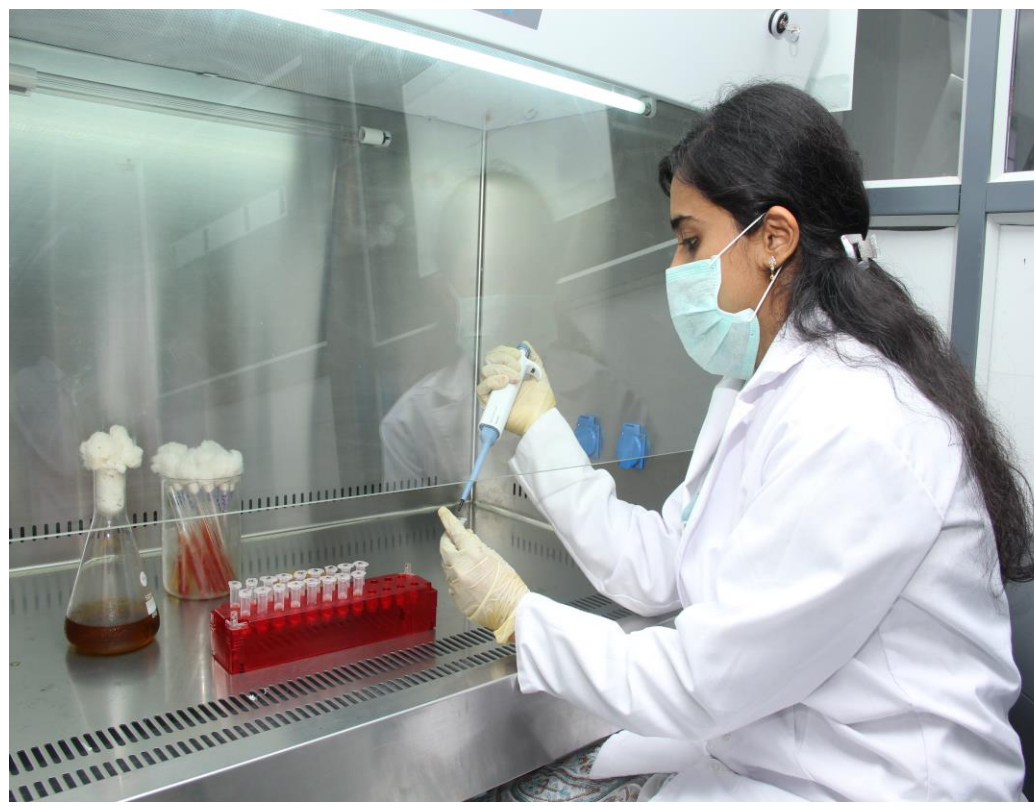


*January'21 –*

*June'21*

## *Research Newsletter*



*Volume 02 | Issue 02*

## Research Advisory Board

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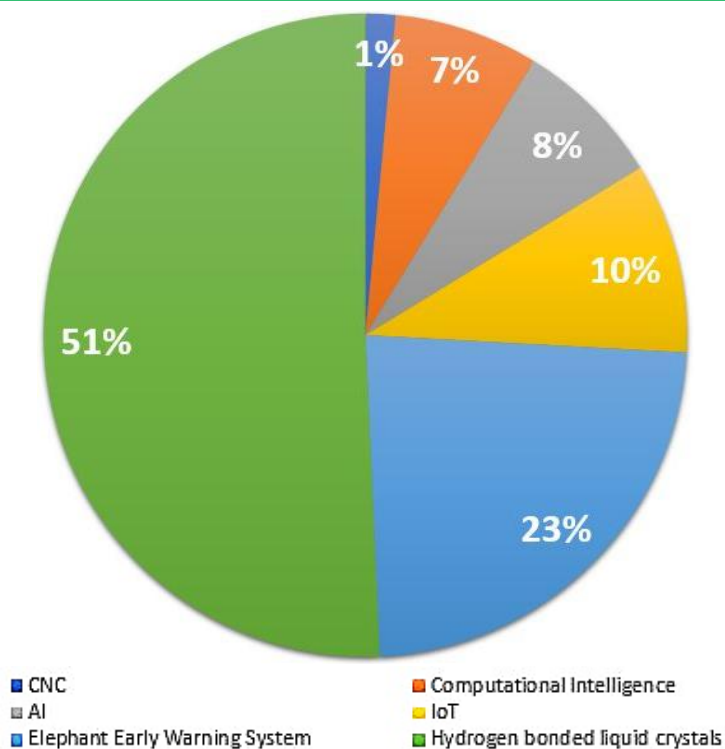
### Dr. M. Thirumoorthy

