IEI Epitome

September 2020, Volume 5, Number 9

A Century of Service to the Nation

# Contents

# Members in the News

**Mr Nirupam Choudhury, AMIE**
*M/s Ramkrishna Electronics, A Micro Enterprise under DICC, Cachar, Assam*


Developed Portable Touchless Sanitizer Dispenser Machine, where Infrared (IR) Sensors are applied for signal transmitting and signal receiving. The onboard circuit includes a fabricated voltage comparator using an Operational Amplifier (OP-AMP) with 5V, 1 A power supply, which can be delivered by a mobile phone charging adapter. When the circuit is powered, the IR sensor emits IR signal which after finding an obstruction from an object, suppose body surface, will be reflected back to IR receiver. The signal received by the receiver module is then processed through the OP-AMP which produces an output voltage, used to drive a mini submersible motor with power transistor. So when a person keeps his palm under the dispensing machine, the onboard sensor immediately senses the obstruction and starts spraying sanitizer in the palm of your hand. The sensing range is around 5-8 cm which can be further manually adjusted by rotating the sensitivity adjuster button fitted in the machine. The machine is useful for hospitals, offices, educational institutions etc.

**Dr Kaarthik M, MIE**
*Assistant Professor, Department of Civil Engineering, Coimbatore Institute of Technology, Coimbatore*

Delivered Lecture on "Scientific Disposal of Solid Waste" during AICTE Sponsored one-week STTP Series-I titled "Industrial and Municipal Solid Waste for Green India" on 23 July 2020.

Delivered Lecture on "Engineering Errors by Man" in the Webinar organised by Assertion of Consulting Civil Engineers (India), Coimbatore Centre on 24 July 2020.

**Mr Vinay Kumar Shukla, FIE**
*Manager (Instrumentation), Urea Instrument Department, National Fertilizers Limited, Bathinda Unit*

Awarded with Commendation Certificate for his suggestion regarding provision of Belt Sway System on Urea Conveyor Belts on the occasion of celebrartion of Independence Day in the year 2020.

**Mr Amit Kumar Dash, AMIE**
*Proprietor, Deepanjali Sanitation*

Awarded the Indian Achievers' Award, 2020 for Young Entrepreneur by Indian Achievers' Forum in recognition of outstanding professional achievement and inspiring social contribution.

**Dr Ankan Bhattacharya, AMIE**
*Assistant Professor, Department of Electronics & Communication Engineering, Mallabhum Institute of Technology, Bishnupur, West Bengal*

Appointed as a Guest Editor of SN Applied Sciences, a multi-disciplinary, peer-reviewed journal of Springer Nature.

# Publication
## by Members

**Prof (Dr) Jagtar Singh Sivia, FIE**

*Council Member, IEI and Professor & Head, ECE, Punjabi University, GKC, Talwandi Sabo Campus, Bathinda, Punjab*

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**Title of Paper:** "Giuseppe Peano and Cantor Set Fractals based Miniaturized Hybrid Fractal Antenna for Biomedical Applications using Artificial Neural Network and Firefly Algorithm", *International Journal of RF and Microwave Computer-Aided Engineering, 30 (1), 2020.*

https://doi.org/10.1002/mmce.22000

Co-author : Manpreet Kaur

**Abstract:** In this research paper, Giuseppe Peano and Cantor set fractals based miniaturized hybrid fractal antenna (GCHFA) is proposed that operates for biomedical applications. The proposed GCHFA is designed by merging Giuseppe Peano and Cantor set fractals that help in achieving better performance characteristics as well as miniaturization. Firefly algorithm (FA) has been employed to optimize the feed position of the designed antenna. The substrate material selected for the proposed GCHFA is low-cost, commercially available FR4 epoxy whose thickness is 1.6mm and relative permittivity is 4.4. A data set of 65 GCHFAs with different geometrical parameters is generated for the realization of two different bioinspired approaches. For the performance evaluation of fabricated prototype, vector network analyzer is used. The experimentally observed resonant frequencies are 2.4400 and 5.8115GHz, and at these resonant frequencies, S (1,1)<−10 dB. The designed antenna is suitable for Industrial, Scientific, and Medical bands of biomedical applications. Moreover, the behavior of the proposed GCHFA is nearly omnidirectional. A comparative study of three different artificial neural networks (ANNs) is also done to evaluate the most suitable ANN type for the analysis of proposed GCHFA. The optimized, simulated, and experimental results depict that they are closely matched.

***Keywords:*** Artificial Neural Networks; Biomedical Applications; Feed Position; Fire Fly Algorithm; Hybrid Fractal Antenna; Resonant Frequency.

**Title of Paper :** "ANN and FA Based Design of Hybrid Fractal Antenna for ISM Band Applications," *Progress In Electromagnetics Research C, 98, 2020, pp 127-140.*

DoI:10.2528/PIERC19110901

Co-author : Manpreet Kaur

**Abstract:** In this paper, a compact Giuseppe Peano, Cantor Set and Sierpinski Carpet fractals based hybrid fractal Antenna (GCSA) is designed and developed for Industrial, Scientific and Medical (ISM) band applications. The proposed GCSA is a hybrid fractal design which is created by fusing Giuseppe Peano, Cantor set and Sierpinski carpet fractals together. The optimization of the microstrip line feed position is performed by using a Firefly Algorithm (FA). The substrate material employed for proposed GCSA is a low-priced, easily available FR4 epoxy of thickness 1.6 mm. By varying the geometrical dimensions of the radiating patch, a data set of 58 GCSAs is randomly generated for the realization of Artificial Neural Network (ANN) and FA approaches. The designed structure is fabricated and then measured results are evaluated. The proposed GCSA is capable of resonating at 2.4450 GHz with S(1,1) < -10 dB. The measured bandwidth of the operating ISM band is 101 MHz. The quantitative performance of three different ANN types reveals that Feed Forward Back Propagation ANN (FFBPN) shows minimum error in comparison to other two ANN types. The simulated, experimental and optimized results show a good match that specifies the preciseness of the measurement.

