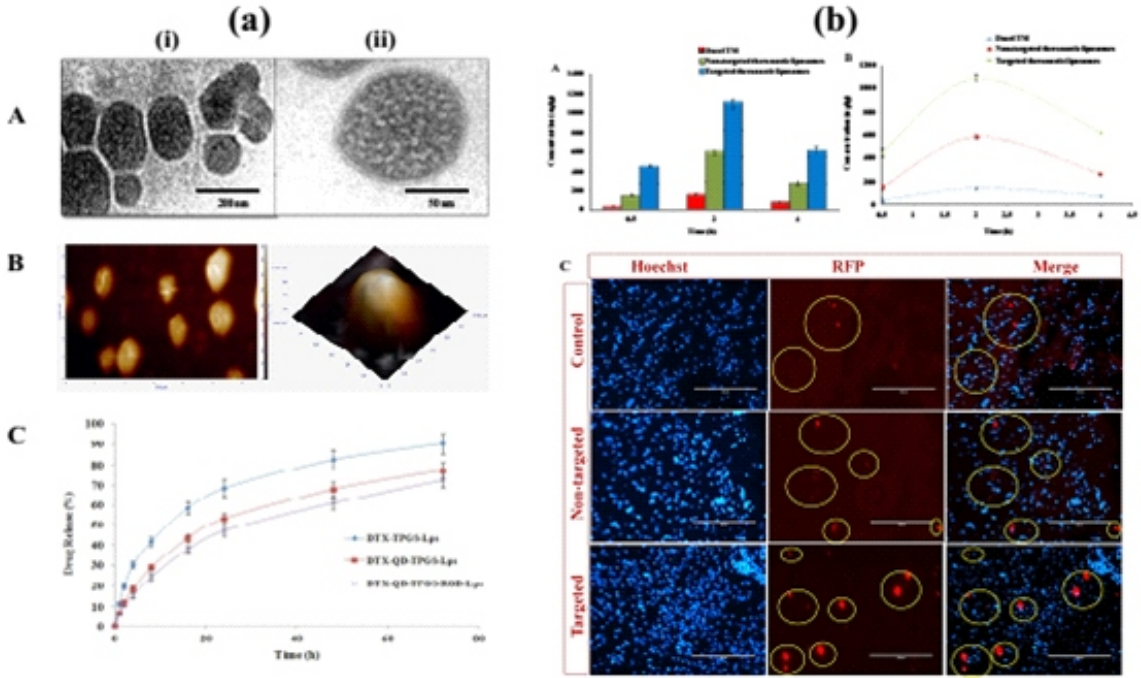
Sonali Singh Doharey, Rahul Pratap Singh, Poornima Agrawal
Banaras Hindu University, Varanasi

Guide :
Dr. M. S. Muthu, Prof. B. L. Pandey

Brain cancer is considered as one of the most devastating diseases because it is hard to treat and cure. Chemotherapy is the most common method for the treatment of different types of brain cancers. Unfortunately, the diagnosis and therapy of brain cancer are very unsatisfying because of the existence of the blood-brain barrier (BBB), which excludes more than 98% of small molecules and almost 100% of large molecules. Another obstacle in cancer therapy is to maintain the desired concentration of therapeutic agents and/or diagnostic agents at tumor site.

The innovator developed targeted and controlled release nanomedicine systems including transferrin conjugated D-alpha-tocopheryl polyethylene glycol 1000 succinate (TPGS) micelles and transferrin / arginine – glycine – aspartic acid (RGD) conjugated TPGS liposomes (i.e., transferrin conjugated liposomes and RGD conjugated liposomes) to deliver docetaxel (DTX) and quantum dots (QDs), simultaneously through receptor-mediated active delivery for brain cancer therapy.

Innovator demonstrated that RGD or transferrin TPGS decorated theranostic liposomes were highly effective in delivering desired concentration of therapeutic agents and diagnostic agents across BBB without any signs of brain damage or edema in brain histopathology. These advanced platforms can diagnose brain cancer at early stages, initiate first-line therapy, monitor it, and if needed, rapidly start subsequent treatments. In future, brain theranostics will be able to provide personalized treatment which can make brain cancer even curable or at least treatable at the earliest stage.



(a)(A) Transmission electron microscope (TEM) image of theranostic liposomes (B) Atomic force microscope (AFM) image of theranostic liposomes (2D and 3D image) and (C) In-vitro drug release study

(b) (A) Brain distribution, (B) Brain distribution kinetics of DTX formulated in DocelTM, non-targeted (DTX-QD-TPGS-Lps) and targeted liposomes (DTX-QD-TPGS-RGD-Lps) (c)Fluorescence microscopic images of brain sections. Quantum dots showing red fluorescence

Prior Art Search:

No patent or published article is found.

Mandeep Singh

Azhar Muneer

Blood Quality Assessment using Digital Holographic Microscopy

Mandeep Singh, Azhar Muneer
Indian Institute of Technology, Delhi

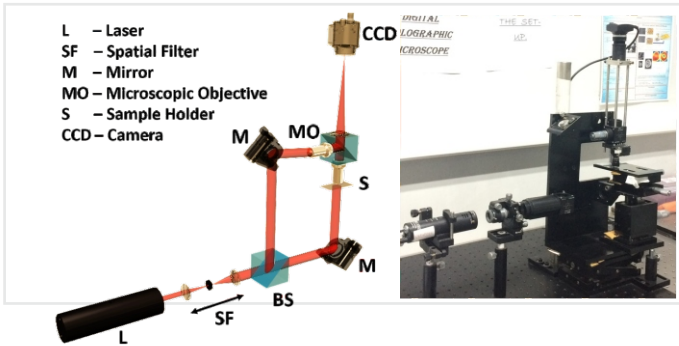
Guide :
Dr. Kedar Khare and Dr. Sarita Ahlawat

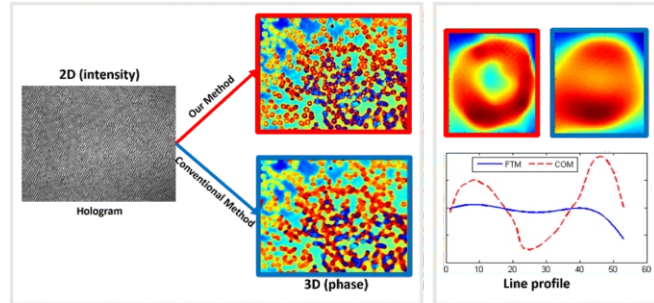
The stored blood in blood banks is used regularly in surgical procedures or transfusions. Blood quality assessment is therefore an important routine task. Current blood quality assessment protocols involve a number of chemical assays or impedance measurements making the process cumbersome and difficult to standardize. In recent years IIT Delhi has developed and patented a superior DHM technology for accurate high resolution 3D imaging of biological cells for blood cell classification and quality assessment.

DHM operates on the principle of interference of light and can provide accurate information regarding minute refractive index changes in the cells that are ultimately related to cellular changes in response to ageing, physical cell damage or infections. Using the novel 3D imaging capability of this prototype system has indicated that fresh and old red blood cells have clearly distinguishable morphological features.

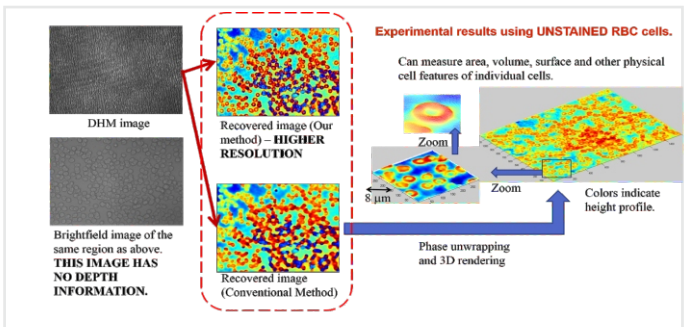
The specialty of the DHM technology is that the usual wet-lab processing of cells prior to their analysis can be minimized thus significantly reducing recurring costs for chemical reagents.

With a more systematic effort in this direction the aim is to develop a methodology for blood cell classification and quality testing that can benefit large number of hospitals, blood banks and pathology labs across India and beyond. The work is expected to lead to an early application of an indigenously developed microscopy technology with superior imaging performance.

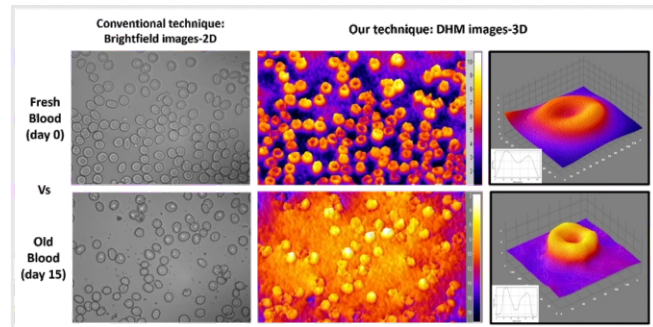




Demonstration of high resolution performance with IIT Delhi DHM system



Steps involved in image recovery from hologram recorded on IIT Delhi DHM system



Blood quality assessment using IIT Delhi DHM system

Prior Art Search:

No patent or published article is found.

Saugandha Das

Archit Devarajan

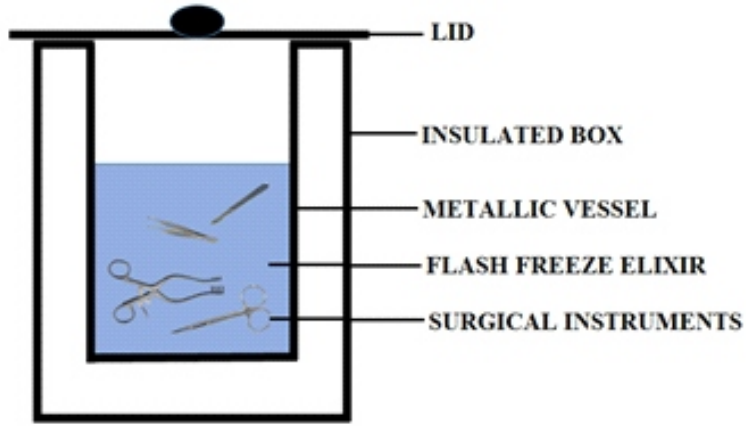
STERI-FREEZ: Flash Freeze Sterilization

Saugandha Das
Institute of Chemical Technology, Mumbai
Archit Devarajan
Ramnivas Ruia Junior College, Mumbai

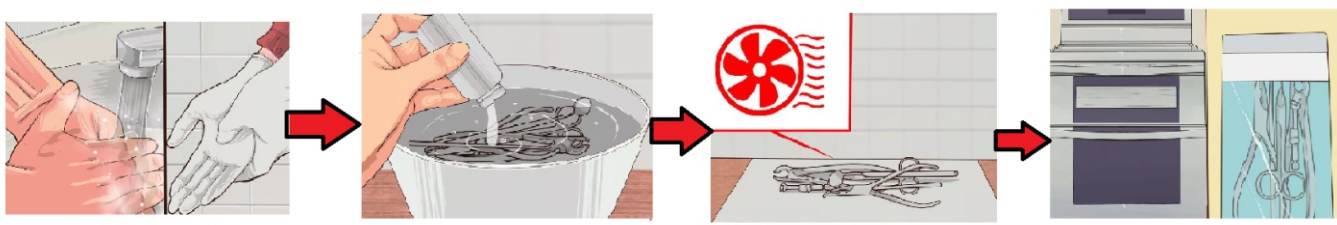
Guide :
Prof. Padma V. Devarajan

Surgical site infections are one of the most common complications associated with surgery, with reported incidence rates of 2-20%. The problem is enhanced in rural or under-resourced clinics in under-developed or developing countries with about one-third of surgical patients getting infected, a rate which is nine times greater than in developed countries. Of the various causes, the use of contaminated medical instruments that have not been properly cleaned and sterilized directly contribute to surgical site infections with around 20 million post-operative patients infected. In absence of proper sterilization and disinfection protocols or methods these situations may become life threatening. Rural clinics in developing countries cater to 3 billion people worldwide, but do not have minimum provisions necessary to prevent post-surgical infections. Considering India has over 60% of the population living in villages, this is a serious problem and hence needs great attention. Thus STERI-FREEZ provides an AMAZINGLY SIMPLE on-site technology, which provides a ready to use, economic yet effective solution to the existing lacuna. This portable, cold sterilization device comprises of an insulator box housing a metallic vessel covered with a lid containing a green cryogenic biocidal mixture or Flash Freeze Elixir (FFE). Sterilization is achieved using a combination of biocides acting at subzero temperatures (-70 degree Celsius). Surgical instruments to be sterilized are kept immersed in FFE and removed just prior to use without leaving any toxic residue on the surfaces. Conventional methods of medical sterilization (autoclave, hot air, chemical and gaseous sterilization) require energy intensive instruments and long processing time while alternative sterilization techniques (Boiling in water) are not considered effective enough.

STERI-FREEZ



STERI-FREEZ_Schematic



Process of sterilization using the STERI-FREEZE

Prior Art Search:

1. Self-contained portable ozone sterilizer for small medical equipment WO 2016025934 A1 **2.** Portable type sterilization and water purification device of silver nano-wires CN 102531112 A **3.** Portable sterilization box for family planning CN 2036836 U

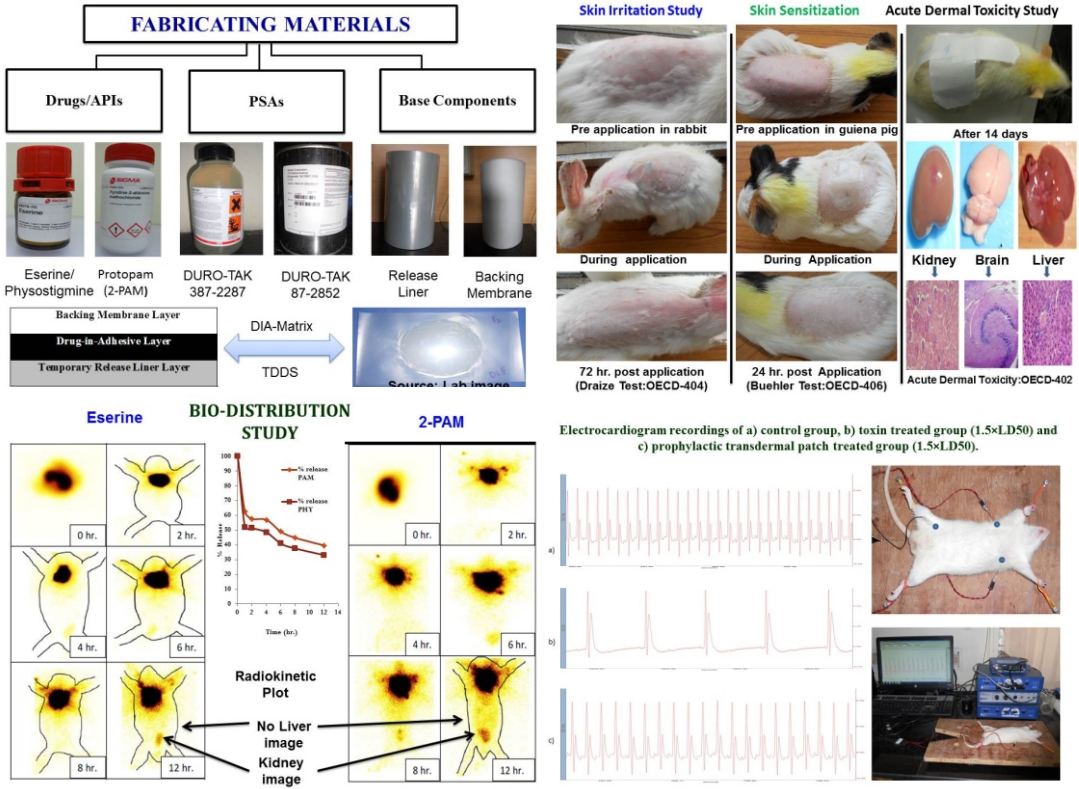
Subham Banerjee

Prophylactic Transdermal Patch Against Neurotoxin Poisoning In Biological Warfare Situations

Subham Banerjee
Defence Research Laboratory, Tezpur
Birla Institute of Technology, Mesra

Guide :
Dr. Pronobesh Chattopadhyay,
Dr. Animesh Ghosh

Drug-in-adhesive matrix type combinational prophylactic transdermal patch composed of eserine and pralidoxime chloride (PAM) against acetyl choline agonist (±)-anatoxin a neurotoxin poisoning was developed. Initially, a simple RP-HPLC method was developed and validated for the simultaneous determination and quantification of eserine and 2-PAM using UV detection. The method was validated as per ICH guidelines for validation of analytical procedures, and was applied for the routine analysis of these two drugs in fabricated transdermal patches. Adhesive matrix type transdermal patches containing eserine and 2-PAM were prepared by solvent casting method. The drug combinations were incorporated in adhesive matrix type system supported by a polyester film laminate backing membrane and attached to a temporary release-liner. The dermal patches were having desired properties such as thin, circular, opaque, smooth, homogeneous, sticky, uniform, flat and flexible in nature. The drug release was sustained from all the formulations up to 72 h and following anomalous (non-fickian) diffusion and fickian release mechanism for eserine and 2-PAM, respectively. Optimized transdermal patch exhibited highest acceptable levels of tackiness with good adherence capacity and showed promising stability potential with respect to all points of analysis. From safety point of view, the optimized transdermal patch was safe for application to the skin with no dermal and mutagenic toxicity as well. Pharmacodynamic study proved that the optimized transdermal patch was effective against acetyl choline agonist (±)-anatoxin a neurotoxin poisoning. While pharmacokinetic study revealed that the systemic absorption of the drugs from the fabricated best optimized patch through the skin was sufficient enough to achieve pharmacodynamic efficacy.



Prior Art Search:

No patent or published article is found.

Iftak Hussain

Dr. Kamal Uddin Ahamad

Low Cost and Field-Portable Smartphone Platform Water Testing Kit for Detection and Analysis of Contaminants in Drinking Water

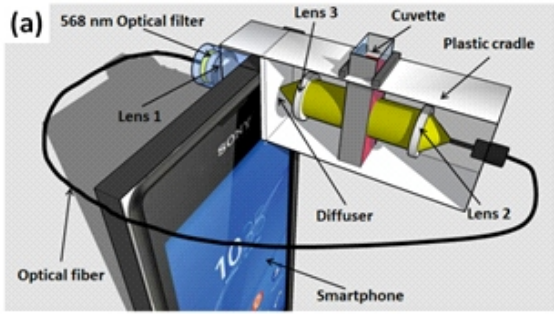
Iftak Hussain, Dr. Kamal Uddin Ahamad
Tezpur University, Tezpur

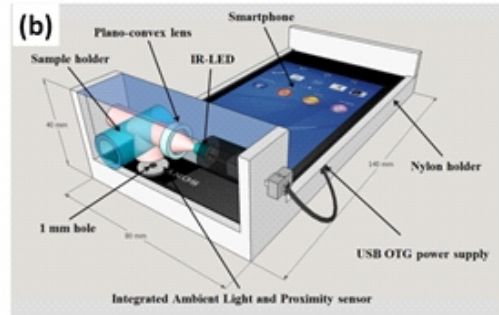
Guide :
Dr. Pabitra Nath

As per the eleventh five-year plan document of India (2007-12), there are about 2.17 lakh regions in the country with more than half affected with excess iron, followed by fluoride, salinity, nitrate and arsenic in drinking water. Majority of such cases are contributed due to unclean water supply and poor sanitation. Most of the detection methods for water contamination are confined to laboratory due to its time-consuming measurement procedure and the use of bulky instruments such as spectrophotometer in colorimetric tests. Water samples from these regions are usually sent to the central water quality monitoring laboratory and the process of estimating fluoride concentration is an in-efficient and time consuming process.

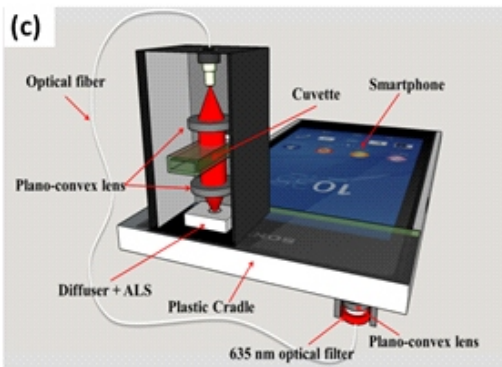
In the present invention, the smartphone is converted into a laboratory grade low cost, robust and field portable water quality monitoring kit to detect and quantify water contaminants such as fluoride, turbidity and salinity. Using the same kit, all the colour based water quality monitoring can be possible. The illumination sensor or ambient light sensor (ALS) of the smartphone is used as a detector and its optical led flash is used as a light source to convert the smartphone in to a photometric sensor for its utilisation in water quality monitoring.