DRDO Hyderabad

## INTERNATIONAL COLLABORATIONS

## COMPLETED FUNDED PROJECTS

| Collaborator                     | Works carried out | Country      |
|----------------------------------|-------------------|--------------|
| King Saud University             | 48                | Saudi Arabia |
| Academia Sinica Taiwan           | 14                | Taiwan       |
| National University of Singapore | 13                | Singapore    |
| Pusan National University        | 10                | South Korea  |
| Sunway University                | 10                | Malaysia     |
| Korea University                 | 9                 | South Korea  |
| King Khalid University           | 8                 | Saudi Arabia |
| Wuhan University                 | 8                 | China        |
| Universiti Malaysia Pahang       | 8                 | Malaysia     |



**TOTAL REVENUE UTILIZED : Rs. 41,94,601/-**

## RESEARCH METRICS

### AUTHOR-LEVEL

Faculty member with highest h-index



**Dr M L N Madhu Mohan**, Professor, Department of Electronics and Communication Engineering

h-index : **23**

Total no. of Citations : **1453** (Citations by 424 documents)

Total no. of documents : **114**

### ARTICLE-LEVEL

Top article with highest number of citations



**Dr S Jegadheeswaran**, Head – Research & Development

Performance enhancement in latent heat thermal storage system: A review. Renewable and Sustainable Energy Reviews, 13(9), 2225-2244

Cited by : **453**

Field-Weighted citation impact : **1.95** (>1 means document is more cited than expected according to the average)

## AICTE SPONSORED PROJECT UNDER RESEARCH PROMOTION SCHEME (RPS)

### Wireless automatic quality domestic water distribution and wastage reduction management system



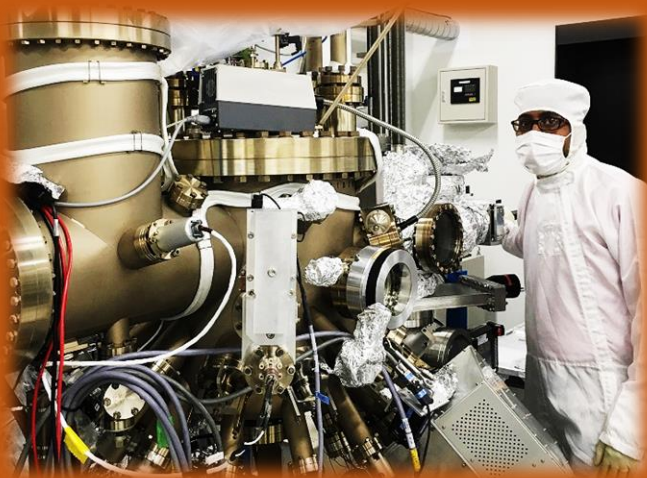
**Investigator** : Dr C Ganesh Babu, Professor, Department of EIE

**Grant** : Rs.3,71,470

**Funding agency** : AICTE

The objective of the research is to provide equal and healthy water to the people without any wastage. In most of the areas, the overhead tanks are filled on a timely basis and overfilling is not taken care properly, by which major amount of water is getting wasted. In order to avoid such issues, we can fit level sensor, so that, when the water level reaches maximum position, the inlet valve closes automatically. The secondary issue is related to the leakage in the pipe which cannot be located manually. The flow meters are attached to all the residential buildings and outlet pipes of the tank. The overhead tanks are not cleaned on a regular basis so we can implement an automatic cleaning system with echo enzyme to avoid impure water. The automatic organic chlorination can be implemented so that bacteria and germs will be killed and healthy water can be provided.