# Publication
## by Members

**Mr Kaviarasu Chinnaiyan, AMIE**
*Department of Mechanical Engineering, Arasu Engineering College, Tamilnadu*
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**Title of Book Chapter:** "Nanomaterials through Powder Metallurgy: Production, Processing, and Potential Applications toward Energy and Environment", *In: Kharissova O, Martínez L, Kharisov B (eds) Handbook of Nanomaterials and Nanocomposites for Energy and Environmental Applications. Springer, Cham, 2020; Online ISBN :978-3-030-11155-7.*

https://doi.org/10.1007/978-3-030-11155-7_127-1

Co-author : Ravichandran M

**Abstract:** Significant progresses in materials science and engineering have developed a novel technology in which materials can be designed and engineered at nanoscale, so-called nanotechnology. Nanomaterials with property being custom-made by nanotechnology have influenced many research and advancement in the field of engineering, science, and technology with peerless novel applications which are far beyond the conventional one. Nanomaterials are synthesized in different shapes like powder particles, rods, wires, tubes, and as thin films which are merely based on the fabrication route one employs. Nanopowders with remarkable properties like high surface to volume ratio, low heat capacity, dispersibility, wettability, adhesive nature, range of size, and usage flexibility have earned a research spotlight. Nanopowders in the form of metals, metal oxides, and ceramics are the most extensively used candidates in powder metallurgy for making nanocomposites. However, the choice of nanopowders for making composites is always confined with a specific objective one deals with; say for example zinc, iron oxide, and titanium oxide are opted to improve corrosion resistance, thermal layer insulation, and self-cleaning ability of a base material, respectively. Mechanical alloying and powder metallurgy are the most preferred techniques employed for processing metal matrix composites at nanoscale. This chapter reviews the fundamentals on nanoparticles, powder processing via mechanical alloying and powder metallurgy, powder characterization techniques, choice of nanopowders in making nanocomposites, and their potential applications toward energy and environment.

**Prof P Mohanraj, FIE**
*Department of Knitwear Design, National Institute of Fashion Technology, Kannur*
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**Title of Paper:** "Tripodal of Visual Merchandising in Fashion Apparel Retail Stores: A Study', *International Journal of Research and Review. 7(6), 2020, pp 453-464.*

https://www.ijrrjournal.com/IJRR_Vol.7_Issue.6_June2020/IJRR0060.pdf

Co-author: Gopalakrishnan S

**Abstract:** In this millennium the organized fashion retailing is no longer selling, displaying the apparels or the customer service where Visual merchandising plays an important role. Visual merchandising is a presentation of merchandise to best-selling advantage and for maximum traffic exposure, plus projection of customer "ready-to-buy". Visual merchandising creates the in-store environment that supports the retailer's marketing and merchandising strategies which sets the mood, invites, attracts, welcomes and informs the shoppers. In this study an attempt has been made to identify the awareness among the consumers about the visual merchandising in particular to the fashion apparel retail stores. About 175 questionnaires were distributed randomly to the customers of different types of fashion apparel stores in malls situated in Chennai, Tamil Nadu, India. Out of which 149 were responded. The response rate works out to 85.14%. The concept of visual merchandising has been analysed using 13 variables such as Color& lighting; Fragrance & music; Interior wallpaper &carpets; Thematic display: the story behind; Arrangement; Ease of access; Employee team; Variety & Volume; Arousal; Dominance; Perceived Store Luxury; Pleasure and Store choice in a five-point scale. The alpha value for all the 13 variables works out to 0.8579 which indicates that the variables are good for the study. The factorial method of data reduction technique enabled to group the variables in to three components and the components were named as Ambience/Décor; Merchandise; and Perceived Store Luxury, Emotions and Choice. The alpha value for all the three factors were 0.7736; 0.8100 and 0.8250 which indicates that all the variables are acceptable in nature for further study. The first three preferences of Ambience/décor were Color& lighting; Fragrance & music; and Interior, wallpaper &carpets. In the case of merchandising the preference were Variety & volume of merchandise; ease of access to merchandise; and Employee team. In the case of Perceived Store Luxury, the preferences were Perceived Store Luxury; Emotions and Store Choice. In this study SEM model has been employed to indicate the strength of the relationships between the factors taken for the study. In all the study indicates Fragrance, Interior and arrangement of merchandise were expected to have top preference.