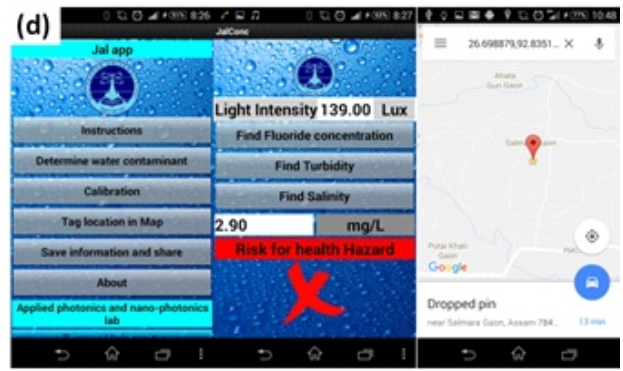
Thus, a simple and user friendly, low cost android platform based application for real time detection and analysis is developed. The visual gesture indication is incorporated in the application so that people without any proper scientific knowledge can easily handle the kit. Using the same application real time reporting and data sharing is made possible using the existing communication facility of the phone.





(a) Schematic of smartphone based Fluoride sensor; (b) Schematic of water turbidity sensor (c) Schematic of salinity sensor





Prior Art Search:

1. S. Levin, S. Krishnan, S. Rajkumar, N. Halery, P. Balkunde, "Monitoring of fluoride in water samples using a smartphone", Science of Total Environment 551, pp. 101–107,2016. **2.** M. Arafat Hossain, J. Canning, K. Cook, P. J. Rutledge, A. Jamalipour, "Combined "dual" absorption and fluorescence smartphone spectrometers", Optics Letters 40, pp. 1737—1740, 2015. **3.** S. Dutta, D. Sarma, P. Nath, "Ground and river water quality monitoring using a smartphone-based pH sensor", AIP Advances 5, pp. 057151— 057159, 2015.

K. Rajasekhar

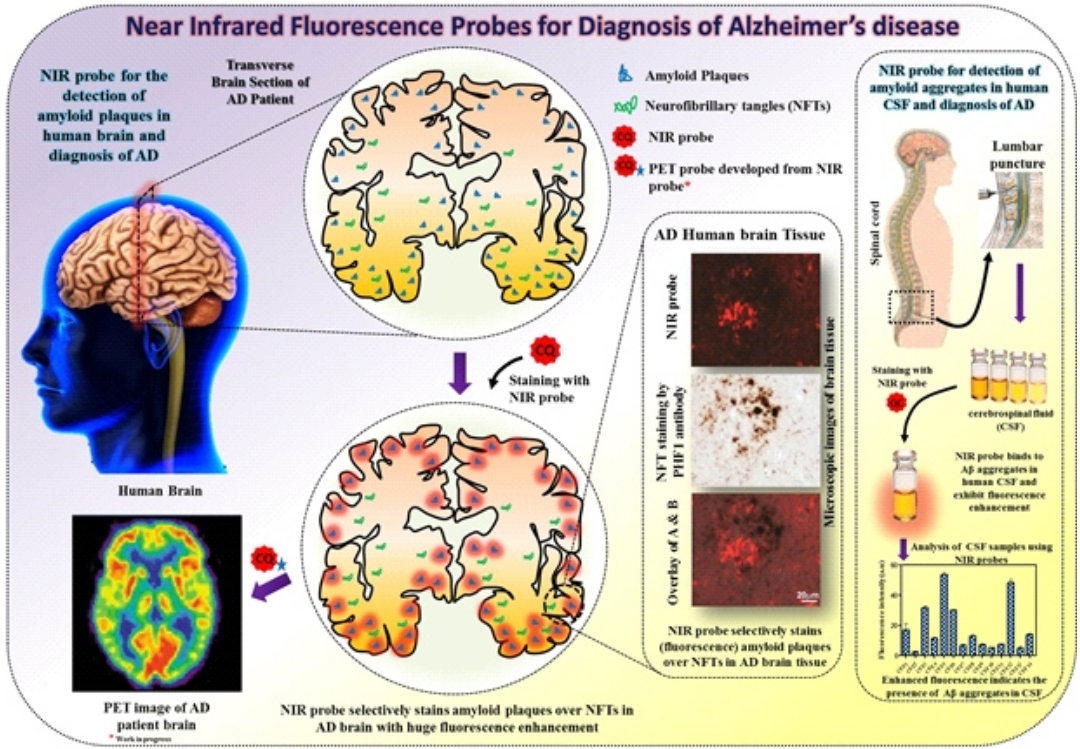
Kavita Shah

Near Infrared Fluorescence Probes for Diagnosis of Alzheimer's disease

K. Rajasekhar, Kavita Shah
Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR), Bengaluru

Guide :
Prof. T. Govindaraju

Selective detection and staining of toxic amyloid beta (Aβ) plaques found in the Alzheimer's disease (AD) brain is crucial for clinical diagnosis and monitoring of the disease progress. Herein, a coumarin-quinoline (CQ) conjugate-based molecular rotor type, turn-on near-infrared (NIR) fluorescence probe for selective and specific detection of Aβ fibrillar aggregates is designed. The probe CQ selectively binds to Aβ fibrillar aggregates over other toxic protein aggregates such as Tau, α-synuclein (α-Syn) and islet amyloid polypeptide (IAPP), and exhibit ~100 fold fluorescence enhancement with nanomolar binding affinity (82 nM). CQ effectively displace Thioflavin T bound to Aβ fibrillar aggregates and exhibit multiple binding sites on Aβ fibrillar aggregates which is extensively studied through fluorescence resonance energy transfer (FRET) and molecular docking. Remarkably, CQ unambiguously stains Aβ plaques in human brain tissue over its co-existing Tau aggregates, neurofibrillary tangles (NFTs), which are strongly associated in AD and in various tauopathies. This is a highly desirable attribute to distinguish AD from disease conditions caused by Tau pathology.



Prior Art Search:

Currently, there are no approved diagnostic methods for AD except based on the assessment of cognitive state of the patients. NIR probes reported in literature for amyloid plaques lack selectivity and there is a finite probability of nonspecific binding to other protein aggregates such as Tauaggregates. The probe is very specific to amyloid aggregates/plaques and it is the first report, were the probe (CQ) efficiently differentiates amyloid plaques from tau aggregates.

Low Cost Automated Handheld Melamine Detection Device (for Testing Melamine in Milk)

Dhiraj Indana, S.C.G. Kiruba Daniel, Varun S., Prateek Katare
Indian Institute of Science, Bangalore

Guide :
Dr. Sai Siva Gorthi

Dhiraj Indana

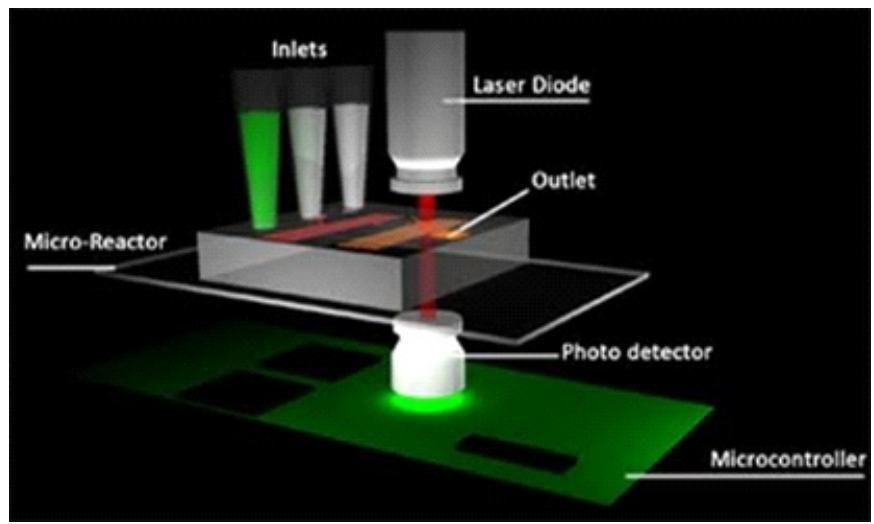
S.C.G. Kiruba Daniel

Varun S.

Even though a number of kits and devices are available for detecting common milk adulterants like urea, boric acid, water, sugar and detergents, there is hardly any portable device available for the detection of melamine. Till now, bulky instruments like Gas Chromatography (GC), HPLC, GC-MS and LC-MS are being used for detecting melamine which costs between 25 to 50 lakhs rupees, as well as requiring skilled personnel for operation. A fully automated handheld device to detect melamine from milk with integrated milk pre-processing step done using chemical dried cotton is developed. Melamine is finally detected through interference in Silver nanoparticle formation. Both the pre-processing and detection steps are innovative and patented. The cost of the device may be few thousand rupees which is almost 1000 times lesser than the price of existing conventional instruments. The developed device is user-friendly which can give the level of melamine adulteration in ppm directly. Thus, the device not only tells the user whether the milk is fit for consumption or not but also gives the exact concentration of melamine in milk. This device fulfills the goal of taking melamine sensing to every household so as to protect every person from melamine adulteration.

Prateek Katare

Melamine read-out device



Schematics for microfluidic interference sensing of melamine

Prior Art Search:

No patent or published article is found.

Nitin Vasanth

NeuroBuds: Brain Wave Mapping Smart Earphones for Rural India

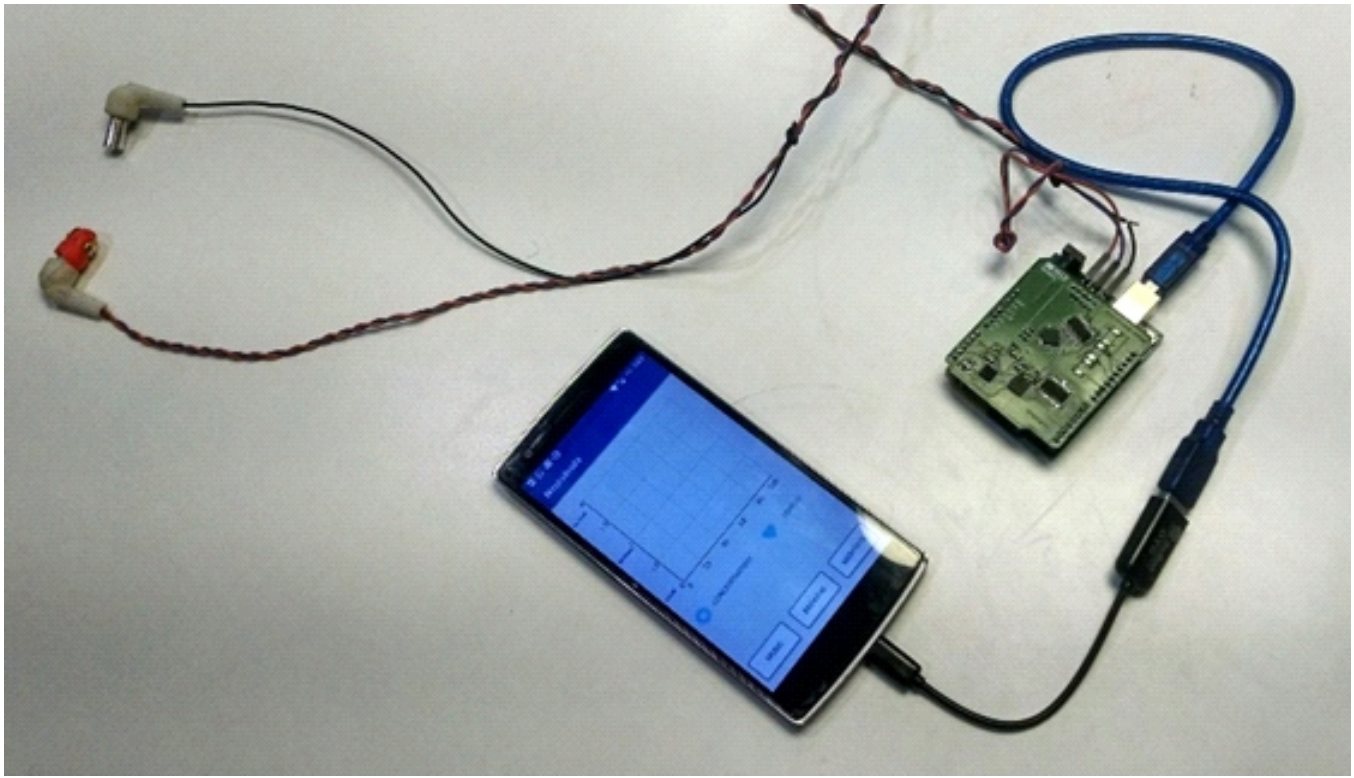
Nitin Vasanth
Cochin University of Science & Technology, Cochin

Guide :
Prof. Unni A M

An average human brain consists of over 80 billion neurons. These communicate with each other by sending short ionic impulses, which in turn creates small voltage fluctuations around the proximity of brain. By placing highly sensitive sensors, these fluctuations can be used to understand the brain activity.

NeuroBuds is a pair of smart earphones that have these specially fabricated sensors embedded into it to understand the brain activity of user. These sensors are integrated into the architecture of an earphone along with a pre-processor. The data from the sensor is passed on to the Smartphone from where the rest of processing is done. This way of utilization of smartphone processor and smartphone battery to power NeuroBuds reduces the requirement for dedicated on-board processor and battery module reducing the size of device greatly. More importantly this helps reduce the device cost to a price point that makes it accessible to common man who is usually unable to explore other expensive brain activity solutions that exist now.

The brain data is analysed to look for anomalies in pattern that indicate brain disorders like Epileptic seizures. This kind of early detection helps in doing pre-emptive action and sending out alerts/SOS. The brain wave data is also used to analyse the mental state of the user, their concentration levels and stress levels. At a time when the working population suffers from stress related issues and sleeping disorders due to a fast-paced lifestyle, NeuroBuds can be used as a mental health monitor. Once the application has enough data coming in from different users, it can recognize patterns and optimize algorithms on its own using the underlying neural network. NeuroBuds serves as the perfect link between the user and the smartphone to monitor other body vitals including heartbeat.



Prototype

Prior Art Search:

Currently there are no such consumer products in the market which use EarCanal EEG integrated into earphone architecture.

Reference to Ear Canal EEG : https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4649040/

Shantimoy Kar

Group Photo

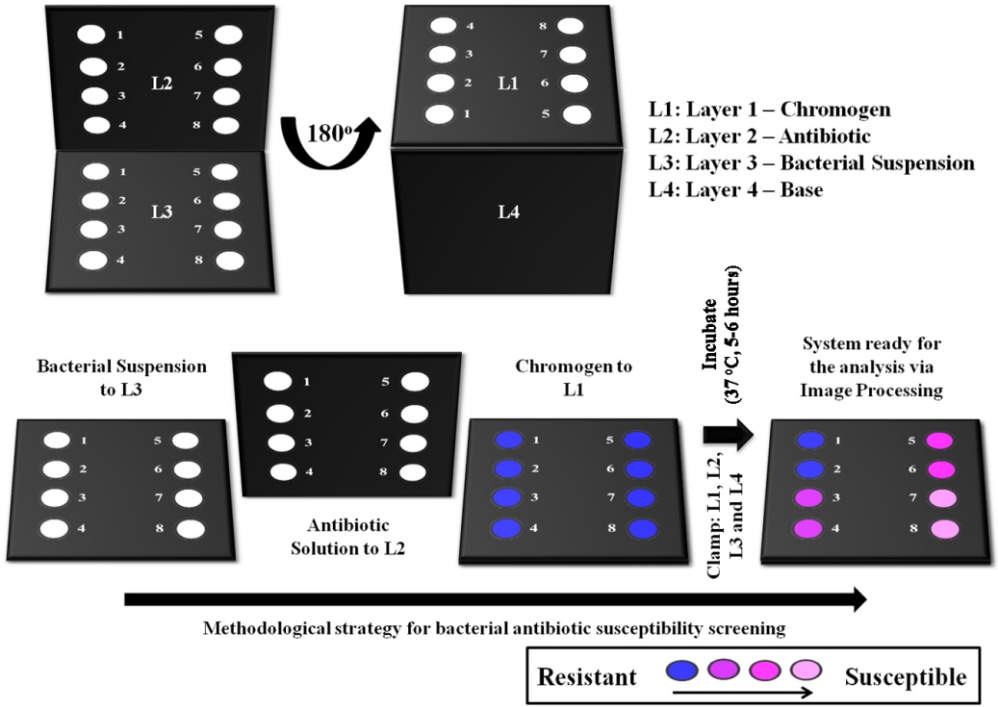
Affordable and Rapid Paper-based Test Kits for Antimicrobial Susceptibility Assays

Shantimoy Kar, Tarun Agarwal, Shubhanath Behera, Varun Varma
Indian Institute of Technology, Kharagpur

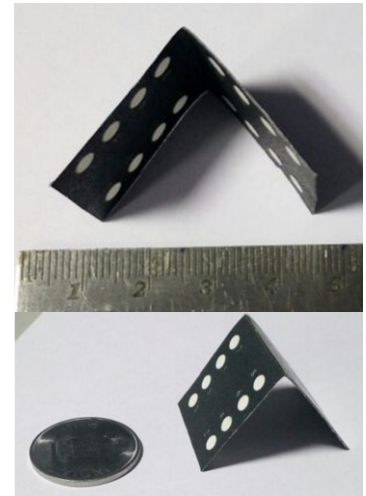
Guide :
Dr. Suman Chakraborty, Prof. Tapas K. Maiti

At the present scenario, increasing drug resistance of the pathogenic microbes is a global threat to the human mortality. To meet this challenge, there is a need to develop a rapid antimicrobial susceptibility testing platform. The current methodologies for detecting antimicrobial susceptibility suffer from severe limitations, thereby negatively effecting patient's survival rates. These techniques are time consuming, labor intensive, require sophisticated infrastructures and skilled personnel; which collectively increase overall cost of the diagnosis.

In this context, herein, a simple paper based microfluidics platform for easy and rapid execution of antimicrobial susceptibility assays is developed. The device consists of a paper-based platform which includes four different layers: a base layer, a bacterial suspension layer, a drug layer and a top layer containing a chromogenic substrate which changes color in accordance to the bacterial metabolic activities. The developed technology provides faster detection (~ 5-6 h) and multiplexing (upto 8 different samples could be analyzed) in comparison to the gold-standard stereotype laboratory practices. Moreover, portable nature and ease of fabrication method collectively make it more convenient for functioning at resource limited settings.



Schematics of the paper-based device for antimicrobial susceptibility assays and its methodological strategy



Prototype

Prior Art Search:

1. Jungil Choi, Yong-Gyun Jung, Jeewoo Kim, Sungbum Kim, Yushin Jung, Hunjong Na and Sunghoon Kwon, Lab Chip, 2013, 13, 280–287. 2. R. Mohan, C. Sanpitakseree, E. Sevgen, A.V. Desai, C.M. Schroeder, and P.J.A. Kenis, Anal. Chem. 2010, 82, 3–10.

3. Frédérique Deiss, Maribel E. Funes-Huacca, Jasmin Bal, Katrina F. Tjhung and Ratmir Derda, Lab Chip, 2014, 14, 167–71.

Sutapa Chandra

Rosna Binish

Arvind Dhawangale

Portable Biosensing Platform Based on Conducting Polymer Decorated Optical Fiber for Bacteria as well as Heavy Metal Sensing in Tap Water

Sutapa Chandra, Rosna Binish, Arvind Dhawangale
Indian Institutes of Technology, Bombay

Guide :
Prof. Soumyo Mukherji

The presence of water borne bacteria and heavy metals in tap water could be a potential human health risk and may lead to death of young children and adult. To address this issue, a common platform is developed for detection of water contaminants (bacteria and heavy metals) in tap water.

The primary sensing mechanism is based on change of optical properties of polyaniline (conducting polymer) due to the binding of water contaminants on the polyaniline coated fiber-optic sensor probe. The experimental setup consists of a broadband light source, light focusing optics and fiber-optic spectrometer. Depending on the analyte (heavy metals, bacteria etc.), polyaniline coated optical fibers were functionalized with different receptors. Thus, by changing the surface chemistry of the polyaniline coated sensor probe, it can be made specific towards detection of different analyte. As a proof of concept, it is demonstrated that as low as 20-60 cfu/ml concentrations of E. coli and 1 picomolar concentration of lead ions are detectable using this system.

The deliverable will be a marketable prototype of an optical fiber sensor integrated with micro-controller unit. The novelty lies in the alteration of optical properties of polyaniline and its utilisation for water contaminants sensing. The detection limit aimed by this technology will surpass the conventional methods available for detecting these analytes. The sensitivity and specificity available by this technology ensures its applicability in water industry.

Proposed Device

Top view

Inside View

Prior Art Search:

Sutapa Chandra, Reshma Bharadwaj, Soumyo Mukherji; Label free ultrasensitive optical sensor decorated with polyaniline nanofibers: Characterization and immunosensing application; Sensors and Actuators B 240 (2017) 443–450

Chandra S, Mukherji S, Bharadwaj R. Conducting Polymer Coated Optical Fiber. Indian patent application no. : 3890/MUM/2014, dated 04 December 2014.