**Venture Business Laboratory's Post-doctoral Research Fellowship at Nagoya University, Nagoya, Japan**



**Fellowship Awardee :**

**Dr D Arun Kumar**, Assistant Professor (Level II), Department of Physics

**Duration :** 2 Years

**Area of Research :** Growth of gallium oxide for power device applications

Dr Arun Kumar's research focuses on growth of gallium oxide by molecular beam epitaxy (MBE) for power device applications at Center for Low temperature Plasma Sciences, Nagoya University, Nagoya, Japan. Compared to the conventional Si and later developed SiC and GaN, recently developed gallium oxide ( $\text{Ga}_2\text{O}_3$ ) has attracted much interest for high power device applications, due to its ultra-wide bandgap of 4.8 eV, high theoretical breakdown field up to 8 MVcm<sup>-1</sup>. The growth rate of  $\text{Ga}_2\text{O}_3$  is much lesser when compared to industrial standards and the growth kinetics are not studied well. His focus of research is to improve the growth rate, quality of crystal and study the growth kinetics by MBE.

**Russian Federation's Post-doctoral Research Fellowship at SUSU Chelyabinsk Russia**



**Fellowship Awardee :**

**Dr K Rajakumar**, Assistant Professor, Department of Chemistry

**Duration :** 12 Months

**Area of Research :** Organic Chemistry

Dr. Rajakumar's research focuses on the synthesis of ethynyl derivatives of heavy polycyclic aromatic molecules at Nanotechnology Education and Research Centre, South Ural State University, Chelyabinsk, Russia under the guidance of Prof. Dmitry Zharebtsov. The design and synthesis of polycyclic aromatic hydrocarbons of luminescent molecular materials is one of the most attractive challenges at the frontier of fundamental research and applications. The design and synthesis of low-band gap conjugated polymers have increasing attention in recent years owing to their wide usage in various fields, such as, OLEDs, organic solar cells & OFETs.

## AICTE - MODERNISATION AND REMOVAL OF OBSOLESCENCE (MODROBS)

### Autonomous robotic manipulator for order picking task integrated with visula servoing, impedance control schemes and ASRS

**Investigator :** Dr K L Senthil Kumar, Head - Academics

**Grant :** Rs.8,51,769

**Funding agency :** AICTE

**Scope :** Upgrading the existing stand alone six axis industrial robot to be employed with force sensor and vision system that will be integrated with an automatic storage and retrieval system.

### Modernisation of electrical machines

**Investigator :** Dr P Sivaraman, Associate Professor, Department of EEE

**Grant :** Rs.13,88,000

**Funding agency :** AICTE

**Scope :** Upgrading the existing facilities thereby establishing CDAQ based automation of motor testing bundle, automation of induction motor testing bundle, eddy current dynamometer motor testing unit, variable frequency drive system, switched reluctance motor drive with eddy current loading and permanent magnet synchronous motor drive

## DST SPONSORED FACULTY DEVELOPMENT PROGRAMME - COMPLETED

### Entrepreneurship in Geo-Environmental Engineering



**Coordinators :** Dr B Soundara, Professor, Dept of Civil Engg & Dr K Saravanan, Associate Professor, Dept of Fashion Technology

**Funding agency :** DST-NIMAT

**Grant :** Rs.2,50,000

Department of Science and Technology has sponsored a two-week Faculty Development Programme on "Entrepreneurship in Geo-environmental Engineering" through National Implementing and Monitoring Agency for Training (NIMAT). The programme has been organized by the faculty members of Civil Engineering and Fashion Technology in the Conference Hall during 25 Nov 2019 – 07 Dec 2019. The participants of the programme were addressed by Er. Rajayogan, President, ASCE India Section - Southern Region and Dr. V. K. Stalin, Professor, Anna University. They shared valuable inputs about the scope and opportunities of geo-environmental engineering in India. There were eminent personalities from various reputed organizations who shared their knowledge and enlightened the minds of faculty members from various institutions across the state. At the end of this course, the faculty members were expected to enhance the ability of their students in terms of entrepreneurial skills.