***Keywords:*** Visual Merchandising; Ambience/ Décor; Merchandise; Perceived Store Luxury; Arousal

# Publication
## by Members

**Dr Ramesh Chandra Nayak, MIE**
*Associate Professor, Department of Mechanical Engineering, Synergy Institute of Technology, Bhubaneswar*
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**Title of Paper:** "Mechanical Concept Applicable for Continuous Irrigation System: An Extra Challenge Towards Shortage of Petrol, Diesel and Unavailability of Electric Supply in Odisha for Agriculture", *Journal of Engineering Research and Application ,ISSN: 2248-9622, 10(3), Series -V, 2020, pp 43-46.*

https://www.researchgate.net/publication/340511126

Co-authors : Manmatha K Roul, Abinash Sahoo, Jogeswari Rout

***Abstract:*** Agriculture is the strength of Indian financial system. It includes all those behavior which are connected to the farming of land for production of crops. It also found that in India the historical, social and cultural background of state affects agricultural output. agriculture is a basis of occupation for underprivileged farmers in india. Irrigation is the controlled application of water for agricultural purposes by rainfall, diesel-driven pumps, electricity supply. Weather in India is becoming progressively more complicated to forecast, both in the short and the long phrase. In India four seasons based on the climate. Summer, winter, autumn, and spring are found but now a days farmers are facing so difficulties like in rainy season the percentage of rainfall is so less. In summer season number of cyclones are there. Awfully Severe Cyclonic Storm Fani was the strongest tropical cyclone strike the Indian state of Odisha on date 26th april 2019, that was the summer season. After that cyclone there was failure of current supply for at least 30 days, all petrol tanks remain closed for number of days, farmers were suffered a lot for that purpose, an energy disaster is any considerable bottleneck in the provide of energy resources to an economy. So it can told access to dependable and reasonable irrigation water for agriculture is a vital factor for the economic growth of the country. In this work a product has been developed where mechanical advantage, Velocity ratio, efficiency, gear terminology, energy store by flywheel concepts has been used and finally water lifting from tube well is possible without diesel pump or electricity.

***Keywords:*** Agriculture; Crops; Energy Resources; Economy; Petrol; Diesel; Electric Supply

**Dr Om Prakash, FIE**
*Professor, Department of Aerospace Engineering, University of Petroleum & Energy Studies, Dehradun, Uttarakhand*
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**Title of Paper:** "Multibody Dynamics of Winged Hybrid Airship Payload Delivery System", *AIAA 2020-3200, Session: Modeling and Simulation for Aircraft Dynamics and Performance, 2020.*

https://doi.org/10.2514/6.2020-3200

**Abstract:** Recent developments in Hybrid-airships indicate its potential as aerial delivery vehicle of goods as well as personnel. The addition of wing to conventional Airship not only adds to its lifting capability but enhances its controllability with addition of ailerons for lateral control. The wing locations directly affect its stability and control aspects. This paper presents scope for multibody modeling and simulation of winged hybrid airship, and its application for payload delivery..

***Keywords:*** Winged Hybrid Airship; Stability and Control; Modeling and Simulation; Payload.

**Title of Paper:** "NDI based Generic Heading Tracking Control Law for Parafoil/Payload System", *AIAA 2020-3195, Session: Modeling and Simulation for Guidance, Navigation, and Control, 2020.*

https://doi.org/10.2514/6.2020-3195

**Abstract:** The parafoil-payload system, consisting of ram-air inflated wing shaped lifting canopy and suspended bluff body shaped payload, experiences pendulum stability in longitudinal and lateral dynamics due to large suspension lines which enables it's post-stall stable flight. The spanwise curved anhedral shaped canopy assists in directional stability. Thus, parafoil/payload system can be used for safe guided delivery of payload at a designated targeted area, or to multiple targets from a single launch. A full 9 DOF two-body dynamic model can be used to capture these distinct motions along with pendulum stability effect. This paper presents Nonlinear Dynamic Inversion(NDI) technique using 9-DOF model to propose generic heading tracking control law of Parafoil/payload System with multibody dynamics and nonlinear Aerodynamic data.

***Keywords:*** Parafoil/Payload System; NDI; 9-DOF; Heading Tracking.

# Publication
## by Members

**Mr P Mahadevan, AMIE**
*Ph.D. Research Scholar, Department of Civil Engineering, School of Environmental and Construction Technology, Kalasalingam Academy of Research and Education (KARE), (Deemed to be University), Tamil Nadu*

Email: mahasqr@gmail.com

**Title of Paper:** "Statistical Studies on Planning for Water Resource Management on Vaigai Reservoir Catchment on Vaigai River, Tamil Nadu State, India", *Indian Journal of Geo Marine Sciences (IJMS), ISSN: 0975-1033 (Online), 0379-5136 (Print), 49(4), 2020, pp 665-677.*

http://nopr.niscair.res.in/handle/123456789/54642

Co-author : Dr S N Ramaswamy

**Abstract:** Irregular and occasional rainfall poses problems for the government authorities to meet the demand of water for drinking and agricultural tenacities of the people dwelling in four important districts of Tamil Nadu viz. Madurai, Theni, Sivagangai and Ramanathapuram. Proper design and management of water resources is essential to address this issue. Therefore, a study on spatio-temporal variations on rainfall trend was done over the Vaigai river catchment, based on the long-term rainfall records for the period from 1959 to 2016. Trend analyses were examined at seven stations by the Kendall's Tau (non-parametric test) to determine the trends. Sen's slope estimator was used to estimate the slope of trend, Cumulative deviations & CUMSUM test were used to identify shift detection for yearly and seasonal rainfall seasons. The analysis displayed a reduction in rainfall in catchment area for most of the rainfall stations except Periyakulam and Veerapandi stations for the past 58-year period spatio-temporally. Also, the findings of change point detection, predicted for yearly and seasonal rainfall series by Cumulative deviations & CUMSUM tests are in agreement with the existence of shift deduction during 1988 over these two stations. The findings will help the authorities for effective planning of irrigation systems, storage and distribution of available water.