Appidi Tejaswini

Syed Basseruddin Alvi

Anurag Meena

Affordable detection kit for Cervical Cancer

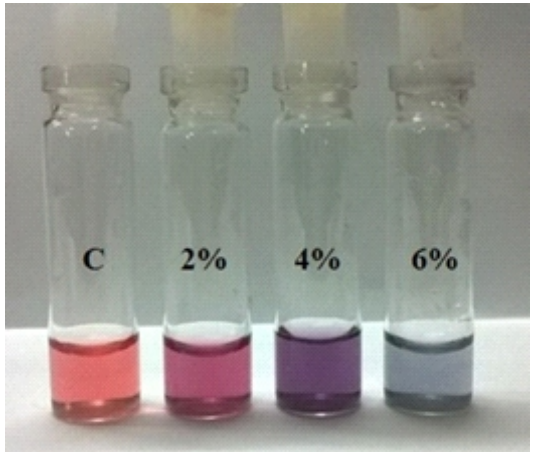
Appidi Tejaswini, Syed Basseruddin Alvi , Anurag Meena
Indian Institute of Technology, Hyderabad

Guide :
Dr. Aravind Kumar Rengan

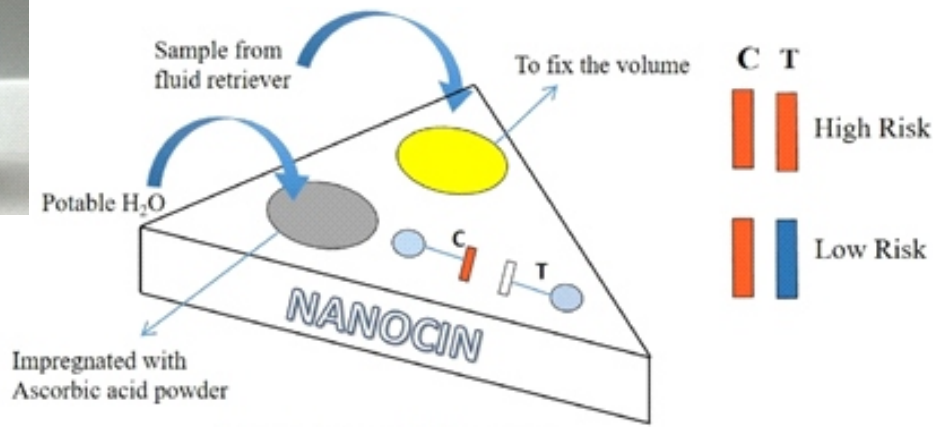
Cervical cancer is treatable, if diagnosed early. The screening/diagnostic procedures available are time-consuming and explorative. A system which is simple, economical with immediate results is needed to increase frequency of screening. The innovation has paved way for the development of one such system.

A technique is developed to quantify the acetic acid that is used for protein coagulation which is responsible for the aceto-white patches in VIA (Visual Inspection with Acetic acid, a conventional screening procedure for detection of Cervical cancer/Cervical intraepithelial neoplasia (CIN)). The percentage of acetic acid is quantified; such that various percentages would result in various colors. This will help to identify the presence of cervical cancer/CIN without naked eye observation as required in VIA. This technique will be embedded into a paper/strip based device which can be initially used as an assistive technique but has the capability to emerge as self-screening tool.

A qualitative screening procedure VIA is also quantified which can be easily embedded into paper/strip based device for the development of an economical, easy to handle kit which will increase the frequency and improve the ease of screening which would in turn increase the Cervical cancer survival rate.



Acetic Acid Variant



Strip based detector

Prior Art Search:

No patent or published article is found on quantification of VIA but VIA has been studied extensively for its sensitivity and specificity. Following are the few research articles that are related to studies regarding VIA.

1. Satyanarayana L, Asthana S, Bhambani S, Sodhani P, Gupta S, Indian Journal of Cancer, June 2014, Volume 51, Issue 2.

2. Catherine Sauvaget , Jean-Marie Fayette, Richard Muwonge, Ramani Wesley, Rengaswamy Sankaranarayanan., International Journal of Gynecology & Obstetrics, 2011, Vol 113, Issue 1, 14–24.

Manashi Chakraborty

Dr. Santanu Patsa

Dr. Nishat Anjum

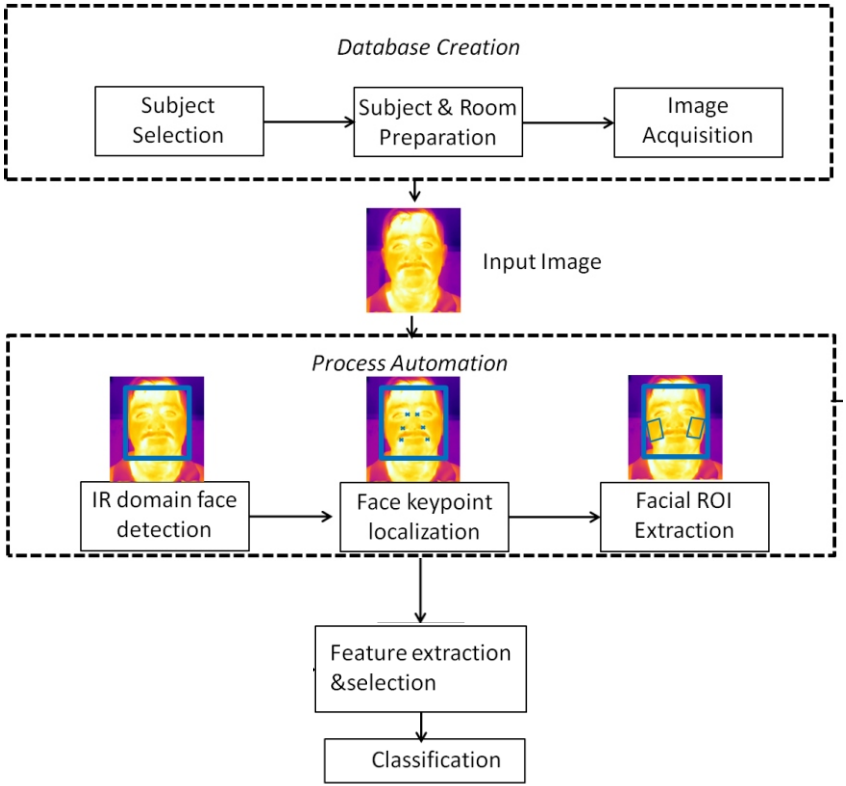
Non-invasive, Point-of-care Diagnostic System for Early Detection of Oral Cancer using Digital Infrared Thermal Imaging

Manashi Chakraborty, Dr. Santanu Patsa and Dr. Nishat Anjum
Indian Institute of Technology, Kharagpur

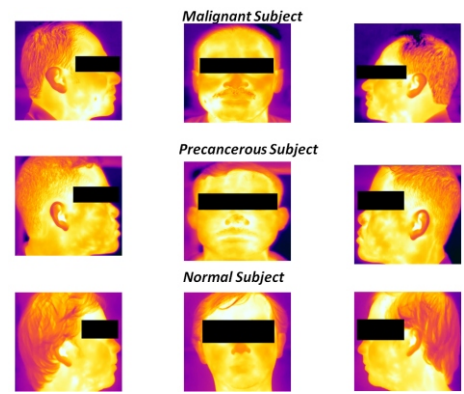
Guide :
Dr. Sudipa Mukhopadhyay (Principal Investigator)
Prof. Swapna Banerjee, Dr. Sourav Mukhopadhyay
Prof. Jay Gopal Ray

This project is the pioneering attempt to develop a non-invasive, non-ionizing, radiation hazard free, point-of-care computer aided diagnostic framework for oral cancer detection using machine intelligence and Digital Infrared Thermal Imaging (DITI). Oral cancer is the most common cancer in India where approximately 14 people die/hour. Patients are unable to avail diagnosis due to scarcity of state-of-the-art infrastructure and oral-pathologist. Patients are reluctant to go for invasive biopsy. All these along with absence of screening facility pose hindrance to early diagnosis.

Due to abnormal metabolic activities in carcinogenic facial regions, heat signatures of patients are different from that of normal subjects. Asymmetry of temperature distribution was compared between facial regions (opposite sides of frontal image and between left and right profile images) for patients and normal subjects. The analysis suggested that patients manifest greater asymmetry compared to normal subjects. This project requires only a one-time investment of a long infrared thermal camera, image processing and machine learning software and a laptop/workstation. Thus, there is minimal resource requirement. Also, Digital Infrared Thermal Imaging (DITI) has no recurring or maintenance cost. The image acquisition protocol is so simple that even a high school student can acquire the images. It provides on-spot oral-cancer screening facility and is portable. Thus, screening camps can be organised even in remote villages with minimal infrastructure. As DITI has no recurring cost, it can be scaled up to cater the huge population of developing countries like India.



Setup for capturing facial thermal image using FLIR T 650 SC camera



Prior Art Search:

No patent or published article is found.

Madhav Aggarwal

Mohd. Suhail

Bhavesh Pachnanda

Navyo - The Smart Glove

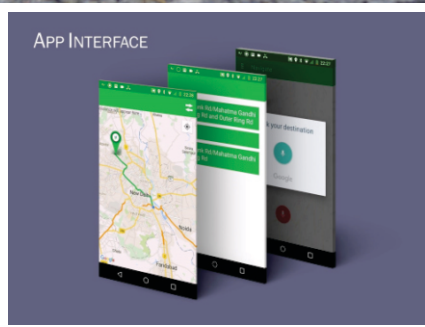
Madhav Aggarwal, Mohd. Suhail, Bhavesh Pachnanda
Delhi Technological University, Delhi

Guide :
Dr. Vikas Rastogi

In the midst of the fast paced life and era of technology, a blind person is still in state of confusion that how will he/she manage to reach his/her destination. Due to his/her impairment, he/she is unable to find his direction (i.e. from where to take a left or a right turn) and eventually gets lost every now and then. So, another person becomes necessary for guiding him along the path. This makes him/her highly dependent on others for his mobility. With this, not only does he reduce his productivity but also, loses his freedom and confidence to walk alone. So, to cater the aforementioned problem a smart glove that will guide the person turn by turn to reach the destination via vibrations is created.

Navyo is accompanied by a mobile App, interface of which is simple and easy to use. User simply needs to speak out the destination in App. Navyo then connects to app via Bluetooth and the person is ready to go. As per the map, when the left turn approaches, the frequency of vibration also starts increasing in left portion of hand indicating left turn and stops when turn is taken. This way by following different vibration patterns at different maneuver points (i.e. right turn, overhead bridges, underpass etc) destination can be reached out easily. In case, user has missed out any vibration instruction on glove, then it can be repeated by simply pressing a button on Navyo.

The solution is based on haptic feedback technology which is safe and non-distractive from blind person's point of view. Also, this solution provides the hassle-free way for navigation by allowing user to speak the destination and walk with mobile phone inside pocket/purse etc.



Swayam FM

Swayam U deck battery

Prior-Art Search:
No patent or published article is found.

Dr. Parikshit Moitra

Dr. Deepa Bhagat

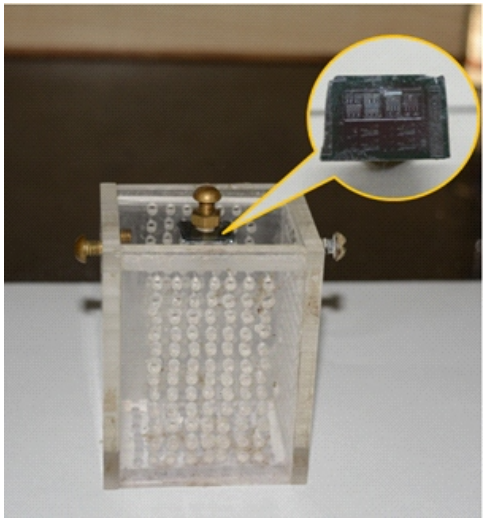
A Novel Bio-engineering Approach to Generate an Eminent Surface Functionalized Template for the Selective Detection of Female SexPheromone of Certain Agriculturally Hazardous

Dr. Parikshit Moitra, Dr. Deepa Bhagat
Indian Institute of Science, Bengaluru

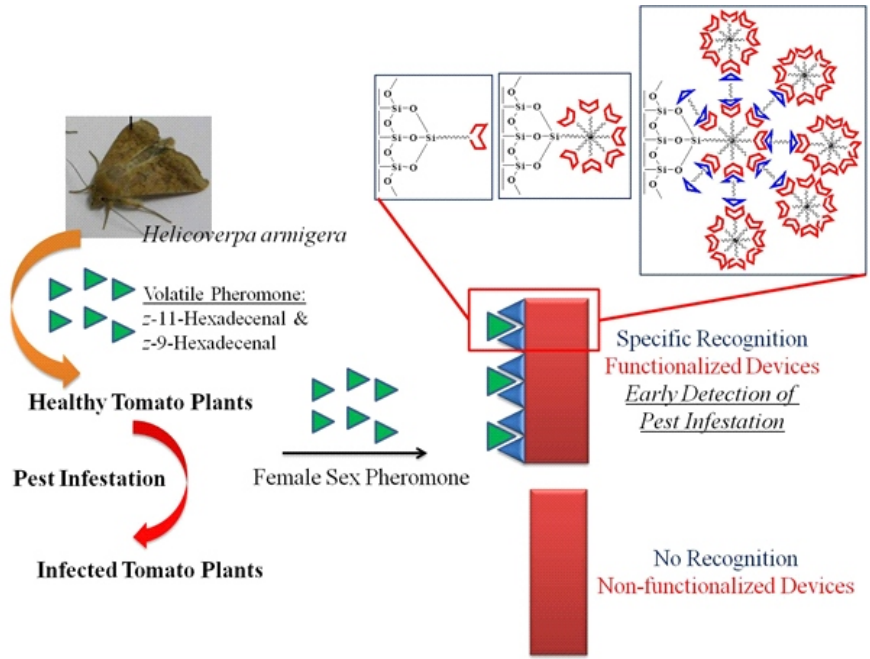
Guide :
Prof. Santanu Bhattacharya

Plant pests exert serious effects on food production due to which the global crop yields are reduced by ~20-40% per year, as estimated by FAO. Hence to meet the world's food needs, loses of food due to crop pestsmust be reduced. Herein silicon dioxide or zinc oxide based MEMS devices are covalently functionalized for robust and efficient optical sensing of the female sex pheromones of the pests like Helicoverpa armigera, Scirpophaga incertulas and Bactocera oleae for the first time in literature. The relative sensitivity of the functionalized MEMS devices is improved by the variation in functionalization protocols that either increased the number of amine or β-cyclodextrin functionalities on each anchor site. The functionalized devices are also capable of selectively measuring the concentration of this pheromone at the femtogram level which is much below the concentration of pheromone found at the time of pest infestation in an agricultural field.

Again, the reversible use of the functionalized devices in any season under ambient conditions, photochemical and thermal stability of the devices and absolutely trouble free transportation of these pheromone nanosensors heightens their potentials for commercial use. Overall, a novel and unique approach is reported herein for the selective and reversible sensing of female sex pheromones of certain hazardous pests which may be efficiently and economically carried forward from the research laboratory to the agricultural field to determine the stage of prior pest infestation. Necessary actions can then be taken as and when necessary in a confined region of alerted pest attack.



Prototype



Prior-Art Search:

1. Santanu Bhattacharya, Parikshit Moitra and Deepa Bhagat. Surface Functionalization for Sensing of Volatile Organic Carbonyl Compounds. Indian Patent Granted (IN 2014CH05166 A 20160701). **2.** Santanu Bhattacharya, Rudra Pratap, Parikshit Moitra, Deepa Bhagat. A Pheromone Detector. Indian Patent Granted (IN 2014CH05201 A 20160701). **3.** Santanu Bhattacharya, Rudra Pratap, Parikshit Moitra, Deepa Bhagat. Forecasting of Pest Incidence: A Unique Surface Functionalized Template for the Selective Detection of Pheromone of the Olive Fruit Fly, Bactocera oleae. Indian Patent Granted (IN 2015CH03696 A 20170120).

Sachin. N. P

Vimal. C

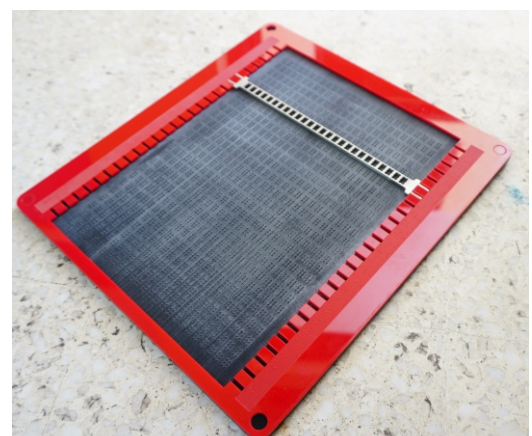
ANUBHAV – An Efficient Writing Tool for Visually Impaired

Sachin. N. P, Vimal. C
Indian Institute of Technology, Kanpur

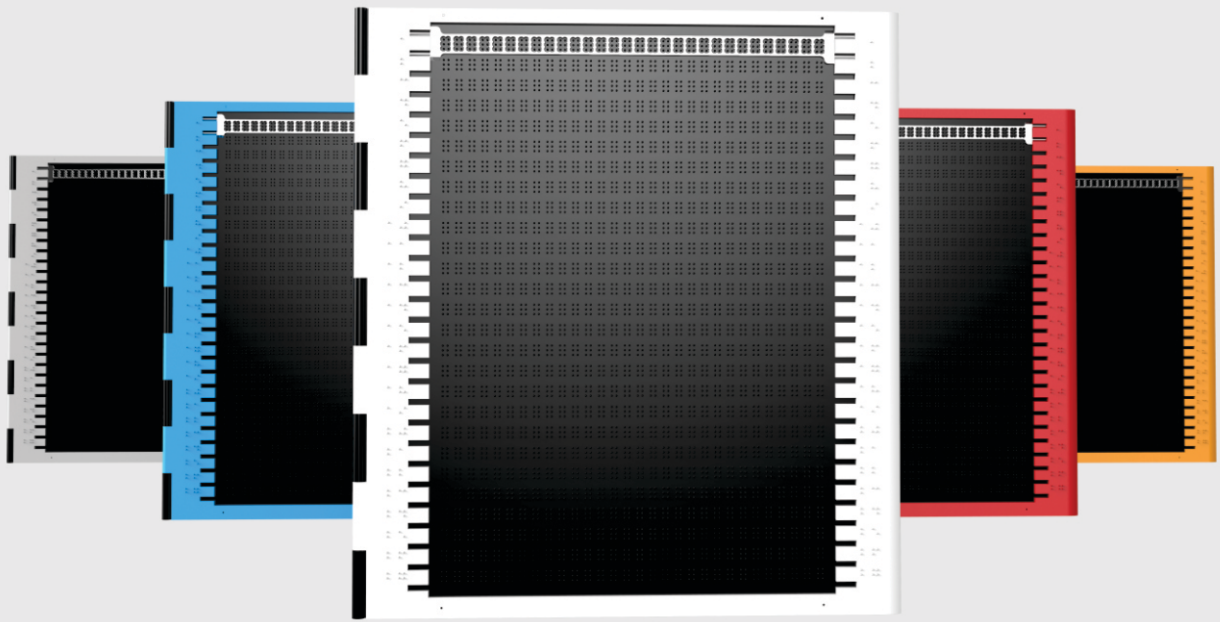
Guide :
Prof. Shantanu Bhattacharya

Currently several tools are available in the market which help people with visual disability to perform everyday functions like read, write, navigate, have food, use ATM etc. The writing tools that are available today do not allow the users to write from left to right which seems natural. It has to written backwards and the paper has to be reversed to read the written text. As a consequence of this, they are unable to read what they have just written effectively. This makes mathematical operations a difficult task as they will have to remember too many numbers and positions. A Taylor slate attempts to solve this problem but requires the user to learn a whole new device and is still slow in its operation. It relies on inserting pegs into holes. Being visually impaired it is very possible that the users may misplace the pegs. Also, the device is heavy and bulky.

This project solves the problems of writing and performing mathematical operations in a single device which uses the same technique which visually impaired people have learnt for writing in an affordable and user friendly package.



Prototype



Final Product

Prior-Art Search:

1. US Patent: US4277239A, Date of patent: July 7, 1981
2. US Patent: US3340625A, Date of patent: Sept 12, 1967

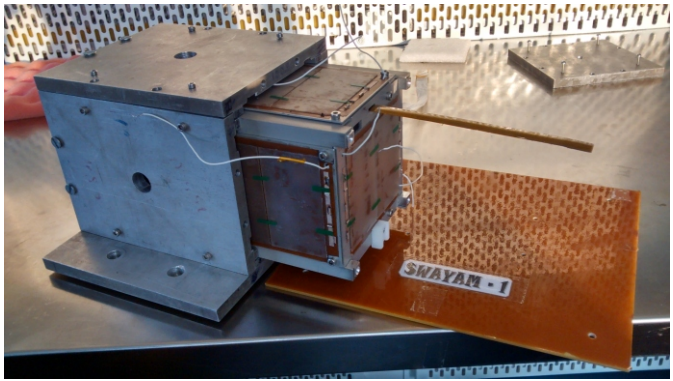
COEP Satellite Initiative

Swayam- Passively Stabilized Communication Satellite

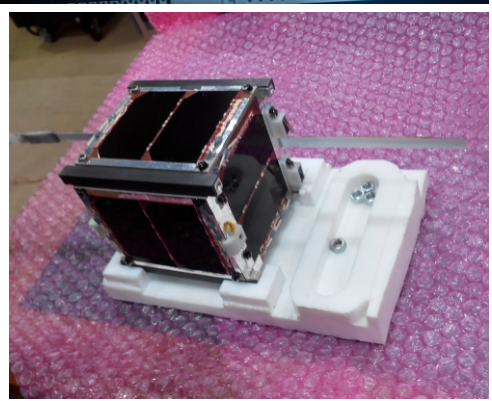
COEP Satellite Initiative
College of Engineering, Pune

Swayam is a pico-satellite developed by undergraduate students of College of Engineering, Pune. Swayam is a passively stabilized communication satellite of dimensions 10 X 10 X 11.35 cm and mass 990 g. Swayam was launched by ISRO on 22nd June, 2016 by PSLV-C34. Swayam is currently in-orbit and data is being downlinked at COEP ground station and analysed on a regular basis. Student satellites offer a distinct challenge in terms of reliability and interdisciplinary nature of design. To achieve the highest standards of design and fabrication, the project was organized into five constituent subsystems. Attitude control is achieved by a passive magnetic attitude control system to satisfy the space and energy constraints. This system consists of an orthogonal arrangement of magnet and hysteresis rods. Volume, strength and placement of magnetic materials are the major design considerations. A numerical simulation has been developed to conclude the effect of various design parameters on stabilization time and its feasibility for the communication payload.