## PhD Awardees

| Name of the PhD awardee | Dept.    | Supervisor          | Title of Thesis  |
|-------------------------|----------|---------------------|--|
| Dr Rajasekar K          | Mech     | Dr Jegadheeswaran S | Control of sub-sonic separation bubble in hyper-sonic intake using perforated wall   |
| Dr Pavithra M K S       | Bio Tech | Dr Kannan K P       | Extraction, purification and characterization of bio-molecules of clinical significance from <i>Evolvulus alsinoides</i> (Linn.) Linn.: Enhancement and validation through insilico and invitro approaches |
| Dr Muthusami R          | IT       | Dr Bharathi A       | Analysis and evaluation of Twitter Data for Stance Detection and Mobile App Recommendation by Topic Modelling using Clustering Techniques  |
| Dr Elango S             | ECE      | Dr Sampath P        | Investigations on VLSI implementation of signed RNS multipliers for cryptosystems  |
| Dr Maheswari K T        | EEE      | Dr Bharani Kumar R  | Performance analysis of quasi Z-source matrix converter for wind turbine driven permanent magnet generator   |
| Dr Ramkumar M           | ECE      | Dr Ganesh Babu C    | Performance analysis of machine learning algorithms for classification of cardiac arrhythmia   |
| Dr Sundar M             | Maths    | Dr Marudai M        | Decomposition of product of semi-ring valued graphs  |
| Dr Arun Jayakar S       | EIE      | Dr Tamilselvan G M  | An investigation on hybrid optimization technique based robust controller design for industrial process  |

### Smart fence for early elephant warning



#### Investigator :

Dr. Sanjoy Deb, Associate Professor,  
Department of ECE

#### Funding agency :

International Elephant Foundation (IEF), United States

#### Grant :

\$3200

#### Nature of work :

Prototype design and field implementation

#### Notable accomplishments :

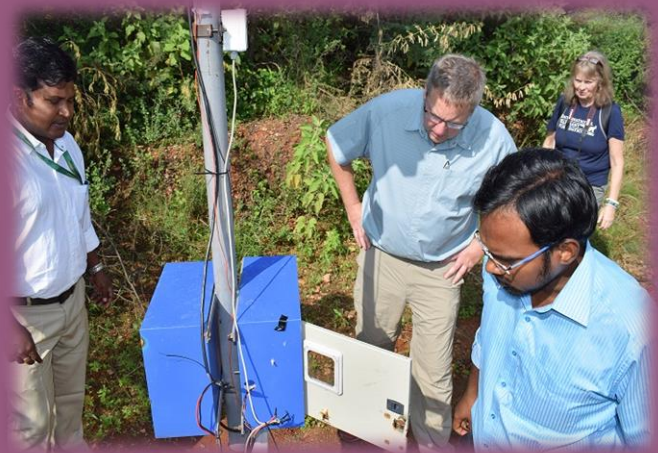
1. The Roadkill Prevention System (RPS) developed and implemented is the one and only functioning system of its kind in India.
2. The animal roadkill rate is significantly reduced at the two points where the system units are implemented.
3. Technological innovative findings of RPS are incorporated in Elephant Early Warning System (EEWS)
4. During the recent years, EEWS has been implemented at BRT Tiger Reserve (Karnataka), Hasanur and Sathyamangalam Divisions of Sathyamangalam Tiger Reserve (Tamil Nadu), Ajodhya Hill and Forest Reserve Area (Purulia, West Bengal), Parsa Wildlife Reserve (Nepal) and many other places under collaborative consultancy project from Government of India and different NGOs.