***Keywords:*** CUMSUM Test; Kendall's Tau Tests; Rainfall; Reservoir; Sen's Slope Estimator; Trend Analysis.

**Dr Punith Kumar M B, AMIE**
*Associate Professor, Department of Electronics and Communication, PES College of Engineering, Mandya*

Email: punithpes@gmail.com

**Title of Paper:** "Automated Quality Inspection of PCB Assembly Using Image Processing", *International Journal of Image, Graphics and Signal Processing, 3, 2020, pp 13-19.*

DoI: 10.5815/ijigsp.2020.03.02

Co-authors: Dr Shreekanth T, Prajwal M R

**Abstract:** Quality inspection of PCB is a crucial stage in the assembly line as it provides an insight on whether the board works correctly or not. When the inspection is done manually, it is susceptible to human errors and is time consuming. The boards should thus be inspected at every stage of the assembly line and the process should be dynamic. This is achieved in this work through three crucial stages in the assembly line and by replacing the conventional manual inspection by using image processing to obtain a faster and more precise quality inspection. The solder paste inspection consists of pre-processing using blue plane conversion, comparing with the unsoldered board in blue color plane and post processing using overlay. The X-ray inspection basically consists of pre- processing the captured image by RGB to gray conversion with thresholding, comparing with the expected image and post processing using overlay to show the shorts that has occurred along the assembly. The conformal coating inspection uses conversion of the blue intensity emitted off the board under UV light to RGB scale. Each of the algorithms were tested using 48 actual in-production boards from Vinyas IT Pvt Ltd, a PCB assembly company based in Mysore. The processing time of the algorithms were found to be less than 2 seconds with an accuracy of 85.7%. The system was also found to be cost effective over existing systems available in the market.

***Keywords:*** Image Processing; Solder Paste; X-Ray; Conformal Coating; PCB; Automation

# Publication by Members

**Ms Usha Gautam, AMIE**

*Research Scholar, Netaji Subhas Institute of Technology, University of Delhi*

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**Title of Paper:** "Optimal Design and Implementation of Compact Fractional Order Microwave Integrator", *International Journal of RF and Microwave Computer-Aided Engineering, 30(8), 2020.*

https://doi.org/10.1002/mmce.22260

Co-authors: Tarun K Rawat, Apoorva Aggarwal

**Abstract:** The implementation of novel, stable, accurate, and wideband infinite impulse response fractional order microwave integrators (FOMIs) is presented. The formulation of FOMIs is employed with equal length line elements in cascading. The optimum values of characteristic impedances of the line elements are determined by approximation to the ideal fractional order integrator (FOI). The hybrid algorithm (HPSO-GSA) combining particle swarm optimization (PSO) and gravitational search algorithm (GSA) which integrates PSO's exploitation and GSA's exploration ability is used. The comparison of HPSO-GSA with PSO and GSA is carried out for the proposed FOMIs. The performance criteria used are magnitude response, absolute magnitude error, phase response, pole-zero response, percentage improvement graph, and convergence rate. The simulation analysis affirms the superiority of proposed FOMI using HPSO-GSA. The absolute magnitude error of proposed 0.5 order HPSO-GSA-based FOMI is as low as 0.9436. The structure of the designed FOI is implemented with microstrip configuration on RT/Duroid substrate with permittivity 2.2 and thickness 0.762 mm that is eligible for wideband microwave integrator. The designed FOMI is compact in size and suitable to cover microwave applications. The measured results are established in fine agreement with simulation results in the frequency range of 2-9 GHz in MATLAB and Advanced Design Software environment.

***Keywords:*** Fractional Order; Gravitational Search Algorithm; Hybrid PSO-GSA, Hybridization; IIR Filter; Microwave Integrator; Particle Swarm Optimization.

**Title of Paper :** "Optimal Design of Compact Microwave Fractional Order Differentiator", *Journal of Microwave Power and Electromagnetic Energy, 54 (3), 2020, pp 210-229.*

https://www.tandfonline.com/doi/full/10.1080/08327823.2020.1794723

Co-authors: Tarun Kumar Rawat, Apoorva Aggarwal, Dharmendra Kumar Upadhyay

**Abstract :** This paper presents a stable, accurate and wideband microwave fractional order differentiator (MFOD) based on infinite impulse response filter. The fractional order differentiator (FOD) design problem is formulated in the z-domain. This formulation alliances with the transmission line elements in cascading. Real coded genetic algorithm (RCGA), particle swarm optimization (PSO) and cuckoo search algorithm (CSA) are applied to determine the optimum values of the characteristic impedances of the transmission line elements. The performance measure criterion of CSA algorithm as compared with other nature inspired algorithms-based differentiator are carried by the magnitude response, absolute magnitude error, phase response, pole-zero response, percentage improvement graph and convergence rate. The simulation and statistical analysis clearly affirm that the proposed MFOD using CSA outperforms RCGA and PSO in all state-of-the-art. The absolute magnitude error for the designed fifth order is as low as 2.9022. The designed fractional order differentiator is implemented in the form of microstrip on RT/Duroid substrate with dielectric constant 2.2 and thickness 0.762 mm, that is eligible for wideband microwave differentiator. The proposed design is compact in size and has low absolute magnitude error over the entire bandwidth. The measured result agrees well with the simulated result in the frequency range 1–12.5 GHz in MATLAB and advanced design software (ADS) environment.