Swayam has a half-duplex communication subsystem. Beam of the antenna is optimized to offer maximum communication link time in conjunction with the available pointing accuracy. To satisfy the power budget of the satellite, the autonomously sent beacon is sent at lesser power than the digital payload data. The power subsystem of the satellite is fully analog capable of functioning independently. Swayam as a template is ideal for carrying low profile payloads which do not require magnetically clean environment. Swayam is also an experiment which shows the cohesive application of passive stabilization for a communication satellite in low power environment.



Swayam in INLS



Swayam FM

Swayam U deck battery

Prior-Art Search:

1. An optimal attitude control of small satellite with momentum wheel and magnetic torquerods by Zhang Fan et al.

2. Passive 3 axis attitude control of MSU-1 pico-satellite by Marcela I. Martinelli et al.

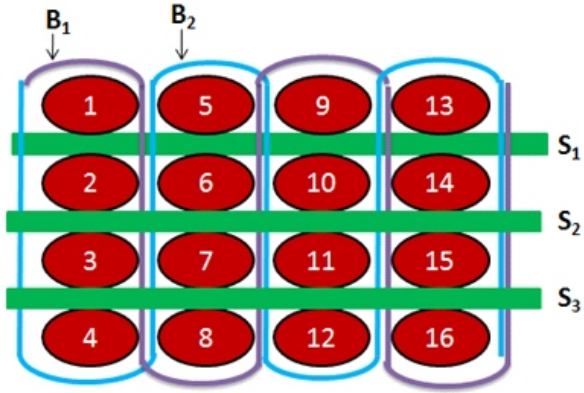
Animesh Laha

Indigenous Technology of Soft Body Armour for Defence Applications Using 3D Woven Aramid Fabrics

Animesh Laha
Indian Institute of Technology, Delhi

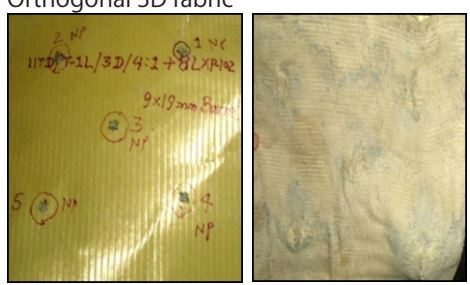
Guide :
Dr. Abhijit Majumdar

Soft body armours are developed by using multiple layers of high performance fabrics. Generally, 30-40 layers of 2D fabrics woven aramid fabrics (Kevlar, Technora etc.) or ultrahigh molecular weight polyethylene (UHMWPE) sheets are assembled together to make soft armour panel which becomes heavy and inflexible. In this innovation, two approaches have been amalgamated to reduce the weight of body armour. 3D fabrics, in which yarns are arranged in three perpendicular directions, namely X, Y and Z were produced in the laboratory. 3D fabrics were then treated with shear thickening fluid (STF). STF treated 3D fabric prototypes developed in this research have been tested against 9 × 19 mm bullets (430 m/s). Soft armour panel having STF treated 3D fabrics stopped bullets fired at 430 m/s. The areal density of the panels was 4500 g/m square. Moreover, the depth of back face signature for these fabrics was varying from 31 to 39 mm which is within the acceptable limit (44 mm). The panel containing STF treated 3D fabric showed dome formation, crack generation and fibre breakage to a lesser extent as compared to those of fabric panels containing untreated 3D fabrics.



Orthogonal 3D fabric

Backing material deformations after BFS test



Face side (left) and back side (right) of STF treated fabric panel after BFS test

Prior-Art Search:

1. Wetzel, E.D., Lee, Y.S., Egres, R.G., Kirkwood, K.M., Kirkwood, J.E., Wagner, N.J., 2004, The effect of rheological parameters on the ballistic properties of shear thickening fluid (STF) Kevlar composites, Numiform, 13–17th June.

2. Chitrangad, 1993, Flourinated Finishes for Aramids, U.S Patent, US5266076 A.

3. Chitrangad, 2000, Aramid Ballistic Structure, U. S. Patent US6030683 A

Avisek Barla

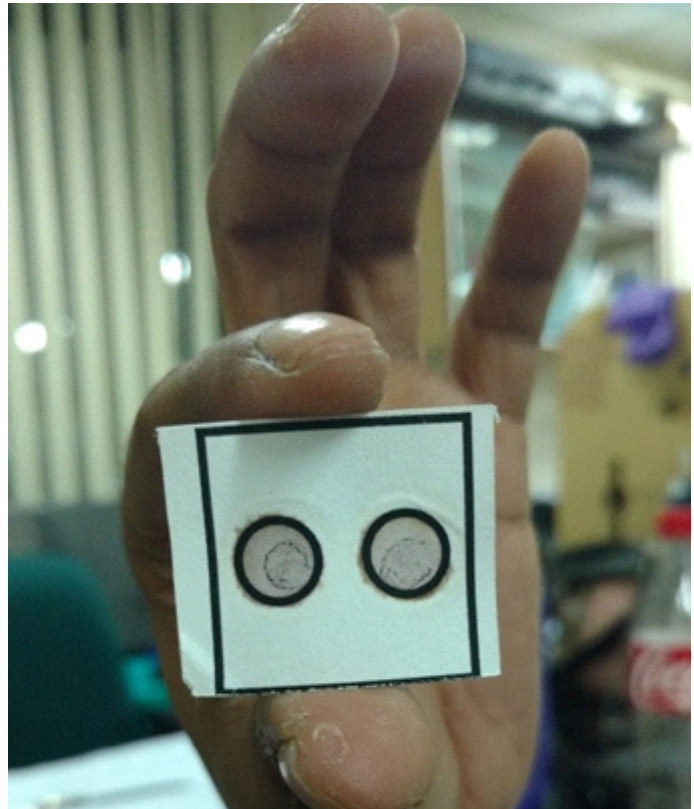
Affordable Paper Microfluidic Device for Blood Glucose and Cholesterol Detection

Avisek Barla, Abrar Ali Khan, Sameer Sharma, Vijay Anand, Nitish Kumar Singh
Indian Institute of Technology, Madras

Guide :
Dr. Vignesh Muthuvijayan

Non-communicable diseases (NCDs) can easily be held responsible for majority of the deaths worldwide and India is no exception. The work is done on detecting diabetes, cholesterol and predict its cumulative effect. There are specific cases of brain stroke leading to complete or partial paralysis including severe cognitive impairment in the long term. The huge demand for diagnosis has flooded market with Point of Care devices for diabetes, but not yet for cholesterol.

The cost of an average device is Rs 800-1500 in the market, but in this project, the price point of the strips used is around Rs 15-50. Thus, a low-cost paper based sensor meant for the masses is made. One would require to add a few drops of blood to the device and colour change will happen in the specified region. A camera is used to quantify and measure colour to display the concentration. The data collected will be used to map the prevalence of the disease and predict the occurrence of strokes. The work is in the process of making a blood drawing mechanism and plasma separation unit which will complete the picture of a true consumer device at nominal price.



Prototype

Prior Art Search:
No patent or published article is found.

Ankit Shah

Benjamin Elizalde

Rohan Badlani

Never Ending Learning Of Sound

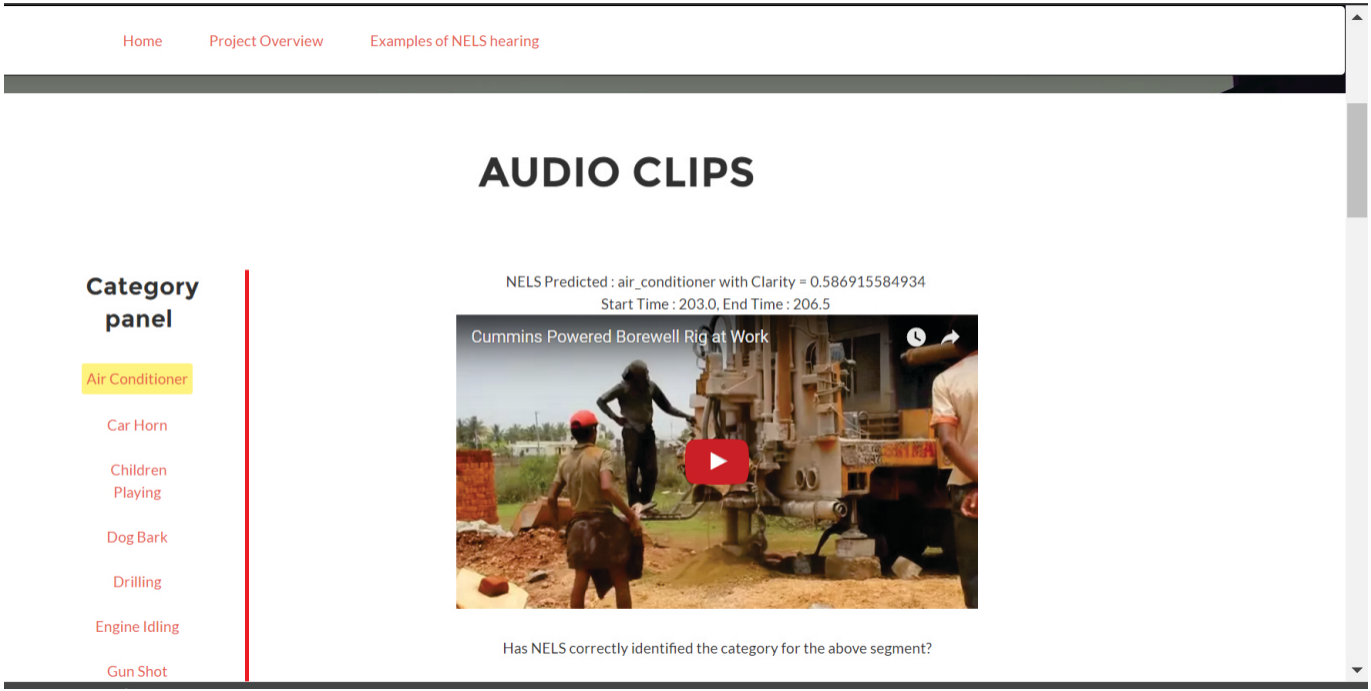
Ankit Shah, Rohan Badlani, Benjamin Elizalde, Anurag Kumar
National Institute of Technology, Surathkal

Guide :
Prof. Bhiksha Raj

Sound recognition is critical to the development of artificial intelligence. However, sound recognition remains an arcane task for computers, given the incomplete understanding of how humans are able to recognize sound and understand its meaning naturally. Never Ending Learning of Sound (NELS) is a system that will continuously learn about sounds through direct supervision or automatically, and expand its vocabulary of sounds through analysis of audio and multimedia recordings and their corresponding metadata. It will eventually present a comprehensive repository of sounds - an invaluable resource in many fields - ranging from automatic video content analysis to audio forensics. India is on its path to a digital transformation, and a semantic understanding of sounds from NELS will help create smarter cities, robotics, automated surveillance systems and will also redefine tangible experiences for approximately 60 million deaf people in India.

NELS will identify known sounds and detect the occurrence of new. Then, learn to recognize new sounds and associate their semantics and metadata to increase its vocabulary. It will also learn hierarchies in the structure of sounds, learn physical and common-sense structural and temporal relationships between sounds, and associations between sounds, their meaning and semantics and categories. NELS system will provide the largest and most up-to-date available repository of sounds in the world.

Anurag Kumar



NELS Website: http: //nels.cs.cmu.edu/

Prior Art Search:

No patent or published article is found.

OCR++: A Robust Framework For Information Extraction From Scholarly Articles

Mayank Singh, Barnopriyo Barua, Priyank Palod, Manvi Garg, Sidhartha Satapathy, Samuel Bushi, Kumar Ayush, Krishna Sai Rohith, Tulasi Gamidi

Indian Institute of Technology, Kharagpur

Guide :

Dr. Pawan Goyal and Dr. Animesh Mukherjee

Mayank Singh

Barnopriyo Barua

Priyank Palod

This project proposes OCR++, an open-source framework designed for a variety of information extraction tasks from scholarly articles including metadata (title, author names, affiliation and e-mail), structure (section headings and body text, table and figure headings, URLs and footnotes) and bibliography (citation instances and references). A diverse set of scientific articles written in English to understand generic writing patterns and formulate rules to develop this hybrid framework is analysed. Extensive evaluations show that the proposed framework outperforms the existing state-of-the-art tools by a large margin in structural information extraction along with improved performance in metadata and bibliography extraction tasks, both in terms of accuracy (50% improvement) and processing time (52% improvement). A user experience study conducted with the help of 30 researchers reveals that the researchers found it to be very helpful.

Manvi Garg

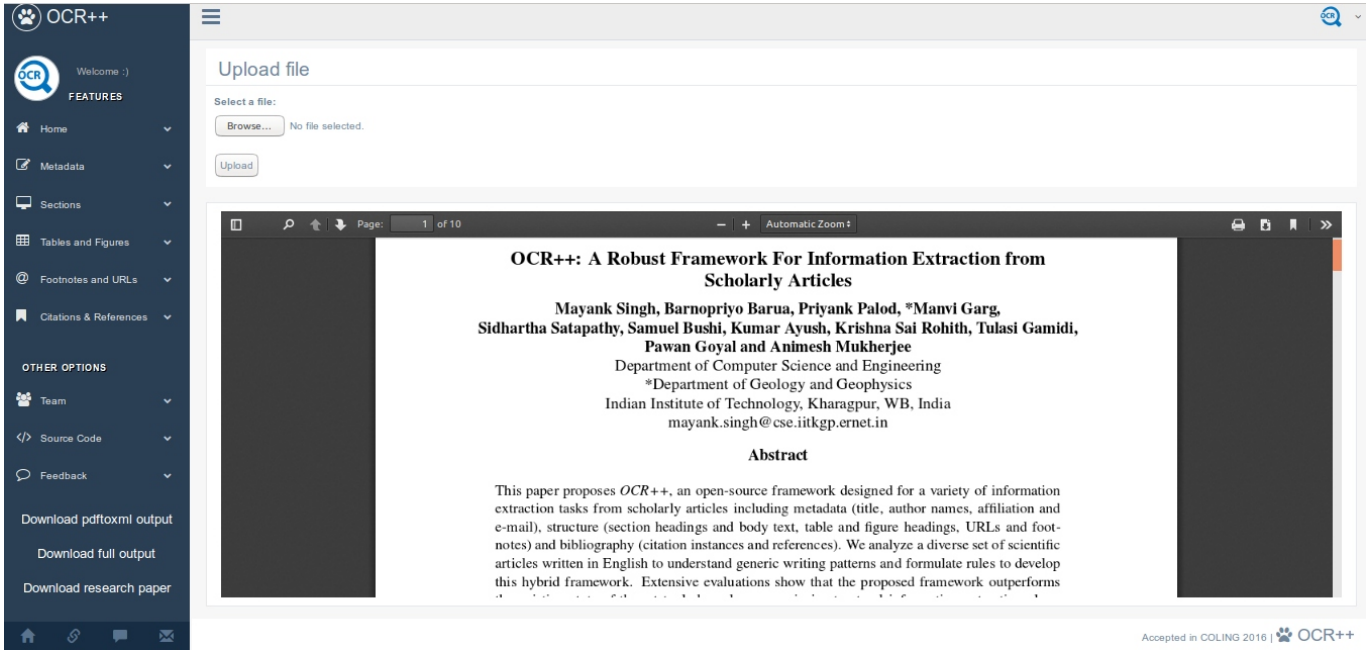
Kumar Ayush

Sidhartha Satapathy

Krishna Sai Rohith

Samuel Bushi

Tulasi Gamidi



Website: http: //www.cnergres.iitkgp.ac.in/OCR++/home/

Prior Art Search:

No patent or published article is found.

Sanjay Kumar

Pulak Bhushan

Paper-based device for rapid detection of Dengue

Sanjay Kumar, Pulak Bhushan
Indian Institute of Technology, Kanpur

Guide :
Prof. Shantanu Bhattacharya

Dengue virus is diagnosed using conventional techniques like PCR (polymerase chain reaction) and ELISA (enzyme-linked immunosorbent assay), and even though these methods are highly accurate they need a highly clean lab and expert people to perform these tests. They are also highly expensive and time consuming. The previously developed devices have one major limitation from the commercial point of view. They utilize saliva or serum as their samples. Even though they are an important source of biomarkers and have less interference, they require pre-processing before they can be used. The pre-processing can only be done in a laboratory rendering it useless for developing commercially available lateral flow test strips. Several rapid diagnostic devices are available in the market for detection of dengue. The devices that detect NS1 are only capable of doing so after 3-4 days, since that is when the concentration of Ns1 increases to a considerable amount. Whereas, the devices that can detect IgM and IgG, suffer from the problem that these antibodies are produced in the body only after 4 days and 7 days respectively (primary infection), hence rendering them useless for early detection purposes.

The primary objectives of this project are as follows:

Development of a device which can detect dengue NS1 in the first 1-2 days itself, when the concentration of NS1 is considerably low. This shall make the device capable of providing an early diagnosis which will further aid the doctors in treating the patients in an effective way.

Using whole blood as the sample, eliminating the need of pre-processing which requires external equipment and expertise..

a. Photograph of the assembled device
b.Top part of the cassette
c. Bottom part of the cassette

Prior Art Search:

No patent or published article is found.

Trolley Straw Baler by Ram Compressing Mechanism with Traction Force

Ramalingam P. L., Prakash M., Prabhu M., Jayaprakash P. S., Logesh C
Panimalar Institute of Technology, Chennai

Guide :
R. Vigithra

Ramalingam P. L.

Prakash M.

Prabhu M.

Straws are left over branches of paddy and wheat after harvesting. The existing system runs by means of drawing power from the engine of the tractor. The machine is coupled by means of PTO shaft. The existing systems cannot be used separately without tractor. The cost of the existing systems ranges from ₹ 3 lakh to ₹ 5 lakh. These systems are not affordable to small scale farmers. The mechanism involved is highly complex and so it needs skilled person to operate. Manual collection of straws takes more time and increases the labour cost. The system is designed for making it affordable to everyone using simple mechanism. The trolley straw baler consists of an inclined plate which conveys the straws during forward motion to the collector container. At the same time, due to rotation of wheels, the sprocket attached to it gets rotated, this rotation is transferred to the crankshaft by means of chain and then this rotation is converted into reciprocating action to ram. During the forward stroke, ram moves over the guide way and collect the straws. During the backward stroke, ram moves over the guide way and compress the collected straws. Finally, the collected straws are made into bundle by using the ropes present in the setup. This project is feasible and more than the feasibility this straw collector is highly efficient and affordable to all small-scale farmers in India. The main objective of making a mechanism that would collect and compress the straws with reduction in cost is successfully proven experimentally.

Jayaprakash P. S.

Logesh C

Prior-Art Search:
The inventor has filed for 2 patents on his works on straw baler and multipurpose wheelchair in India.

Anusha Vadde

Enhancement of Distribution System Performance using High Voltage Alternating Current (HVAC) Boost Converter and Fuzzy Controller

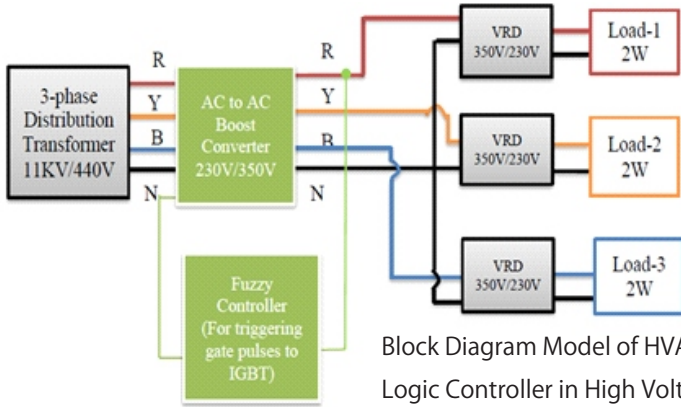
Anusha Vadde
M. S. Ramaiah University of Applied Sciences, Bengaluru

Guide :
V. S. N. Sitaramgupta V.