#### Outcomes :

1. The team members have developed a product “Elephant Early Warning System (EEWS)”.
2. The project has been successfully implemented in two different locations in Tamil Nadu.

#### Areas of Implementation:

- Sathyamangalam Tiger Reserve
  - Bhavanisagar Dam
3. The team members have filed a patent based on the concept of early warning system.





### Industrial Internet of Things (IIoT)

**Grantee :** Dr. K. Premalatha, Professor, Department of Computer Science and Engineering

**Funding agency :** DST-NIMAT | **Grant :** Rs.3,00,000

The Industrial Internet of Things (IIoT), also known as Industry 4.0, brings together brilliant machines, advanced analytics, and people at work. A digital transformation is underway; driving huge change across all industries. The driving philosophy behind IIoT is that smart machines are not only better than humans at capturing and analyzing data in real time, they are better at communicating important information that can be used to drive business decisions faster and more accurately. The IIoT is enabled by technologies such as cyber security, cloud computing, edge computing, mobile technologies, machine-to-machine, 3D printing, advanced robotics, big data, internet of things, RFID technology, and cognitive computing. This workshop was meant for entrepreneurs who wish to come up to speed with the new technology and to use it in their startups and business. This hands-on workshop provided the opportunity of learning the technologies, strategies and case studies to advance the career.

## DST-SEED Sponsored Research Project

### Technological interventions for enhancing productivity, scalability and value addition to obtain fiber from a local plant (Urtica dioica) for tribals in Nagaland