***Keywords:*** Equal Length; Fractional Order; Microwave Differentiator; Optimization; Transmission Line.

# Publication
## by Members

**Mr S Saravanan, AMIE**
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**Title of Paper:** "Waste to Energy Technologies for Sustainable MSW Management - An Overview", *International Journal of Technical Innovation in Modern Engineering & Science (IJTIMES),e-ISSN: 2455-2585, 6(1), 2020.*

http://www.ijtimes.com/papers/finished_papers/IJTIMES06I01151130133648.pdf

Co-authors : Prashant P Angarakh, P Bhaskar Rao, C Vijay Kumar

**Abstract** : Rapid population growth, Urbanization, Industrial growth is increasing the generation of municipal solid waste (MSW) day by day in developing countries like India. The management of MSW is very severe problem and biggest challenge not only because of environmental and aesthetic concerns but also the potential threat to public health, resulting improper and non-scientific handling of municipal waste due to enormous quantities generated every day. In India the average MSW generation is 450 gm/per capita/day. Inappropriate disposal of waste creates various health effects and pollution in the environment. The preferred Integrated Solid Waste Management System (ISWMS) strategies within the hierarchy includes at-Source Reduction and Reuse, Recycling, Composting, Waste to Energy (WtE) & Landfills. Among these WtE is safe, economical, eco-friendly, minimizes the amount of disposal of MSW, and also accepted socially. Recovering energy before final disposal of MSW can be achieved through production of heat, electricity, or fuel and WtE technologies viz. Incineration, Pyrolysis (syngas), Gasification, Refuse derived fuel(RDF), fuel in cement kilns/Iron/steel industries, biodiesel, etc. through thermal, biological and chemical processes. Segregation of wastes at source is highly important to make the system more efficient for energy recovery and involvement of all investors and Govt. also in effectively managing MSW to fulfil the objective of zero waste going to landfills. This paper deliberates on how WtE technology is feasible, financially reasonable, environmentally benefit able, analysis of energy generation, revenue from waste, status of WtE plants, issues and challenges of handling waste, separation methods, pollution control, public awareness and selection of suitable disposal technologies ensuring successful integrated MSW management and also consider the future aspects of WtE in India along with a few recommendations for the course of action and for developing better, effective WtE technologies as part of 'Swachh Bharat Mission'.

***Keywords :*** Waste to Energy; Integrated Municipal Solid Waste management; Technologies; Standards; Pollution

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Title of Paper: "The Role of Customer Relationship Management in Auto Car Industry in Building Customer Relationship in After Sales Department", *Journal of Critical Reviews, 7(11), 2020, pp 3826-3834.*

http://www.jcreview.com/fulltext/197-1595748065.pdf?1601295518

Co-author : Dr. Arvind Kumar Jain

**Abstract :** Customer Relationship Management mostly called as CRM is a combination of 3P's People, Process, and Planning through proper technology. It is philosophy itself which means management of customers through a proper organization management. It seeks clear understanding of all people working in organizations and for customers, so that both present and future to be on the same platform. It is also called as an integrated approach to managing relationships of service provider and customer by focusing the customer retention. During the study in auto car segment, it was found that there exists a co−relation in consumers, how they differ from customer to customer. It is also needed of the hour, that a good and scientific framework is incorporated in all corporates for communication which leads to good customer return in the after−sales care industry. Also, it was found that three important factors that are important for customer relationships are as below:-1) Timely update 2) Cost of Repair & 3) The transparent system for checking the status of car at the workshop without human intervention. These three factors would help in better customer relationships and hence would have a great impact on profitability and customer loyalty and should not be ignored.

***Keywords***: Customer Relationship Management (CRM); Customer Retention; Value for Money; Customer Relationship; Service Advisor; Time update; Customer Satisfaction; Auto Car Dealership

# Publication
## by Members

**Mr Rahul Kumar, AMIE**
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**Title of Paper:** "Development of Remote Wireless Environmental Conditions Measurement, Monitoring and Recording Device for Metrological and Other Scientific Applications", *MAPAN 35, 2020, pp 193-199.*

https://link.springer.com/article/10.1007/s12647-020-00368-3

Co-authors : P K Dubey, Afaqul Zafer, Ashok Kumar, Sanjay Yadav

**Abstract** : Measurement, monitoring and recording of the environmental condition is the essential and sometimes statutory requirements, to observe the small change or deviation in the results of measurements in calibration and testing laboratories as well as other scientific applications. This motivated the authors to develop a precision wireless environment conditions, measurement, monitoring and recording (WEMMR) device. The present paper describes the design and development of an indigenous precision WEMMR device. The WEMMR is comprised of a micro-electromechanical sensor (MEMS; BME-280) capable to measure, monitor and record three parameters related to prevailing environmental conditions in the room, i.e., ambient temperature (T) in the range (0–100) C, ambient pressure (P) in the range (300–1100) mbar and relative humidity (H) from (0–100)%. The system was developed using microcontroller (ATmega328) and Wi-Fi module (ESP8266) for wireless operation. These environmental conditions were also used to determine the prevailing air density (qair) in the room and display the same on the monitoring panel. The monitoring and recording of qair are extremely important parameters in measurement and realization of mass and mass-related quantities, i.e., force, pressure, flow and ultrasonic power. Apart from monitoring, recording of the data device is also capable to transmit the data to remotely located computer through internet connectivity. The developed WEMMR device had been calibrated against national standards available at the National Physical Laboratory, India, for ambient temperature, ambient pressure and humidity ranged for (10–50) C, (300–1100) mbar and (30–80)%, respectively. The uncertainty in the ambient temperature, ambient pressure and relative humidity has been evaluated as ± 0.37 C, ± 0.31 mbar and ± 0.71%, respectively.