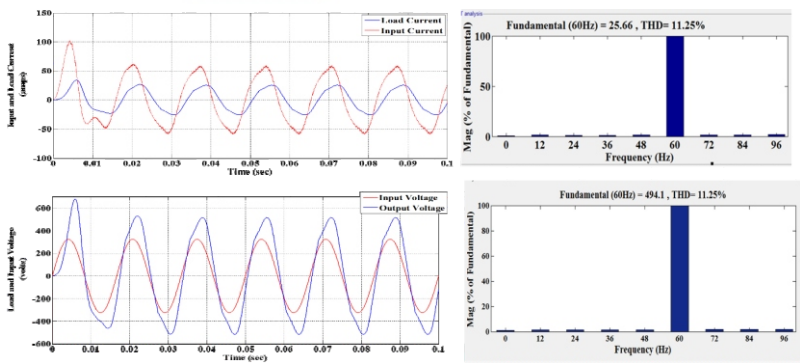
Power quality is one of the key factor in electrical systems and is taken into consideration to meet the demands of the customer. Voltage dips, momentary interruptions, harmonics and transient surges affect the reliability and quality of the power supply. The reliability and cost of any electrical system depends on the quality of the supplied power and consumed by the system. High Voltage Distribution System (HVDS) is one of the methods used to improve the quality and reliability of the distribution system through a reduction in losses, voltage fluctuations and power consumption.

In HVDS, power is transmitted from the distribution station to consumer premises through the booster transformers and voltage regulators. Inrush currents or magnetizing currents and heating of insulation have been observed in transformers due to non-linear loads. As a result, the current drawn by the system is high. To overcome these effects, a step-up power converter with fuzzy controller has been designed. In this research work, High Voltage Alternating Current (HVAC) Boost Converter with fuzzy controller has been proposed for a cost-effective solution to reduce distribution losses. Simulation studies have been carried out for verifying the utilities of the proposed design.

The performance of the designed fuzzy logic controller is compared with that of the existing booster transformer scheme by using the simulations. It has been found that the efficiency is improved by 4%, and power losses are reduced by 1.4% to maintain the voltage fluctuations within the acceptable levels. The proposed controller in the case study of old city area in Hyderabad has been shown that revenue savings are increased by 12%.



Block Diagram Model of HVAC Boost Converter using Fuzzy Logic Controller in High Voltage Distribution System



Single phase output voltage, Input current and output currents of HVAC boost Converter using Fuzzy Controller

Prior-Art Search:

Vadde, A. (2015, December). Enhancement of distribution system performance using HVAC boost converter and fuzzy controller. In 2015 Annual IEEE India Conference (INDICON) (pp. 1-5). IEEE

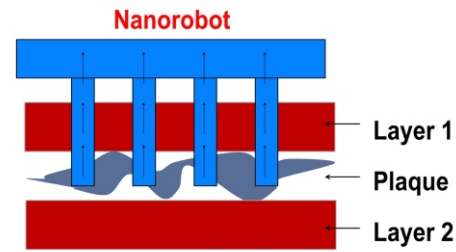
Mallikarjunachari G

Design of a Mechanical Device (Nanorobot) for Diagnosis and Removal of Plaque from Human Heart Artery System

Mallikarjunachari G
Indian Institute of Technology, Madras

Guide :
Dr. Pijush Ghosh

Plaque is full-of-fat (waste) substance that forms in between the heart artery layers. The growth of this waste at the interface of the two layers block the blood flow and finally leads to the heart attack. Identification of plaque growth and removal of the plaque from the interface are two major challenges for the research community. There are many mechanical devices to remove the plaque from heart artery. However, there are certain limitations in the device features. For example, Pantheris is one of the tools that are using to remove plaque, and the restriction of this tool is the diagnosis. In this research, it is aimed to design a mechanical device which can be utilized for both sense as well as waste removal. The proof of concept explained in this research work. The conditions of the waste growth at the interface of the artery layers with two polymer thin film materials is mimicked.



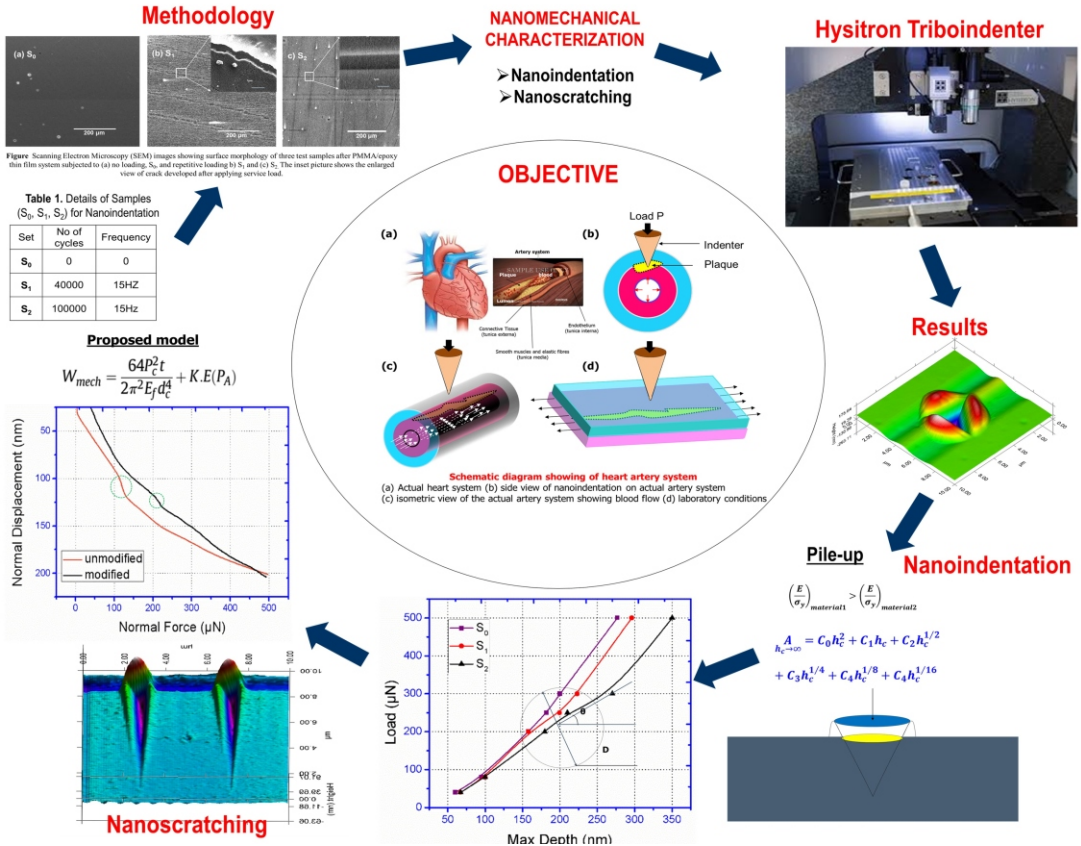


Figure Scanning Electron Microscopy (SEM) images showing surface morphology of three test samples after PMMA/epoxy thin film system subjected to (a) no loading, S_0, and repetitive loading b) S_1 and (c) S_2. The inset picture shows the enlarged view of crack developed after applying service load.

Table 1. Details of Samples (S_0, S_1, S_2) for Nanoindentation

Set	No of cycles	Frequency
S_0	0	0
S_1	40000	15HZ
S_2	100000	15Hz

$$\left(\frac{E}{\sigma_y}\right)_{material1} > \left(\frac{E}{\sigma_y}\right)_{material2}$$

$$\frac{A}{h_c \to \infty} = C_0 h_c^2 + C_1 h_c + C_2 h_c^{1/2} + C_3 h_c^{1/4} + C_4 h_c^{1/8} + C_4 h_c^{1/16}$$

Prior Art Search:

No patent or published article is found.

Santanu Talukder

"Electrolithography"- A Novel Nano Patterning Technique Using Electric Field Induced Material Transport

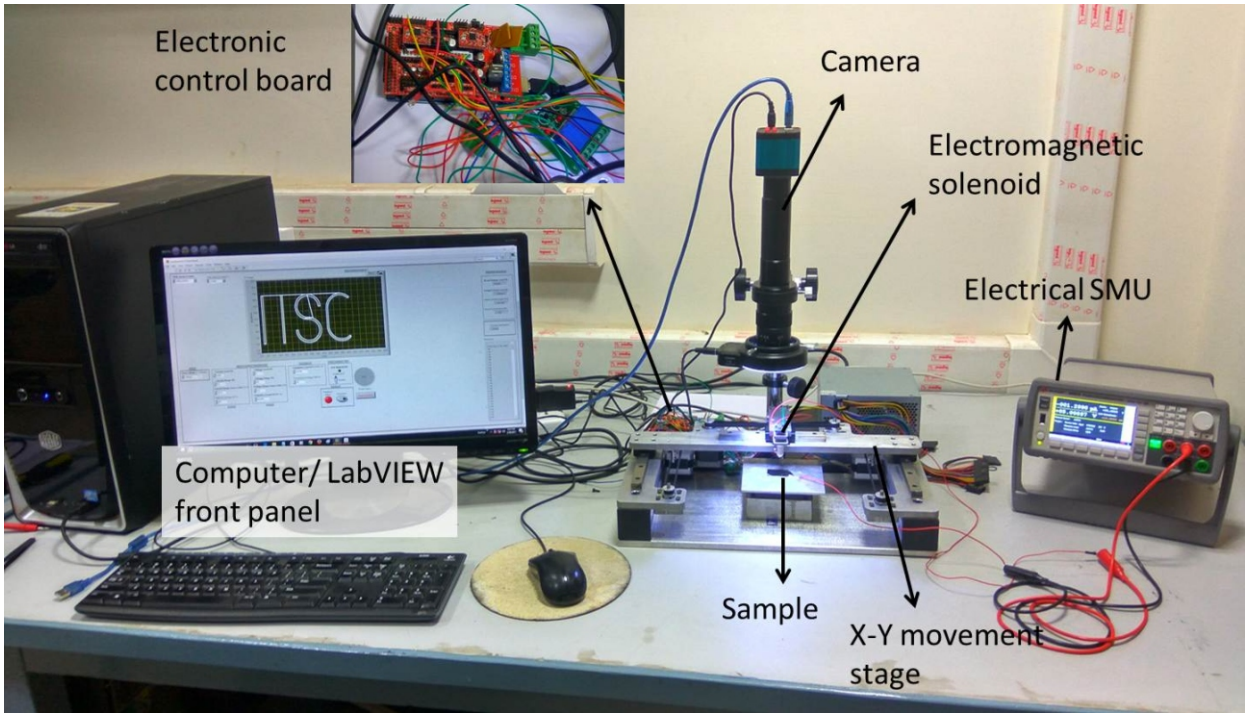
Santanu Talukder
Indian Institute of Science, Bengaluru

Guide :
Prof. Rudra Pratap, Dr. Praveen Kumar

In this work, electrolithography is introduced — a new nano patterning technique based on electric field induced material transport. Electrolithography can be used for drawing patterns having dimensions from a few nanometres to a few hundred micrometres. It does not need any UV or e-beam sources like existing lithography techniques, and can be performed in ambient condition.

It is discovered that electric current assisted by joule heating can induce long range flow of material on thin metal films, such as Cr. This phenomenon is known as liquid electromigration. In electrolithography, a thin Cr film is used as a masking layer and a polymer layer beneath it as a pattern transfer layer. A negatively biased scanning probe is used to etch metal according to the desired pattern. Once the metal is etched, the pattern is transferred to another material by subsequent development of polymer, deposition of new material and lift off.

Using this technique, best resolutions achieved are of 9 nm on the polymer, and 40 nm on transferring the pattern to another material. Depending on the probe diameter and speed, throughput for this process has been achieved in the range 10^6 to 10^9 $\mu m^2/h$, which is considerably higher than the conventional scanning probe lithography (SPL) techniques. In electrolithography, polymer is used only to transfer the patterns. Hence, any polymer and corresponding developer can be used in this process thereby, removing need of costly and toxic chemicals from lithography processes. It also demonstrates direct writing or resist less patterning for making mask using this technique.



Prototype system for performing electrolithography

Prior Art Search:

No patent or published article in Electrolithography or electromigration induced scanning probe lithography (both patent and non-patent database) is found. In this project (electromigration induced patterning) following patent is filed.

Patent: A device, system and method generating structures on a substrate by electromigration, S. Talukder, P. Kumar, and R. Pratap, Indian patent application IPA12130001 (9 December 2014).

Prasobhkumar P. P.

Cost Effective Inspection System for Automated Large Scale Cocoon Quality Assessment

Prasobhkumar P. P.
Indian Institute of Science, Bengaluru

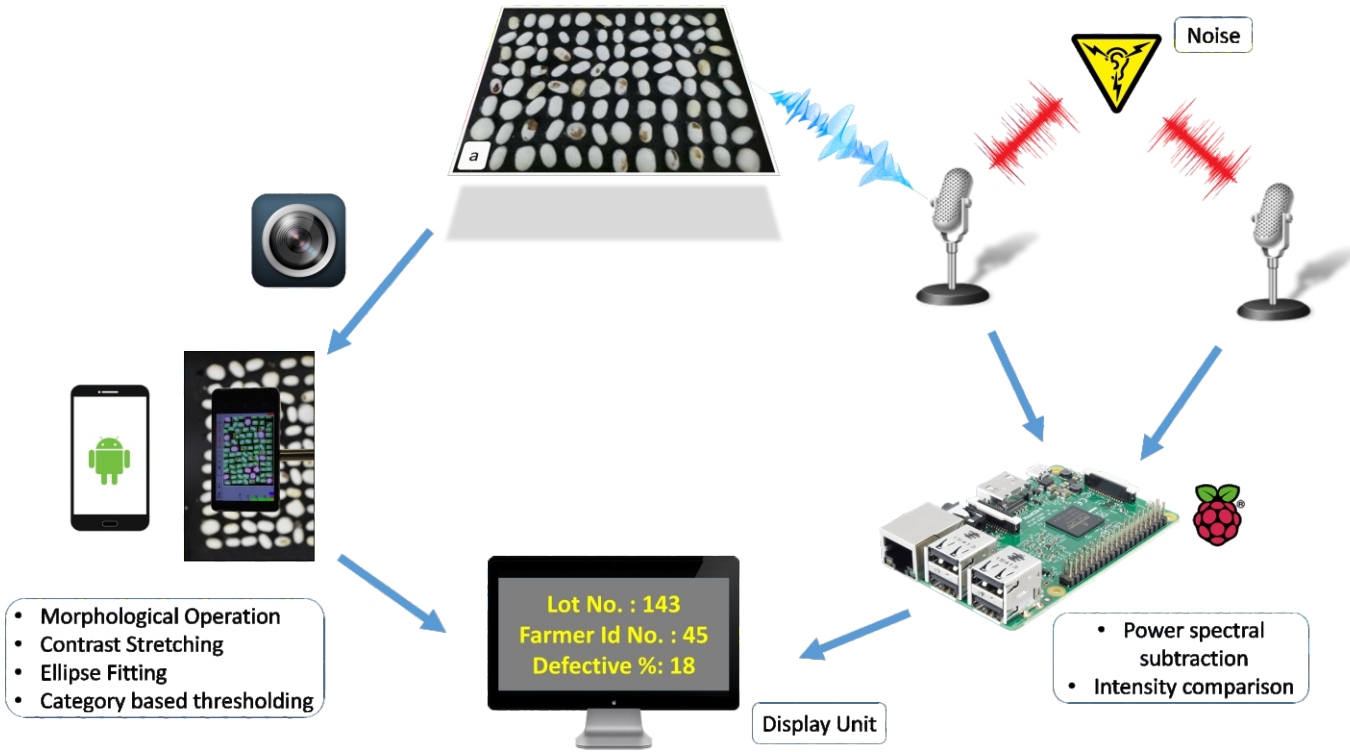
Guide :
Dr. Sai Siva Gorthi, Prof. C. R. Francis

Currently in the cocoon market, quality assessment of cocoon is done manually, only for a few random lots, due to the time constraint and lack of equipment. This method is subjective, prone to human errors, skilled laborer dependent and time-consuming. The random sample testing and inherent errors, adversely affect the farmers as well as the silk reelers. This proposed automated quality assessment system for cocoon that is more economic, accurate, faster and easier to use as compared to the manual method.

The developed system consists of two functional blocks, image processing and acoustic emission processing units.

The former consists, conditioned illumination, image acquisition, and processing unit (smartphone). The cocoons were rolled over a slope to expose the whole surface of the cocoons to smartphone. Subsequently, on the screen of the camera, the defective cocoons are highlighted and also provided the statistical information along with the alert feature. The algorithms used category specific thresholding, morphological operations, contrast stretching and ellipse fitting to perform automated classification.

The latter consists subunits for cocoon vibration and acoustic emission processing, which classify cocoons based on vibration impact acoustic emissions. The power spectral density (PSD) subtraction is used for background noise reduction. The magnitude of PSD of the noise reduced signal is assessed to identify the category of cocoons. All the major types of defective cocoons are identified with the help of the device. This system will facilitate quality-based-price-fixation with transparency, heralding quality awareness among the cocoon farmers and silk reelers.



Prior-Art Search:

The project is related to cocoon, it does not address defects in silkworm cocoons, not using image and sound processing techniques but uses X rays to discover only living or dead worms.

Akhilesh Kumar Pal

Processing of Biodegradable Films for Food Packaging Application with High Oxygen Barrier Properties

Akhilesh Kumar Pal
Indian Institute of Technology, Guwahati

Guide :
Dr. Vimal Katiyar

This invention discloses the synthesis of biodegradable, non-toxic polysaccharide based additive within an hour by an elegant and industrially viable technique, which is capable to reduce oxygen permeability (OP) up to 10 folds after dispersing small load of additive (~5 wt%) in poly (lactic acid) (PLA) using both solution and melt extrusion processes. The OP values of fabricated biodegradable polymer films are comparable to that of commercial polyethylene terephthalate (PET). In a particular case, the synthesis of lactic acid oligomer-graft-chitosan (OLLA-g-CH), a nanoamphiphilic molecule has been performed by in situ condensation polymerization, which is further used as a nano-filler in PLA films to improve multiple physico-chemical and oxygen barrier properties. The uniform dispersion of nanoamphiphilic OLLA-g-CH molecules has been detected in the form of self-assembled micelles having size as low as ~20 nm and as high as ~ 150 nm with core-shell morphology in PLA matrix. The % reduction in OP has been calculated up to ~82% at 25° C and 0% RH conditions, which has further increased up to ~99% at 15° C and 0% RH due to the reduction in solubility of oxygen molecules and improvement in crystal nucleation density due to availability of nano-nucleating sites. The elongation at break has been improved significantly, however the glass transition temperature of bio nanocomposites is decreased by ~18° C with increase in OLLA-g-CH loading, which indicates the improved plasticization characteristics of PLA matrix. Hence, PLA/OLLA-g-CH bio nanocomposite films can be one of the best substitute to increase food shelf life in stringent food packaging applications.

Figure: Pilot plant scale production of PLA grafted chitosan bionanocomposite films **(a)** Twin screw extruder for lab and industrial scale film processing, **(b)** PLA granules coated with grafted chitosan, **(c)** Bionanocomposite film passing through rotating drums, **(d)** Processing of bionanocomposite film, **(e)** Extruded PLA film, **(f)** Extruded PLA grafted chitosan bionanocomposite film and **(g)** Laminated PLA grafted chitosan bionanocomposite film.

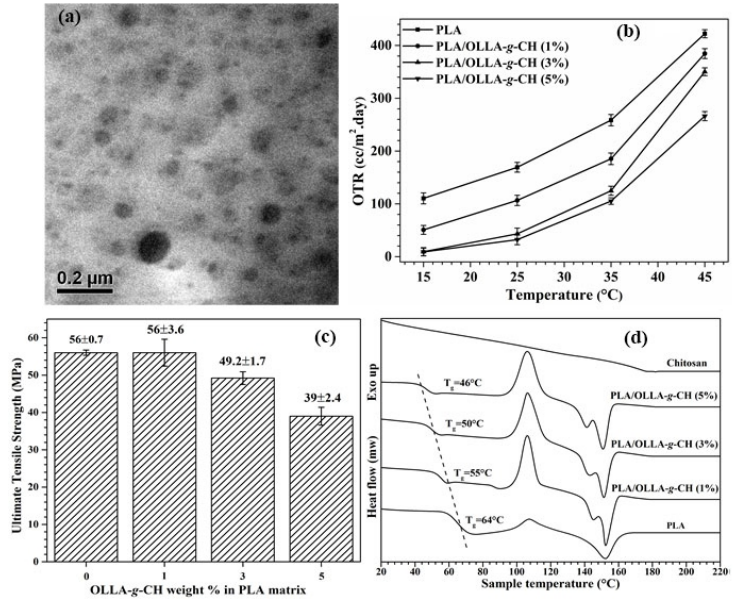


Figure: **(a)** TEM image of grafted chitosan bionanocomposite, **(b)** Oxygen transmission rate analysis at various temperatures, **(c)** Ultimate tensile strength variation with respect to grafted chitosan wt% and **(d)** DSC analysis of extruded PLA grafted chitosan bionanocomposite film.

Prior-Art Search:

1. Suyatma et al., 2004 have reduced the water permeability of chitosan film by mixing PLA as additive.
2. Li et al., 2011 has modified chitosan with PLA by 1-ethyl-3-(3-dimethylaminopropyl) carbodiimide (EDC) mediated coupling reaction.