**Investigator :** Dr R Deepa, Assistant Professor (Level III), Department of EIE

**Funding agency :** DST - SEED

**Grant :** Rs. 68,82,120

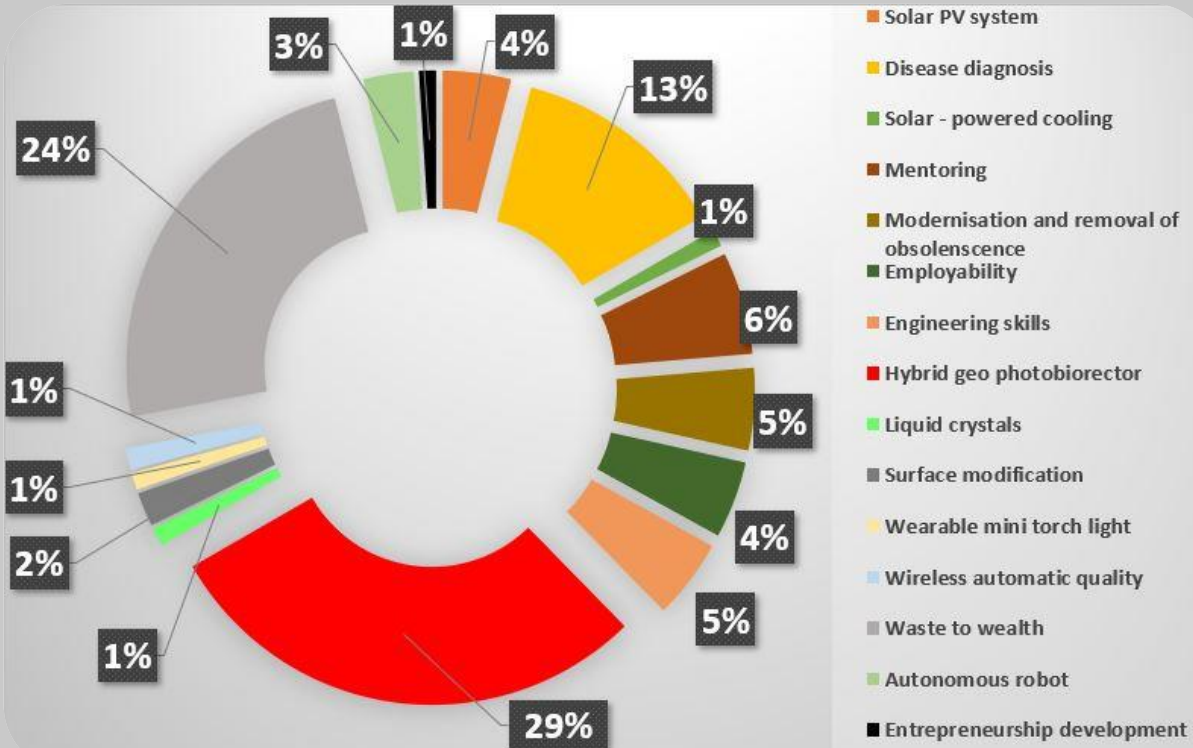
#### Scope

Design and develop technology to obtain fine fibers of the specific plant and develop machineries for its yarn and spinning

#### Core Objectives

- To design and develop the technology to obtain fine fibers of the specific plant and develop machineries for its yarn and spinning
- To document and disseminate traditional knowledge about distribution and uses of nettle
- Value addition through utilization of the entire plant and diversification of Nettle (Urtica dioica) fiber products
- Training of Naga tribal farmers on the technology package developed

## ONGOING FUNDED PROJECTS



## TNSCST SPONSORED RESEARCH PROJECT

### Body heat operated wearable mini torch light for rural areas



**Investigator :** Dr Sanjoy Deb, Associate Professor, Department of ECE

**Funding agency :** TNSCST – S&T

**Grant :** Rs.4,15,000

Government of Tamilnadu has sanctioned a research project to Dr Sanjoy Deb through Tamil Nadu State Council for Science and Technology (TNSCST) – SAT. He will be responsible for developing a prototype coupled with field trials for body heat operated wearable mini torch light for rural areas. The project has been sanctioned for a period of two years. The development of indigenous prototype titled “Wearable Mini Torch Light (WMTL)” is a novel research to be carried out by the faculty members of BIT. Once the prototype of WMTL is developed, it will be powered by human body heat using Thermoelectric Generator (TEG).

## DST SPONSORED ENTREPRENEURSHIP PROGRAMME - COMPLETED

### NIMAT – Entrepreneurship Awareness Camp



**Grantee :** Ms M Senthamarai, Assistant Professor (Level II) Department of Biotechnology

**Funding agency :** DST-NIMAT

**Grant :** Rs.60,000

Udyami - Entrepreneurship Development Cell of BIT was financially supported by National Science & Technology Entrepreneurship Development Board (NSTEDB), Dept. of Science & Technology, Govt. of India under the scheme DST -NIMAT to promote & strengthen science & technology based entrepreneurship. Since its inception in the year 2008, “Udyami” is continuously getting recognized through financial support from DST for organizing “Entrepreneurship Awareness Camp”. This camp was organized for three days with the eminent resource persons and first generation student entrepreneurs and industrialists.

## UGC-CSR Sponsored Research Project

### Surface modification of one dimensional metal oxide nanostructures by ion implementation for spintronics



**Investigator :** Dr K Senthil, Associate Professor, Department of Physics

**Funding agency :** UGC-CSR

**Grant :** Rs.7,05,240

#### Scope

To study the effect of ion implantation on the magnetic and gas sensing properties of metal oxide nanostructures

#### Features

The research focus is mainly on the synthesis of Metal Oxide based nanocomposites for multifunctional applications. The research facilities to synthesis various nanomaterials / nanocomposites by wet-chemical methods are incorporated. The main emphasis is on developing advanced nanomaterials for supercapacitor, battery, photocatalyst, antibacterial, gas sensor, spintronics, superhydrophobic coating and anti-corrosion applications.

## RESEARCH PROJECT FUNDED BY DST-CERI (Clean coal technology)

### Microbial recovery of biogenic methane from coal rejects with CO<sub>2</sub> sequestration using novel hybrid geo photobioreactor



**Investigator :** Dr R Ravikumar, Professor,  
Department of Biotech

**Funding agency :** DST-CERI

**Grant :** Rs. 84,40,000

#### Scope

To utilize the coal washery reject with a solid waste biomass and converting it into a wealth energy of Biomethane.