***Keywords :*** Wireless; Environment Condition; Metrology; Uncertainity

**Dr Omkar Suresh Vaidya, MIE**
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**Title of Paper:** "Qualified Scrutiny for Real-Time Object Tracking Framework", *International Journal on Emerging Technologies, ISSN No. (Print): 0975-8364, ISSN No. (Online): 2249-3255, 11(3), 2020, pp 313-319.*

https://www.researchtrend.net/ijet/pdf/Qualified%20Scrutiny%20for%20RealT ime%20Object%20Tracking%20Framework%20RAVINDRA%20R%20PATIL%202229j6.pdf

Co-authors : Ravindra R Patil, Gayatri M Phade, Sanjay T Gandhe

**Abstract** : In this modern edge of the world, life is turning out to be more and more palatial due to resourceful technology but security is an overriding concern. The tracking offered significant robustness to the security approaches. The discipline is generally based on interest such as pedestrian tracking, vehicle tracking, surveillance systems, etc. This paper represents qualified scrutiny for tracking API's in OpenCV such as BOOSTING, TLD, MEDIANFLOW, MIL, MOSSE, CSRT, KCF, and GOTURN for speed and accuracy. The newer cost effective, powerful Raspberry Pi 3 Model B+ and another Intel ULV Processor with lofty specifications are two different systems used for running OpenCV and webcam for capturing real-time video frames for further analysis. It is a really tricky and challenging part to work on these two distinct systems and different natured trackers for accomplishing a task of tracking for intended consequences of visual upshots and computations which highly differs in many technical aspects. The python language is used for effective coding due to its simple syntax with multi-threading in OpenCV. From experimental results, the qualified scrutiny has evidenced or substantiated that which tracker will be pre-eminent for real-time tracking framework in the practical world according to essentials.

***Keywords:*** Intel ULV Processor; Object Tracking; OpenCV; Python; Qualified Scrutiny; Raspberry Pi 3 Model B+

# Publication
## by Members

**Dr G V S Rama Krishna, MIE**
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**Title of Paper:** "Antibacterial and Cytotoxicity Activities of Bioactive Compounds from Micrococcus Species OUS9 Isolated from Sea Water", *Journal of King Saud University-Science, 32(6), 2020, pp 2818-2825.*

https://doi.org/10.1016/j.jksus.2020.07.003

Co-authors : K Shanthi Kumari, P Shivakrishna , Atef M, Al-Attar

**Abstract** : Bacterial screenings were collected from Nellore coastal regions of Bapatla and Vishakhapatnam from south India. Altogether, 29 bacterial isolates were attained from seawater and sediment samples consuming Zobel-culture media (pH = 7.3 ± 0.2) and incubated at 27 °C of temperature. Among these 29 bacterial isolates, 3 bacterial strains were shown the highest zone of inhibition producing the molecular characterization. The strains of Micrococcus species OUS9 was demonstrated to be potential. To characterize such activity and recognize the promising isolates, further research is required. This new natural biological product is also used in enormous sectors, pharmaceutical and food industries for preservation of natural environment. This study has confirmed that the bacteria isolates environment for halophilic bacterial growth, where there are numerous bacterial communities and many industrial applications are possible.

***Keywords:*** Industrial Applications; Zobel; Micrococcus sp. OUS9.

**Title of Paper:** "Wound Healing Activities of the Bioactive Compounds from Micrococcus sp. OUS9 Isolated from Marine Water", *Saudi Journal of Biological Sciences, 27(9), 2020, pp 2398-2402.*

https://doi.org/10.1016/j.sjbs.2020.05.007

Co-Authors: K Shanthi Kumari, Pabba Shivakrishna, V.S. Ramakrishna Ganduri

**Abstract:** Marine species are increasingly important as a source of specific biological active metabolites. Marine species comprise almost half of global biodiversity. Oceans and sea are thus the biggest source of positive natural compounds that could be utilized in the pharmaceutical industry as functional constituents. In the present study was to find out the wound healing property of the bioactive compounds from Micrococcus sp. OUS9 isolated from marine source. The in vivo wound healing activity was studied using excision wound model. The KLUF 10 and KLUF13 ointment was prepared and used to determine wound healing activity in albino rats. Topical application of the ointment enhanced the contraction of wound in contrast with rat control group. KLUF13 had shown strong healing ability in wounds and had a positive influence on the various phases of wound repair.

***Keywords:*** Marine; Micrococcus sp. OUS9; KLUF 10; KLUF13; Wound Healing.

**Title of Paper:** "Formulation of Pullulan/Plasticizer Blended Films for their Physical and Biodegradability Studies", *Current Trends in Biotechnology and Pharmacy, 14(4), 2020, pp 31-38.*

https://www.researchgate.net/publication/342131265_Formulation_of_Pullulanplasticizer_blended_films_for_their_physical_and_biodegradability_studies/citations

Co-Authors: M Usha Kiranmayi, Rao K R S Sambasiva, Podha Sudhakar

**Abstract:** The present investigation utilizes the ecoefficient pullulan polysaccharide as film forming biopolymer. Pullulan-based edible films offer good physical, thermal and mechanical properties which enable them to use in shelf-life preservation of fresh produce. Blends of other film forming polysaccharides, plasticizers and an antioxidant with pullulan (Pu) solution were prepared in order to determine physical and optical parameters of those films. The morphological and biodegradable studies were attempted to identify the changes on the films' surfaces. The films made from (only) pullulan (10Pu), pullulan composited with sodium alginate(10Pu_0.5SA), gelatin (10Pu_0.5G), polyethylene glycol (10Pu_0.5PG), calcium chloride and lemon juice (10Pu_1CC_2L) resulted heavier film densities, higher whiteness indexes and lower total color difference values. All the films were tested for their biodegradability in soil, where visual changes were appreciated after 15 days, partial and complete degradation took place at the end of 34 days and 53 days, respectively. Thus, these pullulan blended films could be a better replacement for synthetic films towards environmental problems.