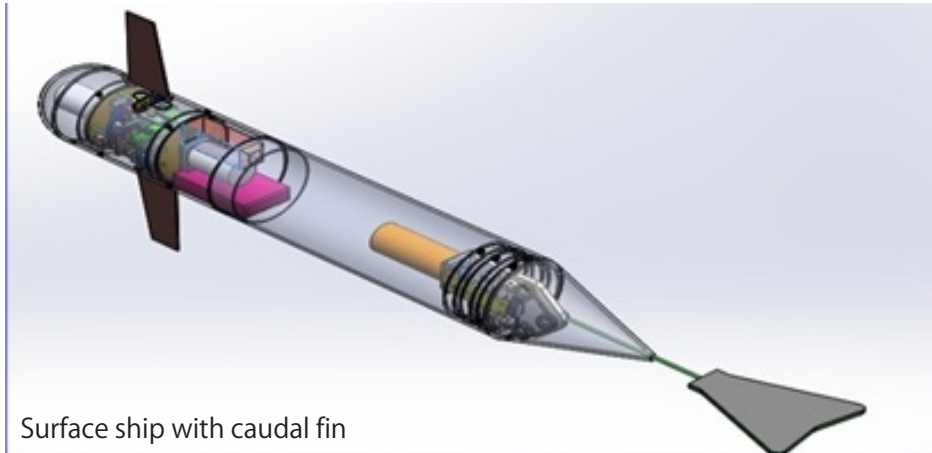
Mannam Naga Praveen Babu

Fish-Inspired Propulsion System for Remotely Operated Surface Ships and Underwater Vehicles

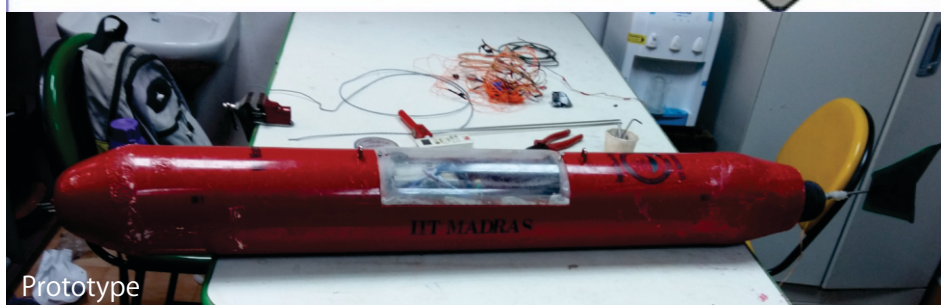
Mannam Naga Praveen Babu
Indian Institute of Technology Madras, Chennai

Guide :
Prof. Krishnankutty P.

The Autonomous Marine Vehicles (AMVs) are much in use for exploring subsea natural resources, monitoring marine pollution, performing hydrographic surveys, etc. Energy for AMV operations are taken from battery cells provided inside the AMV. The energy consumption can be reduced by providing the AMVs with a propulsion system which is more efficient than the conventional screw type thrusters. Recent advances in planetary sciences shows that NASA is trying to explore liquid atmospheres such as methane lakes, icy crust atmospheres in Jupiter's largest moon Europa and Titan planets with the help of robotic eel fish and underwater submarines. The use of marine vehicles on earth ocean's world exploration advances into planetary atmospheres. Compared to conventional marine vehicles, bio-inspired swimming vehicles have shown higher performance in comparison to screw propellers. This performance results in efficient cruising, maneuverability (turning and stopping ability), noiseless motion and eco-friendly. These are defined as fish-like bio-inspired vehicles which propel through undulation or oscillation motion of the fish body or its fins. Flapping foil propulsion are more efficient (80%) than the conventional screw propulsion system (60%). Use of flapping foils also disturbs the water less compared to screw propellers, thus making it more environment friendly and create less noise. With these perspectives under consideration, the present research reports the studies carried out on a remotely operated surface ship model and underwater vehicle fitted with a fin at the aft end, resembling caudal fin of a thunniform fish. The aft (tail) fin has freedom to oscillate in the horizontal plane about the longitudinal axis. Self-propulsion tests are carried out for determining the thrust performance of marine vehicles.



Surface ship with caudal fin



Prototype

Prior-Art Search:

1. Mannam Naga Praveen Babu, Mallikarjuna J M, Krishnankutty P. Hydrodynamic study of freely swimming shark fish propulsion for marine vehicles using 2D particle image velocimetry. Robotics and Biomimetics. 2016;3:3. doi:10.1186/s40638-016- 0036-0.

2. Mannam Naga Praveen Babu, Richards C S, Krishnankutty. P. Powering Prediction of Bioinspired Underwater vehicle with pectoral and caudal fins (Journal Under Preparation).

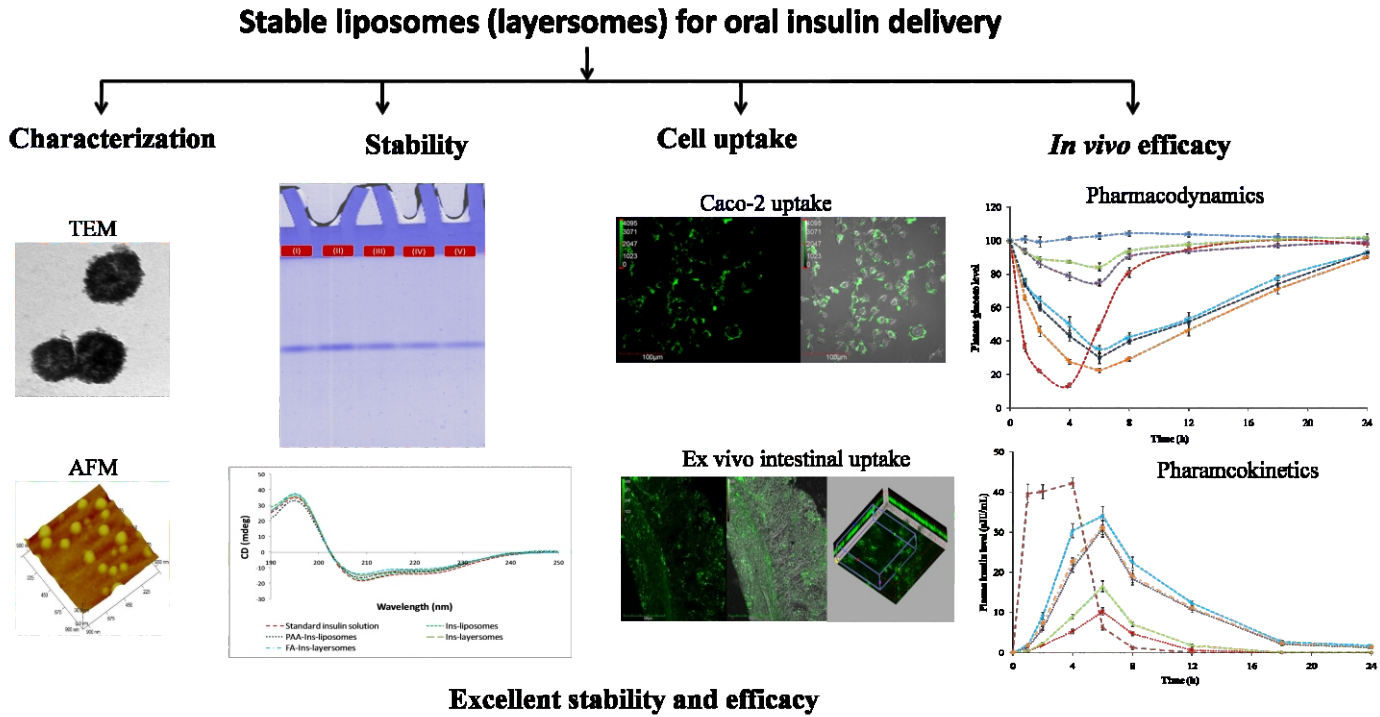
Ashish Kumar Agrawal

Development and Characterization of Smart Nanocarriers for Oral Insulin Delivery

Ashish Kumar Agrawal
National Institute of Pharmaceutical Education and Research (NIPER), Mohali

Guide :
Dr. Sanyog Jain

In the present report polyelectrolytes stabilized liposomes (layersomes) were prepared by alternating coating of oppositely charged polyelectrolytes over the liposome core which resulted into the formation of robust structure "layersomes". Moreover, folic acid(FA) functionalization was done for enhanced uptake and better therapeutic efficacy. Surface morphology was examined by using SEM, TEM and AFM. in vitro release profile was examined in three different media i.e simulated gastric fluid (SGF, pH 1.2), simulated intestinal fluid (SIF, pH 6.8) and PBS (pH 7.4) in order to mimic the bio-environmental conditions followed by a formulation during its entire journey following oral administration. Chemical stability of the insulin, entrapped within the freeze dried FA-Ins-layersomes was confirmed by RP-HPLC method and Native-PAGE. Conformational stability was evidenced by the overlay spectra of CD spectroscopy. The developed layersomes demonstrated excellent stability in simulated biological fluids and during storage at 2-25° C and humidity up to 60±5% for 6 months. FA functionalization demonstrated 3.33 folds higher uptake of FA-Ins-layersomes in comparison with liposomes in Caco-2 cells. In vivo efficacy was performed in diabetic animals. Subcutaneous insulin exhibited severe transient hypoglycemia while oral insulin solution was practically inactive as no blood glucose reduction was observed. FA-Ins-layersomes revealed almost double (1.92 folds) cumulative hypoglycemia in comparison with subcutaneously administered standard insulin solution, Cmax within 6 h and the highest BAR (19.3±1.6) among all the treatment groups. Overall the proposed strategies are expected to contribute significantly in field of designing ligand anchored stable lipidic and polymeric systems in drug delivery.



Prior Art Search:

No patent or published article is found.

Dilshad Ahmad Khan

Faiz Iqbal

Zafar Alam

Design & Development of Automated Five Axis CNC Ball End Magnetorheological Finishing Machine

Dilshad Ahmad Khan, Faiz Iqbal, Zafar Alam
Indian Institute of Technology, Delhi

Guide :
Dr. Sunil Jha

The project is an innovation and technology based work aimed at providing nano level finish on various materials of complex shapes and size. This project is related to the design and development of a fully automated five axis CNC ball end magnetorheological finishing (BEMRF) setup from the conceptual idea to an industry standard machine. The developed machine caters to the demand of today's advanced industries which deals in finishing of 3-D dies, high precision lenses, orthopaedic implants, jewelleries and gems etc.

In the first phase of the project an idea is conceptualized to finish 3-D complex surfaces using magnetorheological polishing (MRP) fluid. After checking the feasibility of the concept, a BEMRF tool is developed which is later mounted on a CNC machine setup. The newly developed finishing process is used to finish ferromagnetic as well as nonmagnetic materials of complex shapes and sizes using specially prepared magnetorheological polishing fluid. Apart from nano finishing on the surfaces, the measurement of surface roughness of the workpiece is also needed to be wear free which is not the case in stylus based measurement systems. Therefore, a non-contact roughness measurement instrument (confocal sensor) is incorporated in BEMRF machine. The confocal sensor is light, compact and easily mounted on the BEMRF tool for quick and error free measurement of surface roughness after the BEMRF process.

In BEMRF machine the forces can be controlled automatically thereby enabling the user to select suitable force according to the material to be finished.

Prototype

Prior-Art Search:

1. Kordonski W, Gorodkin S, Sekeres A "System for magnetorheological finishing of substrates" US patent no.: US 20120164925 A1.

2. Singh A K, Jha S, Pandey P M “Design and development of nanofinishing process for 3D surfaces using ball end MR finishing tool”, International Journal of Machine Tools and Manufacture (2011) 51: 142–151.

Rajan Kumar

Grid Interactive Solar PV Based Water Pumping Using BLDC Motor Drive

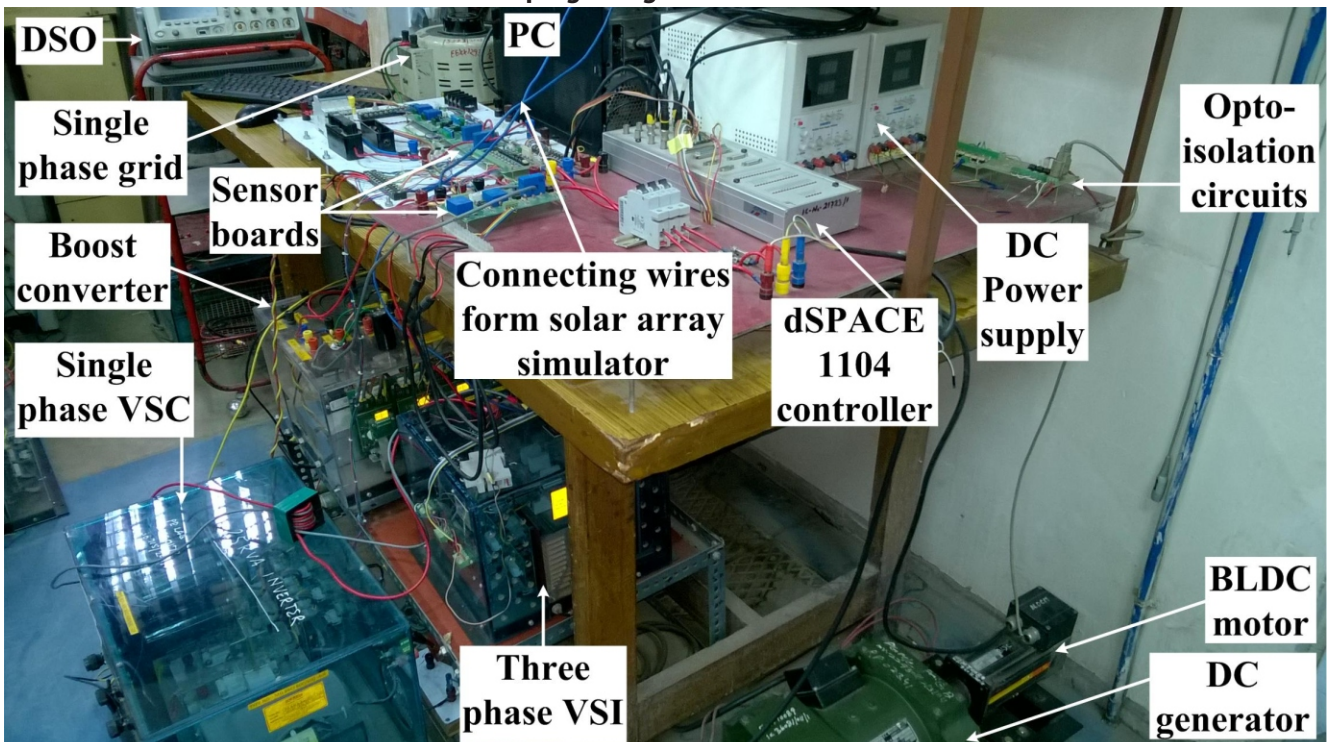
Rajan Kumar
Indian Institute of Technology, Delhi

Guide :
Prof. Bhim Singh

Being a grid-isolated or standalone system, the existing brushless DC (BLDC) motor driven water pumps fed by a solar photovoltaic (SPV) array, rely only on solar PV energy. Due to its intermittency, the solar PV generation exhibits its major drawback which results in an unreliable water pumping systems. In the course of bad climatic condition, water pumping is severely interrupted, and the system is underutilized as the pump is not operated at its full capacity. Moreover, an unavailability of sunlight (at night) leads to shutdown of an entire water pumping system.

This innovation proposes a bidirectional power flow control of a grid interactive SPV fed water pumping system. A BLDC motor-drive is used to run a water pump. This system and control enable a consumer to operate the water pump at its full capacity for 24-hours regardless of the climatic condition and to feed a single-phase utility grid when the water pumping is not required. The full utilization of SPV array and motor-pump is made possible in addition to an enhanced reliability of the pumping system. Using a single-phase voltage source converter (VSC), a unit vector template (UVT) generation technique accomplishes a bidirectional power flow control between the grid and the DC bus of voltage source inverter (VSI) which feeds a BLDC motor. The maximum power point (MPP) operation of SPV array, and power quality standards such as power factor and total harmonic distortion (THD) of grid are met by this system.

Grid Interactive Solar PV Based Water Pumping Using BLDC Motor Drive



Prior-Art Search:

1. Huang, "Photovoltaic Water Pumping and Residual Electricity Grid-Connected System," Chinese Patent CN 204131142 U, Jan. 28, 2015. 2. Zhao Yan, "Photovoltaic Pumping System Using Power Grid as Energy Storage Device," Chinese Patent CN 202455296 U, Sept. 26, 2012.

Arvind Pujari

Shashwat Jain

D V S S S Kushal Kumar Reddy

A Mechanism for Toilet Seat Sanitation

Arvind Pujari, Shashwat Jain, D V S S S Kushal Kumar Reddy, Subham Kumar Sahana and Tanay Garg
Indian Institute of Technology Madras, Chennai

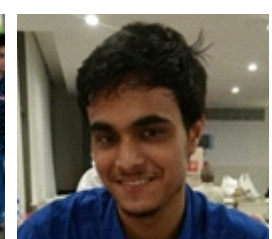
A simple, purely mechanical device is developed to ensure the sanitation and cleaning of the toilet seat by the push of a foot pedal which can be implemented as an add-on to the existing toilet structure. The mechanism consists of three parts.

a) A Lifting Mechanism: A foot pedal lifts the seat, as seen in dustbin lids.

b) A Spraying Mechanism: When the seat reaches its apex position, a nozzle is automatically pressed, spraying a sanitizing liquid onto the seat. There are four such nozzles, thus ensuring that the entire seat is sterilized.

c) A Wiping Mechanism: The wiper is a rod attached with a removable sponge, located at the back end of the seat, so that it does not encumber the user. When the foot pedal is pressed, the seat is lifted and the wiper is lifted along with the seat until it reaches the front edge, thus cleaning the seat of any dirt or water left by the previous user. Then the spray heads attached to the lid of the seats are pressed and spray a sanitizing liquid on the seat. The spray is uniformly spread and wiped across the seat, by the wiper, thus completely sterilizing it. There are many advantages of this mechanism over currently implemented methods (such as disposable seat covers, sanitary wipes, sanitary sprays and UV light). Thus, this device provides a low cost (the device will cost less that ₹ 1000 to manufacture and set up), user friendly, touch free and electricity free method of sanitizing and cleaning the toilet seat by the simple push of a foot pedal.

Subham Kumar Sahana



Tanay Garg

Prototype

3 - D Model

Prior-Art Search:

Patent 1: Title – Toilet seat lifter, Patent No- US 3504385 A, Inventor – Fields Marshall

Patent 2: Title – Toilet cover having internal cleaning mechanism, Patent No- US 20140096314 A1, Inventor – Michael Ferro

Harsha Nagar

M. Madhumala

Shaik Nazia

Design of Highly Efficient and Inexpensive Membrane Equipment as Import Substitutes for Demineralized Water Production and Hemodialysis

Harsha Nagar, M. Madhumala, Shaik Nazia, Y.V.L. Ravi Kumar
CSIR- Indian Institute of Chemical Technology, Hyderabad

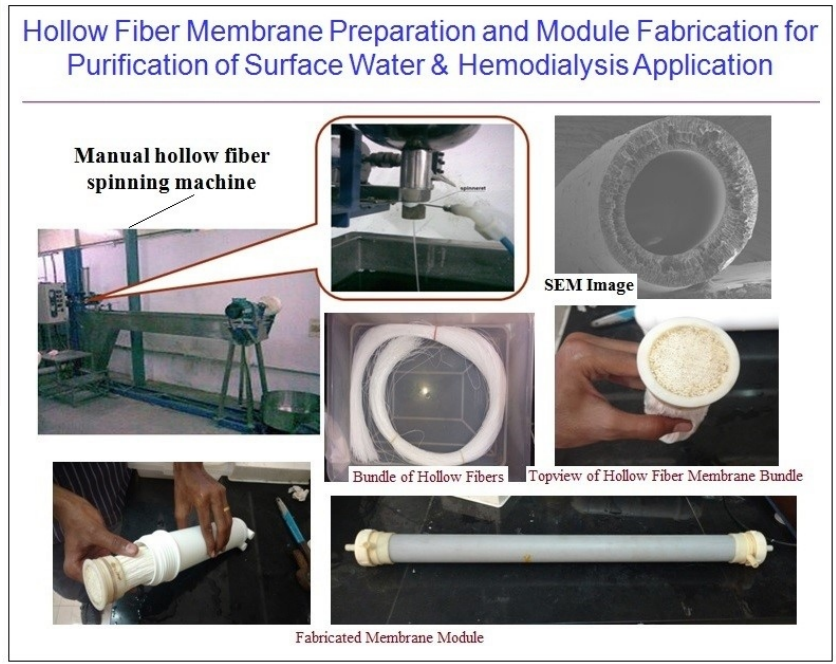
Guide :
Dr. S. Sridhar

Demineralized (DM) water has gained huge applications in various industries including hospitals, laboratory for culture preparation, cooling systems, laser cutting etc. Therefore Membrane Separations Group of IICT has designed a highly compact and low cost two stage cascaded membrane system which would produce 40-60 L/h capacity of demineralized water with a total dissolved solids (TDS) of zero ppm. The system costs Rs. 35000/- only as compared to Rs. 5 - 10 Lakhs charged by multinational companies. The unit produces demineralized water at a cost of 5 Paise per liter with a low maintenance.