#### Features

- It is capable of simultaneous utilization of the carbondioxide gas released during the biochemical reaction for the growth of algae and extraction of valuable product.
- It has high potential in cosmetics, food and pharma industry.
- Biomethane gas can be utilized in house for cooking.
- This is a feasible technology.
- It can be transferred to all the mines in India.

## CONFERENCES ORGANIZED

### Name of the Conference

### Dept(s)

International Virtual Conference on Advancements in Automotive Technology (ICAAT) 2021

**Auto**

International Conference on Biomaterials and Biosensor Technologies (ICBBT 2021)

**Bio Medical**

Third Virtual National Conference on Metamorphosis of Modern Management and Research (3MR)

**SMS**

Eighth National Conference on Recent Advancements in Geotechnical Engineering (NCRAG'21)

**Civil**

National Conference on Mechatronics and Automation Systems (NCMAS)

**MTRS**

National Virtual Conference on Evolution and Future Scope of Mechanical Science (EFMS-2021)

**Mechanical**

National Virtual Conference on 'Quality Assurance' A Demanding aspect in Product Manufacturing

**Fashion Tech**

Virtual National Conference on Innovations in Information and Communication Technology (NCIICT-2021)

**ISE, CT, CSBS**

National Conference on Recent Advancements in Science, Engineering & Technologies (RASET 2021)

**ECE**

## AICTE Sponsored Scheme for Setting Startups

### Skill and Personality Development Programme Centre for SC/ST Students



**Investigator :** Dr K Balakrishnan, Professor, BIT - TBI

**Funding agency :** AICTE - Samriddhi

**Grant :** Rs.13,00,000

AICTE has sanctioned grant for the scheme entitled "SAMRIDDHI" for the benefit of SC/ ST students of BIT towards start-up creation. 9 idea based venture creation has been supported via BIT-TBI under this scheme. BIT-TBI has organized Capacity Building Programme entitled "IVP Funding Schemes for Start-ups" for selective incubates and students along with AICTE Samriddhi Scheme beneficiaries. Shri M R Jagannathan, Deputy Director, EDII, Chennai has been invited as guest. AICTE - New Delhi has conducted online meeting (project review) for the SAMRIDDHI Scheme beneficiaries of nine start-ups / teams.

## Programme(s) Funded by AICTE-ISTE - COMPLETED

### AICTE-ISTE – Short Term Training Programme

on

Hands-on training programme to utilize Artificial Intelligence algorithms and tools

**Grantee :** Dr A Bharathi, Professor, Department of Information Technology

**Funding agency :** AICTE - ISTE

**Grant :** Rs.3,15,000

### AICTE-ISTE – Short Term Training Programme

on

Recent trends in IoT and IIoT for real world applications through LoRa and LoRaWAN