***Keywords:*** Pullulan; Plasticizers; Antioxidant; Edible Film; Biodegradable.

# Publication
## by Members

**Dr. Ashok Kumar Srinivasan, MIE**
*Jyothishmathi Institute of Technological Sciences, Hyderabad*
Email: srinivasan.ashokkumar@jits.edu.in

**Title of Paper:** "Design of CPW-Fed Inverted Six Shaped Antenna for IoT Applications", *Transaction on Electricals and Electronic Materials, Springer, 21, 2020, pp 524–527 .*
https://doi.org/10.1007/s42341-020-00213-z
Co-author : T Shanmuganantham

**Abstract:** In this paper a novel coplanar waveguide fed antenna with inverted six shaped configuration having wide band attributes, proposed and designed on a FR4 substrate. The dimensions of the designed antenna are 54 mm×38 mm. Few rounded corners system is used in this design to improve the bandwidth and gain of proposed antenna. Being a simple antenna, it makes it extremely reasonable for the future generation of Internet of Tings applications. A well-ordered outline process is completed to get an upgraded plan for good impedance matching in the required band. The Reflection coefficients along with the current densities at various phases of the design process are discussed and analyzed to get a decent understanding into the proposed antenna plan. The proposed antenna exhibits stable radiation, having low back lobes and low cross polarization and having greatest gain 6 dBi.

***Keywords :*** Coplanar Waveguide; Internet of Things; Six Shape Antenna; FR4

**Title of Paper:** "Design of Wideband Patch Antenna with Compact CPW Feeding Network for L-Band Applications", *2020 URSI Regional Conference on Radio Science ( URSI-RCRS), Varanasi, India, 2020, pp 1-4.*
https://doi.org/10.23919/URSIRCRS49211.2020.9113579
Co-author : T Shanmuganantham

**Abstract:** In this paper T shaped microstrip monopole Antenna has been designed and proposed here for L band Applications. This proposed antenna structure involves a symmetric T slot concerning rectangular patch. The Results demonstrate that T Slot receiving antenna operated at frequency range from 1.2 to 1.7GHz, which is able to accomplish least voltage with great transmission capacity and radiation properties. Finally a Microstrip patch antenna working at full resonating frequency 1.5 GHz is designed. Operating frequency of the L band is in the range of 1 GHz to 2 GHz. Wavelength of L band from 30 cm to 15cm. Major Applications in the L-band are Radars , Radio , Telecommunication , Global positioning system(GPS) and Air Craft surveillance.

***Keywords:*** Monopole; Antenna; L Band Applications

**Title of Paper:** "Scalp – Implantable Antenna for Biomedical Applications", *2020 URSI Regional Conference on Radio Science (URSI-RCRS), Varanasi, India, 2020, pp 1-4.*
DoI: 10.23919/URSIRCRS49211.2020.9113574
Co-author : T Shanmuganantham

**Abstract:** This paper presents implantable antenna systems which are miniaturized and it is proposed for biomedical applications, particularly for scalp administration. The advanced prototypes reveal the broad band features on the industrial, scientific, and medical (ISM) bands. Every structure is concatenated with the microelectronic constituents and a battery. The methodology and the operation are discussed briefly in this paper. The results of scalp implantable antenna produces a band from 0.9GHz to 0.92GHz. The measurements are fulfilled in an isotonic solution of sodium chloride for validation. The antenna proposes a fine accordance between the simulated and firmed results and to examine the range of the data transmission, a link budget is calculated.

***Keywords:*** Biomedical Applications; Microstrip Antenna; Dual-band and Link Budget etc.

**Mr Manasi R Mulay, AMIE**
*School of Engineering, Indian Institute of Technology Mandi, Himachal Pradesh*
Email: manasi.r.mulay@gmail.com

**Title of Paper:** "Candle Soot: Journey from a Pollutant to a Functional Material", *Carbon, 144, 2019, pp 684-712.*
https://doi.org/10.1016/j.carbon.2018.12.083
Co-authors : Aditya Chauhan, Satyanarayan Patel, Viswanath Balakrishnan, Aditi Halder, Rahul Vaish

**Abstract :** Candle soot, traditionally considered as an unwanted source of air-pollution, has slowly been phased out by modern lighting techniques. However, a 2007 study by Liu and co-workers first brought to light the presence of fluorescent carbon nanoparticles (CNPs) in untreated candle-soot (CS). Subsequent studies revealed that these soot-generated CNPs can be refined and extracted for various applications including humidity sensing, trace element detection and biomedical to Li-ion batteries, supercapacitors, electrocatalysis and solar collector among others. There are over 100 published articles dealing with fabrication, extraction, treatment and application of CS derived CNPs. However, unlike traditional carbon-based nanostructures including graphene and fullerene, this field lacks the presence of a systematic endeavour to tap into the vast potential of candle-soot. Therefore, this article aims to present a focused review on the topic of CS derived CNPs and their potential applications. The paper starts with a brief introduction on the topic of candle-soot and its historic significance. This is followed by a description of the techniques used to extract, refine and functionalize these carbon particles. Thereafter the reported applications of candle-soot derived nanostructures and their comparative analysis with the current state-of-art are provided. Finally, a section discussing future scopes and challenges is presented followed by conclusions.