The another innovation reports the design of low cost spinneret for making synthetic polymeric hollow fibers having different sizes which are used for Dialysis and water purification. The spinneret consist of a bore fluid pin, the lower part of the extruder/polymer solution reservoir which is connected to venturi shape taper with varied diverging part where various concentric polymer clearance can be achieved according to the application. The detachable bore fluid pin mounting design allows hollow fibre with inner diameter ranging from 110 microns to 800 microns. Different sizes of diverging part of venturi shape of taper connected to polymer reservoir allows for the manufacture of hollow fibers having different sizes.

Y.V.L. Ravi Kumar

Demineralized Water System



Novel Spinneret and Manual Spinning Machine for Fabrication of Hollow Fiber Membranes for Drinking Water Purification and Haemodialysis

Prior Art Search:

No patent or published article is found.

Ramesh Kumar

Anupam Chandra

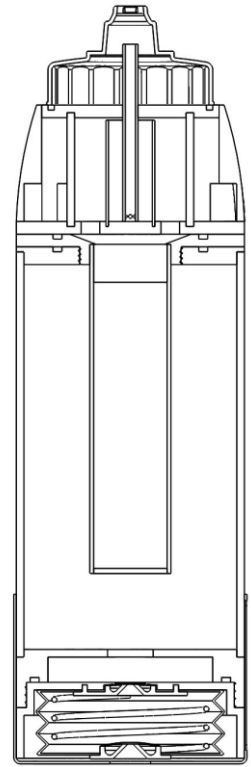
Portable Geo Specific Water Filtration Bottle

Ramesh Kumar, Anupam Chandra
Indian Institute of Technology, Madras

Guide :
Prof. T. Pradeep

In all natural calamities, those who get most affected are the poor and affordable solutions are essential for alleviating their sufferings. In regions, such as West-Bengal and Assam where flood water can also contain regional contaminants such as arsenic, rapid removal of particulates, microbial, chemical and regional contaminate such as arsenic and fluoride require a combination of technologies to be effective at acceptable flow rates. A personal water purifier to deliver one liter of clean water from arsenic contaminated water requires materials with enhanced removal kinetics and high adsorption capacity so that filter is effective. This is currently possible only with advanced nano-materials in conjunction with other technologies such as nanofiltration, reverse osmosis, etc. Here it demonstrates an affordable purifier involving multiple technologies for microbially, chemically and heavy metal safe drinking water. In this purifier bottle, feed water passes through four stages of filtration, 1) reusable pre-filter, which removes all particulate matter, 2) microfiltration / ultrafiltration hollow fiber membrane cartridge, which removes all microbial and viral contaminants, 3)geo-specific filtration unit, which removes geo-specific contaminant such as arsenic, fluoride and pesticides, 4)silver nanoparticles decorated activated coconut charcoal, which provides antimicrobial and organic contaminant removal capacity to the water purifier bottle. To develop pressure required in feed water container vessel for microfiltration or ultrafiltration, a hand operable bellow pump is added to the unit. Cheap and indigenously developed filtration membranes make this water purifying device affordable for mass distribution to the affected population of a natural disaster.

Water Purifier bottle prototype with (A) ultra-filtration (UF) membrane in packaged state, (B) micro-filtration (MF) membrane in expanded state



Cross sectional and expanded view of water purifier bottle

Prior Art Search:

No patent or published article is found.

HONEY BEE NETWORK

Honey Bee Network (HBN), a new social movement, pioneered open innovation culture much before the term became popular. For the past 25 years, it has been the vanguard of protecting knowledge, resources and rights of the 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 200,000 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 Society for Research and Initiatives for Sustainable Technologies and Institutions (SRISTI), Grassroots Innovation Augmentation Network (GIAN), National Innovation Foundation (NIF) and inspired many national and international innovation policies. It is a global platform where likeminded individuals, innovators, farmers, academicians, policymakers, entrepreneurs and non-governmental organisations (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 levels

* Supporting knowledge and intellectual property rights (IPR) 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 research and development (R&D) institutions, market and communication institutions & networks, media etc., so that more and more people are inspired to find solutions to problems of our society

* Supporting NIF(www.nifindia.org), part of Department of Science & Technology now, and helping take HBN goals to much larger level by focusing on technological innovations at grassroots and among school children. SRISTI (www.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 a large number 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 techpedia.in and facilitating Gandhian Young Technological Innovation Awards by SRISTI

* Creating world's largest open-source pool of sustainable solutions developed by people without outside help, accessible to communities worldwide

* Bringing out HBN newsletter, a unique voice of creative and innovative people at grassroots in different languages

* Motivating commercial organisations and public systems to become more empathetic in providing extremely affordable services and products to common people

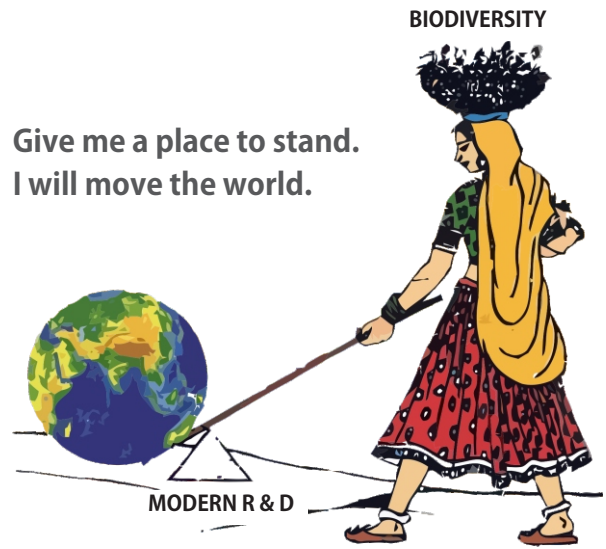
SRISTI

Society for Research and Initiatives for Sustainable Technologies and Institutions (SRISTI), which means creation, was born in 1993, essentially to support the activities of the Honey Bee Network to recognise, respect and reward creativity at the grassroots. The objectives were: systematic documentation, dissemination of and value addition in grassroots green innovations, providing them IPR protection and risk capital 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 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: English (Honeybee), 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 Es (ethics, empathy, equity, efficiency, excellence, environment, education and entrepreneurship) –the values that are central to the existence of Honey Bee Network. SRISTI organises Shodhyatra (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 past 25 years, protecting knowledge rights 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 biodiversity 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

SRISTI

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 sciences and other applied technologies, in the form of Gandhian Young Technological Innovation (GYTI) Awards 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, crowdfunding, incubation, e-commerce and challenge awards. Volunteers and collaborators are invited.



SRISTI (Society for Research and Initiatives for Sustainable Technologies and Institutions, 1993) is a developmental voluntary organization, set up to strengthen the Honey Bee Network of grassroots innovation engaged in conserving biodiversity and developing sustainable solutions to local problems.

National Innovation Foundation (NIF) – India towards a creative, compassionate and collaborative India

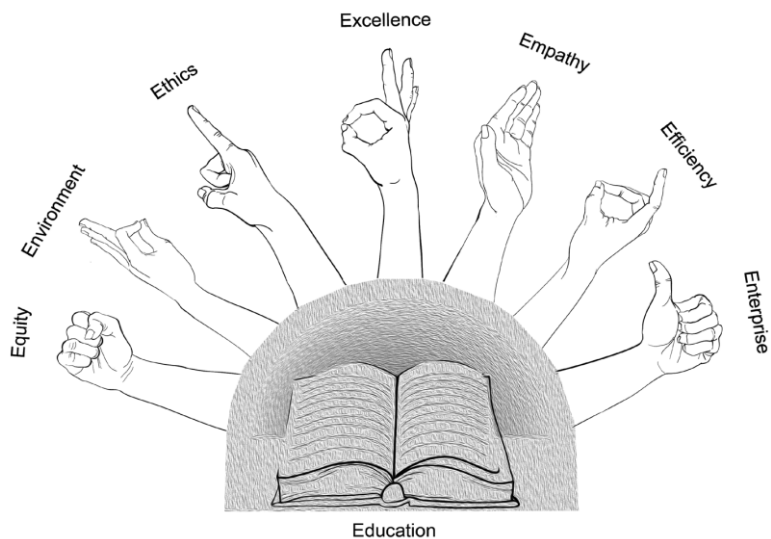
The National Innovation Foundation (NIF) – India, set up in 2000 by the Department of Science & Technology, building upon the Honey Bee Philosophy[1], has taken major initiatives to serve the knowledge-rich, economically poor people of the country. It is committed to making India innovative by documenting,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

With major contribution from the Honey Bee Network, NIF has been able to build a database of over 185,000 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 & 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 Massachusetts Institute of Technology (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 file over 743 patents (including eight filed in USA and 27 patent cooperation treaty applications) on behalf of the innovators and outstanding traditional knowledge holders of which 39 patents have been granted in India and five in the USA. It has also filed applications for 38 plant varieties developed by farmers at the Protection of Plant Varieties and Farmers' Rights Authority. Micro Venture Innovation Fund (MVIF) at NIF, with the support of Small Industries Development Bank of India (SIDBI), has provided risk capital of over Rs 3.84 crore to 193 projects, which are at different stages of incubation. NIF has received over 950 product inquiries from around 108 countries for various technologies and has succeeded in commercialising products across countries in six continents, apart from being successful in materialising 89 cases of

1. Honey Bee Philosophy - The honey bee 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 ensure that a fair share of benefits, arising from commercial exploitation of local knowledge and innovations, reaches the innovators and knowledge providers

technology licensing, many with the support of GIAN.

NIF has proved that Indian innovators can match anyone in the world when it comes to solving problems creatively. Where they perform better than the 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 creativity and innovations at grassroots. 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, 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 young technology students across the country. For the past sixty years, India has not utilised much of 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 repeat what has already been done before. This will be possible only when they can find out what has been done before. Techpedia has 200,000 technology projects done by about 600,000 students from more than 600 colleges in India.

* Connecting the technical students with the problems of informal unorganised sectors and grassroots innovators.

* To harness collaborative potential of students across disciplines and colleges to solve persistent problems of our country in formal and informal sectors.

* Explore kho kho model (relay) of product development; the idea is that if one student group has brought the solution of a particular problem to a specific stage, the next group of the same/other department should be able to build upon it and take it forward.

* To pose challenges for students to address unsolved problems of our society. Gandhiji had announced an award of 7,700 pounds (Rs 100,000) to redesign charkha (spinning wheel). Today, the value of this prize will be more than Rs 10 crore. Industry association, government and others can offer attractive prizes for solving those problems which have remained unsolved for 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 National Mentoring Network (NMN) to harness skills, insights and experiences of senior tech experts, for mentoring young students. Also, remote 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 ecosystem more responsive to societal needs and aspirations of young talent.

* Organise summer schools to 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 models, pioneered by the Honey Bee Network, are further diffused among student communities worldwide.

GYTI 2012 Awardees

Sr. No.	Title	Students	Supervisor Name	College / Institute
1	LPG based Refrigerator	Jainil Bhatt DhruvinKagdi TirthJani KunjalJadav	Prof. Tushar Patel	LDRP-ITR College
2	Domestic Refrigerator with Water Heater	Dhruv Patel		Gandhinagar Institute of Technology, Gandhinagar
3	LPG based Refrigerator	Chintan Patel Mayank D Patel Mayank I Patel Biren Patel	Prof YL Raol Prof AB Patel	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	IIT Gandhinagar
6	Multi Desire Wheelchair	Pratik Gandhi Chintak Dholakia Sumit Shatwara Bhargav Desai Priyesh Rajnikant Vanraj Kamliya	Prof. B H.Parmar	L.D.College Of Engineering
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
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	Government Engineering College, Rajkot
11	Image, Speech Recognition and Speech Synthesis for physically disabled	Saurabh Saket Rahul Ranjan	Inderdeep Singh Grewal	Bhutta College of Engineering,
12	Jeevan Dhara hand-pump 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		Parul Institute of Pharmacy, Limda, Vadodara
14	Automobile air conditioning using engine exhaust	Harish Umashankar Tiwari Prof. Dr. G.V. Parishwad	Prof. Dr. G. V. Parishwad	Pimpri Chinchwad College of Engineering Nigdi Pune 44

GYTI 2013 Awardees

Sr. No.	Title	Students	Supervisor Name	College / Institute
1	Self-Cleaning Functional Molecular Material	M. B. Avinash T. Govindaraju Carsten Schmuck Elisabeth Verheggen	T. Govindaraju	JNCASR
2	High Performance Cooking Stove	Mayur Rastogi	Prof. S Ray	IIT Kharagpur
3	Apparatus for Making Silk Fiber Based Lamellar Biomaterials to Solve Problem Of Lower Back Pain	Maumita Bhattacharjee Maumita Bhattacharjee	Dr. Sourabh Ghosh. Prof. Alok R Ray	Indian Institute of Technology, IIT Delhi
4	Electronic Support System for Physically disabled(Deaf & Dumb)	Margie Ashok Joshi Vishal patel Chirag Patel Jay patel	Ms. Dipti Patel	C.K.Pithawalla Engg. college
5	Reactor & Catalyst development for oxygen evolving step in Sulfur-Iodine cycle for Hydrogen production	Kishore Kondamudi	Dr. Sreedevi Upadhyayula	Indian Institute of Technology Delhi
6	The Third Eye	Naveen Kumar Rai	Dr. Amit Sethi	Indian Institute of Technology Guwahati
7	Clubfoot Orthosis	KANWALJIT SINGH KHAS	Dr. P.M. Pandey (Dept of Mechanical Engineering, IIT Delhi)	IIT Delhi

8	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	VIDYA ACADEMY OF SCIENCE AND TECHNOLOGY, THRISSUR
9	SHE- Society Harnessing Equipment	Manisha Mohan Rimpi Tripathi		SRM Univeristy , Chennai
10	VAJRA(vessel desk)	raghunath p lohar		Ganesh institute of engineering
11	Robotic Dredger	Amit Dinanath Maurya Digvijay Maheshwari	C. Amarnath	IIT Bombay
12	Chetna - Celebrate Your Pregnancy	Keyur Sorathia Amit Ranjan Jagriti Kumar	Keyur Sorathia	Indian Institute of Technology (IIT) Guwahati
13	Automatic Fish Scaling Machine	M.Rajesh Kanna C.Mathan M.V.Krishnamoorthy Mahesh Mithilesh	Dr.P.Rajesh Kanna	Velammal College of Engineering and Technology,Madurai.
14	Spectral Eye	Sai Vijay Gole Saket Choudhary Yashesh Gaur		Sai gole- IIT Madras, Saket Choudhary- IIT Bombay, Yashesh Gaur- DA-IICT
15	Cross Linked Antibaterial Hydrogel	Mr. Chakavala Soyeb Rafikbhai Ms. Vaishali Thakkar	Dr. Nirav V Patel, Dr. Tejal R. Gandhi	Anand Pharmacy College
16	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

17	Vision for the blind using ultrasonic sensors	Santosh Kumar Bhandari Amrita Pattnaik Vinod k		SRM , Kattankulathur
18	Snippets-Memory Aid for People With Disability	Devender Goyal Aditi Srinivasan(Bangalore) Nirali Savla(Mumbai)	Kshitij Marwah (MIT-Media Labs)	IIIT-Hyderabad
19	Design of a Smart Automotive Ventilation System for Parked Vehicles	Gaurav Kumar Jaiswal Mohit Gandhi Sanket Phalgaonkar Harshal Upadhyay Ankit Agrawal	Dr. Vasudevan R.	Vellore Institute of Technology, Vellore
20	E-diagnoser: An Advanced Low Cost Patient Monitoring Watch	LIBIN VARGHESE PILLAI SAREESH SHIBINJOSEPH ADARSH.S CHITHIRA JACOB NITHYA MERIN ANOOP.P PILLAI SAREESH	Asst.Prof.Reshmi.v	Amal Jyothi College of Engineering
21	Ultra Low Cost Tunable Nano Scale Patterns	Nandini Bhandaru	Dr. Rabibrata Mukherjee	Indian Institute of Technology Kharagpur
22	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 (IIT) Delhi
23	Hybrid Classifier for Marine Vessel based on Propulsion	Piyush Aggarwal	Ms. Mukta Goyal	Jaypee Institute of Information Technology University, Noida
24	Laser Ignited Internal Combustion Engine	Kewal Dharamshi	Prof. Avinash K Agarwal	Indian Institute of Technology Kanpur

25	Saree cutting machine for mat making handlooms	Alap Kshirsagar Abhijit Patil Vikalp Jambhulkar	Prof. Suhas Joshi	Indian Institute of Technology, Bombay
26	A Portable and Efficient Electronic Filter for Sub-Micron Particles from Fluids	Aswathi R Nair	Sanjiv Sambandan	Indian Institute of Science
27	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
28	Development of a Geo-hazard Warning Communication System	Devanjan Bhattacharya	Dr. Jayanta Kumar Ghosh, Dr. Narendra Kumar Samadhiya	Indian Institute of Technology Roorkee
29	Cow Dung based Microbial Fuel Cells (CDFCs) to Light up Indian Villages	Vishnu Jayaprakash Prof.TS Natarajan	Prof TS Natarajan,IIT Madras	University of California at Berkeley
30	HIGHLY GAS IMPERMEABLE ELASTOMERIC RUBBER-RUBBER BLEND NANO COMPOSITES	Ajesh K Zachariah	Prof.(Dr.) Sabu Thomas	Mar Thoma College
31	Semi-Automatic Rubber Tapping Machine	G.R.MALARMANNAN S.Emmanuel Richards	Dr.P.Rajeshkanna	Velammal College of Engineering and Technology, Madurai

32	Multifunctional Nano-in-Micro Alginate Microspheres for Biosensing, Drug delivery and MRI	Rashmi Dilip Chaudhari Abhijeet Joshi	Prof. Rohit Srivastava	IIT Bombay
33	Digital Pen	Kalpesh Wani Vivek Bavishi Venkat Rao		Visvesvaraya National Institute of Technology, Nagpur
34	Target Oriented Niosome Based Delivery of an Antitubercular Drug, Development and Characterisation	Gyanendra Singh A.K. srivastava	Prof. Shubhini Saraf	Department of Pharmaceutics Indian Institute of Technology Banaras Hindu University, (IIT-BHU) varanasi-221005
35	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	Padmabhushan Vasantdada Patil Pratishthan\s College Of Engineering
36	Mosquitocidal Endotoxin from Vellore Poultry Farm Wastes	BISHWAMBHAR MISHRA Abhishek Gupta	Dr. Suneetha Vuppu, Associate Professor	VIT UNIVERSITY, VELLORE
37	Development Bamboo-epoxy nanocomposites for manufacturing of helmets and other structural applications	Vivek Kumar	Dr. Sanat mohanty	IIT Delhi
38	Nanofinishing of Free-form Surfaces of Prosthesis Knee Joint Implants	Sidpara Ajay Muljibhai	Prof. V. K. Jain, Prof. V. K. Suri, Prof. R. Balasubramanian	Indian institute of technology Kanpur
39	Hydro-operated Square-Bottom Paper and Jute Bag Making Machine	Anirudh Thakur		llriet moga

40	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
41	Ambulatory Health Network App	Jayesh Vrujlal Khasatiya	Ankita Shah	Narnarayan Shastri Institute of Technology, Jetalpur.
42	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	Council of Scientific & Industrial Research-Central Food Technological Research Institute (CSIR-CFTRI).