**Grantee :** Dr K Premalatha, Professor, Department of CSE

**Funding agency :** AICTE - ISTE

**Grant :** Rs.4,01,667

### AICTE-ISTE – Short Term Training Programme

on

Recent trends in Computational Intelligence for healthcare monitoring

**Grantee :** Dr C Ganesh Babu, Professor, Dept. of EIE

**Funding agency :** AICTE - ISTE

**Grant :** Rs.3,05,000

## SELECTED RECENT PUBLICATIONS

1. Kokilavani, S., et al. "Decoration of Ag<sub>2</sub>WO<sub>4</sub> on Plate-Like MnS for Mitigating the Charge Recombination and Tuned Bandgap for Enhanced White Light Photocatalysis and Antibacterial Applications." *Journal of Alloys and Compounds*, vol. 889, 2022. doi:10.1016/j.jallcom.2021.161662.
2. Pongali Sathya Prabu, N., M. L. N. Madhu Mohan, and K. Pal. "Dielectric Responses and Stimulative Optical Shuttering Action of Self-Assembly Supramolecular Hydrogen Bond Liquid Crystalline Formation Via  $\alpha$ - and  $\gamma$ -Types Benzoic Acids." *Journal of Molecular Liquids*, vol. 343, 2021. doi:10.1016/j.molliq.2021.117386.
3. Sathish, D., and S. Jegadhgeswaran. "Evolution and Novel Accomplishments of Solar Pond, Desalination and Pond Coupled to Desalination Systems: A Review." *Journal of Thermal Analysis and Calorimetry*, vol. 146, no. 5, 2021, pp. 1923-1969. doi:10.1007/s10973-021-10579-8.
4. Selvakumar, S., P. Kulanthaivel, and B. Soundara. "Influence of Nano-Silica and Sodium Silicate on the Strength Characteristics of Clay Soil." *Nanotechnology for Environmental Engineering*, vol. 6, no. 3, 2021. doi:10.1007/s41204-021-00142-z.
5. Vandarkuzhali, S. A. A., G. Karthikyan, and M. P. Pachamuthu. "Microwave Assisted Biosynthesis of Borassus Flabellifer Fruit Mediated Silver and Gold Nanoparticles for Dye Reduction, Antibacterial and Anticancer Activity." *Journal of Environmental Chemical Engineering*, vol. 9, no. 6, 2021. doi:10.1016/j.jece.2021.106411.
6. Kokilavani, S., et al. "Ag<sub>2</sub>O Decorated Cr<sub>2</sub>S<sub>3</sub> NPs Embedded on PVP Matrix: A Colorimetric Probe for Selective and Rapid Detection of Sulphide Ions from Environmental Samples." *Spectrochimica Acta - Part A: Molecular and Biomolecular Spectroscopy*, vol. 264, 2022. doi:10.1016/j.saa.2021.120253.

8. Arulanantham, D., and C. Palanisamy. "Trusted Cognitive Sensor Based Dual Routing Network on Internet of Things." *International Journal of Communication Systems*, vol. 34, no. 10, 2021. doi:10.1002/dac.4836.
9. Kumar, G. S., and K. Premalatha. "Securing Private Information by Data Perturbation using Statistical Transformation with Three Dimensional Shearing [Formula Presented]." *Applied Soft Computing*, vol. 112, 2021. doi:10.1016/j.asoc.2021.107819.
10. Preethi, T., et al. "Effect of Hydrothermal Reaction Time on Structural, Optical, and Catalytic Properties of Tin Oxide Nanoparticles." *Brazilian Journal of Physics*, vol. 51, no. 4, 2021, pp. 1249-1254. doi:10.1007/s13538-021-00933-4.
11. Vasudevan, M., and N. Natarajan. "An Investigation on the Adaptability of Residential Rainwater Harvesting System in Tamil Nadu Technoeconomic Considerations and the Way Forward." *Water Science and Technology: Water Supply*, vol. 21, no. 5, 2021, pp. 1927-1938. doi:10.2166/ws.2020.249.
12. Arulanantham, D., et al. "An Energy Efficient Path Selection using Swarm Intelligence in IoT SN," vol. 1916, 2021. doi:10.1088/1742-6596/1916/1/012102.
13. Mohan, M. L. N. M., and K. Pal. "Camphoric Acid Based Ferroelectric Hydrogen Bonded Liquid Crystalline Materials Integration further Dielectric Relaxations and Novel Applications." *Journal of Molecular Structure*, vol. 1232, 2021. doi:10.1016/j.molstruc.2021.130022.
14. Selvaraj, A. R., et al. "Ultrahigh Surface Area Biomass Derived 3D Hierarchical Porous Carbon Nanosheet Electrodes for High Energy Density Supercapacitors." *Carbon*, vol. 174, 2021, pp. 463-474. doi:10.1016/j.carbon.2020.12.052.

## *Address for Communication*

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