***Keywords :*** Candle Soot; Carbon Nano-particle; Fluorescent Carbon Particles.

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***Theme***

## Medical Textiles for Fighting with Covid-19

Panelist

**Mr Siddhartha Chakrabarti**
Managing Director
Pyro Tex Industries, GmbH, Germany

Panelist

**Prof Sourabh Ghosh**
Institute Chair Professor
Department of Textile & Fibre Engineering
IIT Delhi, New Delhi

**Date**
**10-10-2020**

**Time**
**17.30 hrs to 19.30 hrs**

Panelist

**Dr Anasuya Roy**
Founder & CEO of Nanosafe Solutions, a Healthcare Technological Startup incubated at IIT Delhi, New Delhi

Moderator

**Prof Sadhan Chandra Ray**
Former Professor & Head
Department of Jute & Fibre Technology,
University of Calcutta, Kolkata

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The soft copy of the duly filled-up applications (in editable format), as per the proforma available in our website www.ieindia.org, should be sent through email to research@ieindia.org and one printed copy of the same should reach the following address:

**Director (Technical)**
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Applications received in format other than that available on our website will not be accepted. Application should be forwarded through the Guide, Head of the Department or Head of the Institution. Please note that preference will be given to project proposals received from Institutions who are members of The Institution of Engineers (India) and with NBA / NAAC Accreditation or valid NIRF Rank. Kindly go through the guidelines (visit link https://www.ieindia.org/webui/IEI-Activities.aspx#RnD-Initiative) carefully before filling up the application.

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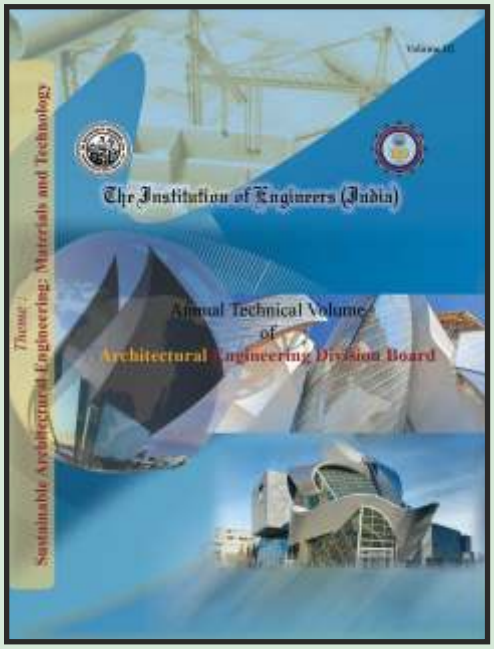


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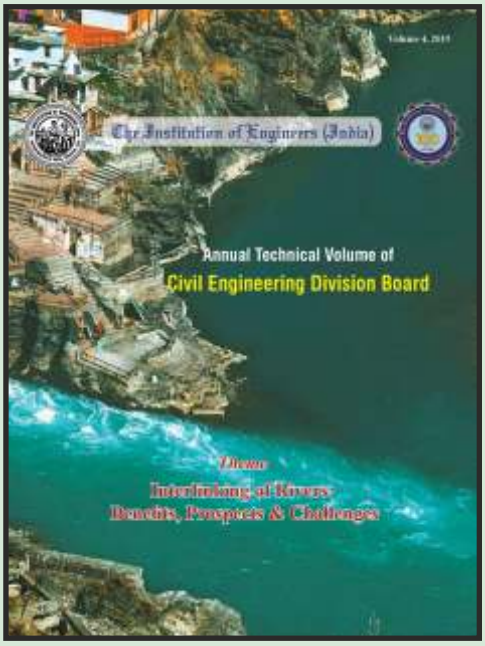


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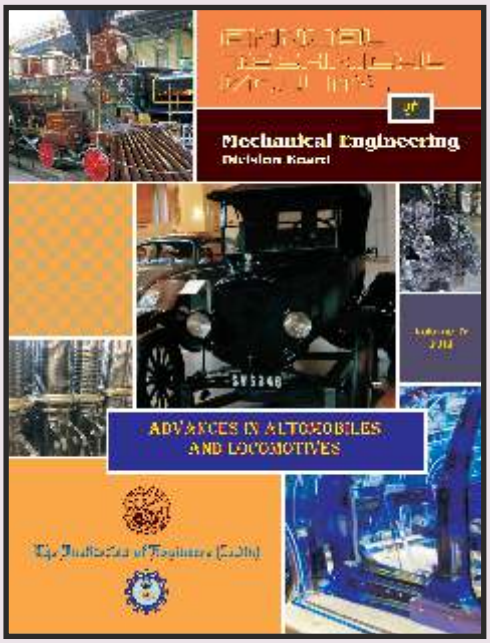


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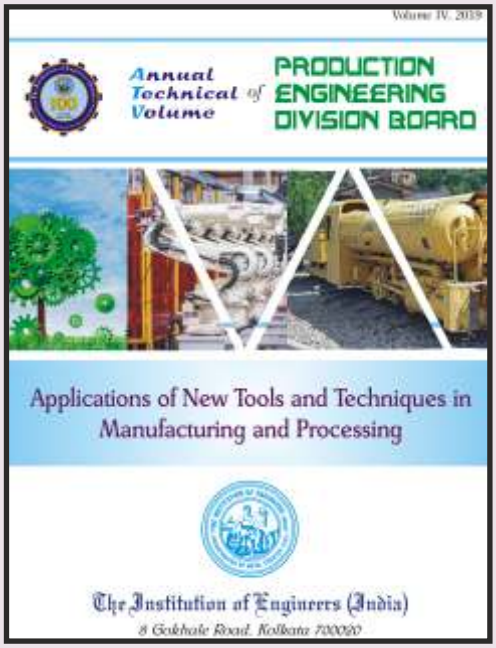


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