GYTI 2014 Awardees

Sr. No.	Title	Students	Supervisor Name	College / Institute
1	LPG based Refrigerator	Jainil Bhatt DhruvinKagdi TirthJani KunjalJadav	Prof. Tushar Patel	LDRP-ITR College
2	Domestic Refrigerator with Water Heater	Dhruv Patel		Gandhinagar Institute of Technology, Gandhinagar
3	LPG based Refrigerator	Chintan Patel Mayank D Patel Mayank I Patel Biren Patel	Prof YL Raol Prof AB Patel	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	IIT Gandhinagar
6	Multi Desire Wheelchair	Pratik Gandhi Chintak Dholakia Sumit Shatwara Bhargav Desai Priyesh Rajnikant Vanraj Kamliya	Prof. B H.Parmar	L.D.College Of Engineering
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
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	Government Engineering College, Rajkot
11	Image, Speech Recognition and Speech Synthesis for physically disabled	Saurabh Saket Rahul Ranjan	Inderdeep Singh Grewal	Bhutta College of Engineering,

12	Jeevan Dhara hand-pump 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		Parul Institute of Pharmacy, Limda, Vadodara
14	Automobile air conditioning using engine exhaust	Harish Umashankar Tiwari Prof. Dr. G.V. Parishwad	Prof. Dr. G. V. Parishwad	Pimpri Chinchwad College of Engineering Nigdi Pune 44

GYTI 2015 Awardees

Sr. No.	Title	Students	Supervisor Name	College / Institute
1	FOOD VENDING MACHINE FOR SCHOOLS	Subrahmanya Shridhar Shetty Chandarashekar Moger Shivanada L.C Udaya g	Pradeep Kanchan	NMAM Institute of technology
2	Nanoemulsions as a vehicle for delivery of omega-3 fatty acids for serum and tissue lipids	D.Sugasini	Dr.B.R.Lokesh	CSIR-Central Food Technological Research Institute
3	DOUBLE DISK ULTRASONIC ASSISTED MAGNETIC ABRASIVE POLISHING DEVICE	Prateek Kala Dr Pulak Mohan Pangey Sumit Kumar	Dr Pulak Mohan Pangey	IIT Delhi
4	RIGHTBIOTIC: The Fastest Antibiotic Finder	Shivani Gupta DV Padmavathi Anuradha Pal	Dr Suman Kapur	BITS Pilani, Hyderabad Campus

5	Development of Shape Controlled Palladium Structures as Electro-catalysts for Fuel Cell Applications	Kranthi Kumar Maniam	Dr.Raghuram Chetty	Indian Institute of Technology Madras
6	Rapid Non-invasive diagnostics kits for diabetics patients to check Glucose level thrice a day	Yadav Vijay Dukhran	Dr Prajakta Dandekar Jain	Institute of chemical technology (ICT)
7	REDUCED CONVERTERS AND BRUSHLESS GENERATORS BASED STANDALONE MICROGRID FOR RURAL ELECTRIFICATION	Krishan Kant	Prof. Bhim Singh	Indian Institute of Technology Delhi
8	INJECTION MOULDABLE POLYMERIC COMPOSITE BASED PASSIVE POLYCENTRIC KNEE JOINT	S. Arun Dr. S. Kanagaraj	Dr. S. Kanagaraj	Indian Institute of Technology Guwahati
9	A novel process to commoditize carbon dioxide gas into fuels and high value nutraceuticals at commercially viable scale	Dilip Singh Preeti Mehta A.S.Mathur Ravi P. Gupta D.K.Tuli	Dr.D.K.Tuli	DBT-IOC Centre for Advance Bioenergy Research
10	Novel Nanozyme Technology for combating Oxidative Stress Related Disorders	Amit Ashok Vernekar Prof. G. Mugesh	Prof. G. Mugesh	Indian Institute of Science
11	FLEXICAST: A breathable, washable and customized cast for immobilization of fractured limb	Nikhil Jamdade Dr. Pankaj Chhatrala Devanshi Saksena		IIT Kanpur

12	Development of X-ray Visible Polymers via In Situ Iodination-Cross-linking for Non-Invasive Real Time Imaging	paulomi ghosh Dr. Santanu Dhara Mr. Arun Prabhu Rameshbabu	Dr. Santanu Dhara	School of Medical Science and Technology, Indian Institute of Technology Kharagpur
13	Affordable power-assist for wheelchair	sripriya kalidoss KARTHIKEYAN SD VIVEK SARDA	Dr. Sujatha Srinivasan	IIT MADRAS
14	Utilization of marine algae as substrate and methanogen inhibitor in microbial fuel cell	Rajesh PP Jadhav D A Prof. M.M. Ghangrekar	Prof. M.M. Ghangrekar	Indian Institute Of Technology Kharagpur
15	Prashamana- A Smart Hospital Bed	Nikhil Jamdade and Toshib Bagde Nikhil Jamdade	Dr. Ramkumar Janakara-jan	
16	Linearly polarised planar inverted F-antenna for Global Positioning System and Worldwide Interoperability for Microwave Access ap-plications	Mayank Agarwal Rajesh Singh and Dr. Manoj K. Meshram	Dr. Manoj K. Meshram	Indian Institute of Technology (BHU), Varanasi
17	Novel technique for energy generation coupled with treatment of wastewater and resource recovery using E-waste as electrode material in Microbial Fuel Cell	Praveena Gangadharan Dr.Indumathi M Nambi Dr.Jaganathan Senthilnathan	Dr. Indumathi M Nambi	Indian Institute of Technology Madras,India

18	Use of High Nutrient, Low Cost Natural Materials for Preparation of Well-Engineered Emulsions for Variety of Applications	V. N. Lad Prof. Z. V. P. Murthy	Prof. Z. V. P. Murthy	Sardar Vallabhbhai National Institute of Technology - Surat
19	Clubfoot deformity measuring device	KANWALJIT SINGH KHAS	Dr. P.M.Pandey and Prof. Alok. R.Ray	IIT Delhi
20	Virtual Reality Based Minimally Invasive Surgical Simulator with Haptics Feedback	M.S.Raghu Prasad M.Manivannan	Manivannan M	Indian Institute of Technology Madras
21	Electrospun Cellulose Acetate Nanofibers for Female Hygiene Applications	Shital Yadav I.Manipujitha Tulika Rastogi	Dr. Chandra Shekhar Sharma	Indian Institute of Technology, Hyderabad
22	One drug to cure them all	Chandradhish Ghosh Dr. Jayanta Haldar	Dr. Jayanta Haldar	Jawaharlal Nehru Centre for Advanced Scientific Research
23	Sway: The rhythm within	Janhavi Joshi Nupura Kirloskar Ninad Kulkarni	Prof Sanjay Jain	MIT Institute of Design, Pune
24	Fabrication Of Nano Object Imaging Probe Using Simple & Fast Hydro -Mechanical Etching Technique	FAZLE KIBRIA	Rajib Chakraborty	University college of Science & Technology
25	Algiculture	Abitha R	Dr.H.N.Chanakya	Indian Institute of Science, Bangalore

26	Evaluation of Blood Pressure and Arterial Compliance by the Radial Arterial Pulse Pressure Waveform obtained using Fiber Bragg Grating Pulse Recorder	Sharath Umesh Prof S Asokan Dr Shwetha Chiplunkar Dr Anand Kalegowda Dr Sukreet Raju Dr Apoorva Girish	Prof Sundarrajan Asokan	Indian Institute of Science
27	Targeting lymphatics to treat HIV using lipid based formulations	Amita Joshi Dr. Amita Joshi	Amita Joshi	B. V. Patel PERD Centre
28	Redefined Spoon For Parkinsons Patient	Dhyey Mayankkumar Shah Eepsit Tiwari Rajesh Patidar	Prof. Bhaskar Bhatt and Prof. Harish P. M.	IIT Gandhinagar
29	Rapid diagnosis of brain injury-A novel approach using citrate-capped gold nanoparticles	SRISHTI AGARWAL	Dr. Anindya Roy (Assistant Professor at Department of Biotechnology, IIT Hyderabad)	INDIAN INSTITUTE OF TECHNOLOGY HYDERABAD
30	TAPARCH: A Visually Challenged People Footwear	Krishna sai Inkoolu		GITAM UNIVERSITY
31	Biodegradable Lipo-sAu Nanoparticles for photothermal ablation of Cancer	Aravind kumar Rengan Amirali Bukhari	Rohit Srivastava	IIT Bombay
32	Biomechanical Investigation of Extracorporeal Irradiation and Reimplantation Therapy in Malignant Bone Tumours	sakshi chauhan K. Manoj (AIIMS) Dr Shah Alam Khan (MD AIIMS) Dr Anamika Prasad (Faculty IIT-D)	Dr. Anamika Prasad, Dr. Shah Allam khan	Indian Institute of technology, Delhi

33	Valproic acid prevents progression of the diabetic nephropathy: Elucidation of molecular mechanisms and proof of concept for promising therapeutic usefulness	Sabbir Khan Gopabandhu Jena	Dr. Gopabandhu Jena	National Institute of Pharmaceutical Education and Research (NIPER), Sector-67, S.A.S. Nagar
34	Suchi-Ahvana	Pratik Raj Deepak Nagar Kewal Chand Swami		PDPM Indian Institute of Information Technology Design and Manufacturing Jabalpur
35	Development of Membrane Technology for Industrial Progress, Societal Benefit and Environmental Safety	Siddhartha Moulik Dr. S. Sridhar	Dr. S. Sridhar	CSIR-Indian Institute of Chemical Technology
36	Recyclable Porous Sheets for Low-Cost Water Filter	Abhishek Gandhi Naresh Bhatnagar	Professor Naresh Bhatnagar	Indian Institute of Technology, Delhi
37	Methane Sensing Module: From concept to prototype	Anwesha Mukherjee Gautam Prasanna Kar R.K. Pavan Sanjay Rao Vaibhav Rao	Dr. Abha Misra	Indian Institute of Science, Bangalore
38	TEDKIT- An Audio Tactile Storybook for Visually Impaired Children	ANKITA GULATI NEIL SHAH	M.BALAKRISHNAN(HOD,CSE DEPTT.,IIT DELHI)	IIT DELHI
39	Development of A Powerful New Antibiotic That Kills All Drug-Resistant Bacteria	Venkateswarlu Yarlagadda Jayanta Haldar Goutham B Manjunath Akkaapeddi Padma	Jayanta Haldar	Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR)

40	Energy Efficient Robust Controller for Autonomous Underwater Vehicle	Meenakshi Sarkar	Dr. Sambhunath Nandy	CSIR - Central Mechanical Engineering Research Institute
41	Gift of New Abilities	Shiva Kumar H R	Prof. A G Ramakrishnan	Indian Institute of Science (IISc)
42	Real Time Wound Management System Wound Segmentation & Analysis Using Image Processing On Mobile Platform (Android).	ABHIRAJ GUPTA		Manipal Institute Of Technology
43	Inch worm mechanism for solar panel cleaning robot	Bhivraj Suthar	Prof. Sudipto Mukherjee	IIT Delhi

GYTI 2016 Awardees

Sr. No	Title	Student Name	Supervisor Name	College/Institute
1	Simple Low-cost Bioactive Titanium Foam via Novel Route for Skeletal Tissue Reunion	Kausik Kapat	Santanu Dhara	School of Medical Science And Technology (Smst)
2	Flexible biodegradable anti-microbial new advanced form of Intra Uterine Contraceptive Device (IUCD)	Bhuvaneshwaran Subramanian Selvakumar M, Dibyendu Gouri	Professor DR. Sujoy K Guha	Indian Institute of Technology, Kharagpur
3	Automated opto-fluidic Microscope for Cellular Diagnostic Testing.	Veerendra Kalyan Jagannadh Jayesh V. Adhikari, Albina L. Nirupa, Rashmi S, Bindu Bhat	Dr. Sai Siva Gorthi	Robert Bosch Centre For Cyberphysical Systems

4	3D printed hydroxy-apatite tray for segmental mandibular bone reconstruction by stem cell delivery for oral cancer patients	Sanskrita Das Dr. Pravesh Mehra	Dr. Sourabh Ghosh	Indian Institute of Technology
5	NStomoz - Vascular anastomosis assist device	Anand Parikh	Prof Venkatesh Balasubramanian; Dr V B Narayanamurthy	Indian Institute of Technology Madras
6	Wearable drug delivery device based on microneedles for efficient management of Chemotherapy Induced Nausea and Vomiting (CINV) and Nausea and Vomiting in Pregnancy (NVP)	Bhushan N Kharbikar	Prof Rohit Srivastava	Indian Institute of Technology Bombay
7	Automatic Urine And Fecal Disposal System	Neenu Jose Athul.K.Raj, Athira.K.R, Neenu.P	Jinu.Sebastian	Sahrdaya College of Engineering And Technology
8	Device for Intrapartum-Materno-Fetal Care	Vichal P M	Appaji M Abhishek	Bms College of Engineering
9	Rapid Endotoxin Entrapment and Detection on Surface-engineered Glass Substrates	Sachin Kumar Prasanta Kalita, Ruchika Sharma, Nitish Goel	Dr. Shalini Gupta	IIT Delhi
10	Near Infra Red light Activable Iron(III) Complex as a Remarkable and organelle-targeted Anti-cancer Agent for the Photodynamic Therapy Application	Aditya Garai	Prof. A. R. Chakravarty	Indian Institute of Science

11	Energy efficient combined process of microbial fuel cell (MFC) and membrane bioreactor (MBR) for high efficiency and reliable treatment of organic wastewater	Sreemoyee Ghosh Ray Gourav Dhar Bhowmick	Prof. M. M. Ghangrekar, Department of Civil Engineering, IIT-Kharagpur	Indian Institute of Technology, Kharagpur
12	A Novel Compound Restores Obsolete Antibiotics to NDM-1 Superbugs	Divakara SS Murthy Uppu Goutham B Manjunath Padma Akkapeddi	Prof. Jayanta Haldar	Jawaharlal Nehru Centre For Advanced Scientific Research (Jncasr)
13	Development of a novel, non-biological pyrogen/ microcellular components detection technique for purification and depyrogenation of water.	Yadav Vijay Dukhran Rohan Chhabra, Nikhil Kalane, Anomitra Dey, Tejal Pant Dr. Ratnesh Jain	Dr. Prajakta Dandekar Jain,	Institute of Chemical Technology
14	A Compact Microwave Sensor for Characterization of Radomes and Dielectric Signature Detection of Materials in 3G and 4G GSM Bands	Abhishek Kumar Jha	Dr. M. J. Akhtar	Indian Institute of Technology Kanpur
15	Development of portable device based on polarized fluorescence for detection of cervical pre-cancer	Bharat Lal Meena Ms. Seema Devi, Prof. Asima Pradhan, Dr. Kiran Pandey, Dr. Asha Agrawal	Prof. Asima Prdhan	India Institute of Technology Kanpur

16	X-niff: Microcantilever based Electronic-nose platform for airborne chemical vapor sensing	Gaurav Gupta Vijay Shrinivas Palaparthy, Shambhulingayya Ningayya Doddapujar Pallabi Das	Prof. Valipe Ramgopal Rao	IIT Bombay
17	Design of an Innovative Retrofitted Tricycle for a Disabled Person	Pushkaraj Sonawane Prof. Pushkaraj D. Sonawane Prof. Dr. Sandip T. Chavan	Prof. Pushkaraj D. Sonawane and Prof. Dr. Sandip T. Chavan	Maharashtra Institute of Technology, Pune
18	Soya Nuggets Ã¢â¬â A novel Drug Delivery Vehicle	Utkarsh Bhutani	Dr. Saptarshi Majumdar	Indian Institute of Technology Hyderabad
19	Air-Assisted Electrostatic Sprayer (AAESS)	Manoj Kumar Patel	C Ghanshyam	Academy of Scientific and Innovative Research (AcSIR-CSIO), Chandigarh
20	AN INDIGENOUS OXYGEN DOSING DEVICE TO CONSERVE OXYGEN USING PATIENT MONITORING SYSTEM	srividhyasakthi		Sri Ramakrishna Engineering College
21	NEURONAL CELLS PRODUCED FROM NON-NEURONAL CELL LINE USING WALNUT OIL	Varsha		Chitkara University
22	Cost effective self-stabilizing smart hand held platform (spoon/pen) for elderly or Parkinsons disease patients	Debjyoti Chowdhury	Dr. Madhurima Chattopadhyay	Heritage Institute of Technology
23	Paper microfluidic chip	Avisek barla Sameer Sharma		IIT Madras

24	Multimechanistic Polymer Based Novel Drug Eluting Stent Coating	Ms. Shiva Kalyani Adepu	Dr. Govinda Kapusetti Prof Kiran Kalia	NIPER Ahmedabad
25	Harnessing Micro Air Jets for Spraying Viscous Non-Newtonian Fuels	Manisha B. Padwal	Prof. D. P. Mishra	Indian Institute of Technology Kanpur
26	Paper based resistive touch-pad for electronic applications	MITRADIP BHATTACHARJEE	Dr. Dipankar Bandyopadhyay	IIT Guwahati
27	High Altitude Wind Energy Using Kite- A revolution in Renewable Energy.	Roystan Vijay Castelino	Prof. Lokesh B	Srinivas Institute of Technology, Merlapadavu, Valachil, Mangaluru
28	Nano Material Based Flexible Aqueous Power Cell for Energy Conversion and Storage(Self-Charging and Flexible Aqueous Power Cell).	Vinay Gangaraju	Prof. Dinesh Rangappa and Dr. D. S. Prasanna	Dept. of Nanotechnology, PG Center Bangalore Region, Visvesvaraya Technological University
29	LOW COST SANITARY NAPKIN DISPOSAL MACHINE	AISWARYA PARAMADATHIL		ADI SHANKARA INSTITUTE OF ENGINEERING AND TECHNOLOGY
30	CHECKit - A low cost mobile OMR system	Rahul Patel	Mehul Raval, Dhruv Gupta	Institute of Engineering & Technology
31	Green flexible conducting paper from edible bacteria derived 3D nanocellulose matrix and polyaniline	Divya Anand	Dr. Mudrika Khandelwal	Indian Institute of Technology(IIT) Hyderabad

32	DESIGN AND DEVELOPMENT OF SEMI-AUTOMATIC FLOWER KNOTTING DEVICE	Dr. G. Senthilkumar C. Cornelius Durai, S.Lakshmana Raja, S. Sriram	Dr. G. Senthil Kumar	Velammal College of Engineering and Technology
33	Handicap Support Device	Vishrut Bhatt Sumanth Mudaliar . Joshi Ashay . Dave Kaushal.	Mr. Harshul Bhrambhatt	LJ Polytechnic
34	Biobased Adhesive Formulation for Construction Applications	Neelima Tripathi	Dr. Vimal Katiyar	Indian Institute of Technology Guwahati (IIT Guwahati)
35	LATEX (NATURAL RUBBER) CARRY BACKPACK	AJIN OMANAKUTTAN	Prof. ABI VARGHESE	AMAL JYOTHI COLLEGE OF ENGINEERING, KANJIRAPPALLY
36	Bio-Inspired Flapping Near Surface Underwater Vehicle	Mannam Naga Praveen Babu	Prof. Krishnankutty. P	Indian Institute of Technology Madras
37	E-Droid Meter	Bitu C. Ghoniya Shruti B. Patel, Jigisha M. Karangiya, Jinal N. Modi	Urmi Desai	Sarvajanik College of Engineering & Technology
38	Design and development of multipurpose electric cycle	Patel Krunal Brijesh patel, Prashant solanki Jigar parmar	Sandip godse	Shri satasangi saketdham
39	Automatic Sugarcane Juicer	Nilkantha Dashrath Gadakh		K. K. Wagh Institute Of Engineering Education and Research, Nashik

40	Cost effective mechanical testing equipment for characterising creep behaviour of materials under combined tension-torsion loading	Vineesh K P	Prof. Vikranth Racherla	Indian Institute of Technology Kharagpur, Kharagpur
41	Application Of Nano Material To Analyze The Strength Of Concrete	Dhrafani Ishita Mayurkumar	Mr. Hitesh Rameshchandra Ashani	Vyavasayi Vidya Pratishthans Sanch. College Of Engineering, Rajkot
42	mSleep - Measure your Sleep	Shuchita Gupta Yashovardhan Sharma	Dr Vinayak Naik	Indraprastha Institute of Information Technology, Delhi
43	Straut AERO : Solar Industrial Hot Air Generator	Sharad Parekh	Dr. Nilesh Bhatt	Universal College of Engineering & Technology

Gandhian Young Technological Innovation Awards (GYTI) 2018

SRISTI celebrates the creativity and innovation of young technological students by recognising their outstanding projects with Gandhian Young Technological Innovation (GYTI) Awards. These awards are given every year during the Festival of Innovation (FOIN) at Rashtrapati Bhavan in the month of March. this year, these awards are on March 5, 2017 at FOIN. It is hoped that such recognition will enthuse young innovators to pursue even more outstanding research addressing unmet social needs and set up entrepreneurial ventures in consonance with Start-Up movement gaining strength currently in India.

The categories of the GYTI awards are:

Gandhian Young Technological Innovation Awards, 2018
(Last Date of Submission: November 30, 2017)

* MLM (More from less for many), Frugal Innovation award-ideas that economise on the use of material, extremely affordable, sustainable
* SRISTI socially relevant technological innovation award-ideas that address unmet social needs or improve the functioning of existing solution, increase affordability and/or improve circularity i.e. ecological compatibility
* Technological-edge award-ideas that push the frontiers in any technological domain
* BIRAC-SRISTI award for biotechnological/medical/healthcare innovation
* Hari Om Ashram Prerit Dr. Amulya K.N. Reddy GYTI Award

Financial support is also given to some of the awardees as per following windows of opportunity:

* BIRAC-SRISTI GYTI Awards – Rs 15, 00,000 grants will be given for further research / prototype development work to each 15 awardees of medical and biotech arena
* BIRAC-SRISTI GYTI Appreciation Awards – Rs 1, 00,000 will be given to 100 Grassroots and student innovations / ideas (School/UG/PG) for value addition at different labs including SRISTI Sadbhav Sanshodhan Lab
* Hariom Ashram prerit, Dr. Amulaya K. N. Reddy GYTI Award – Rs 50,000 each to Five GYTI awardees.

Any student project that has been completed during 2015-16 to 2017-18 is eligible for consideration of awards. The faculty members can encourage their students to submit the projects at following URL: www.gyti.techpedia.in or submit it themselves under the names of the students. We acknowledge that much of the good work students do is done under the guidance of their teachers/mentors; however, we aim to encourage creativity of students and thus request teachers to support them in the Honey Bee Network movement's effort to promote young innovators.

Last date for submission of entries is November 30, 2017

For any queries, please email us at **gyti.techpedia@sristi.org** , Call us at **9099258492.** We look forward to your cooperation in making India innovative and spread the spirit of the Honey Bee Network.

Gandhian Young Technological Innovation Awards (GYTI)

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