Volume 6, No 11, November 2021

IEI EPITOME

A Century of Service to the Nation

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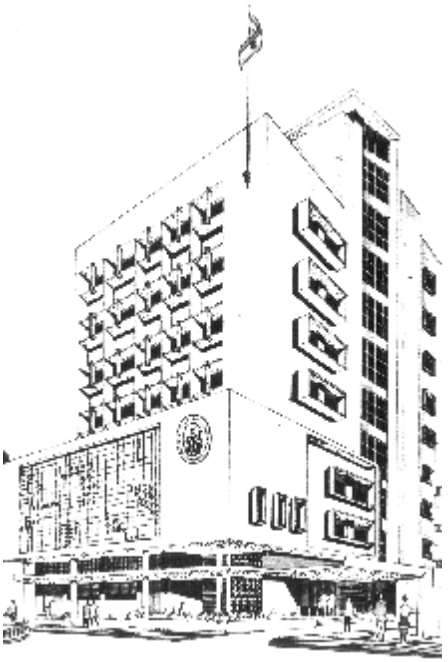

Publication by Members

Dr Mahesh Radhakrushna Gadekar, MIE
Chief Executive and Consultant,
GeoEnviroVision (Testing, Consultancy and Research Organization)
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Title of the Book Chapter: **Modeling Undefined Complexities of Wastewater Treatment Processes with Artificial Neural Network**
Chapter 22, Soft Computing Techniques in Solid Waste and Wastewater Management, 1st Edition, Elsevier, Rama Karri R Gobinath Mohammad Hadi Dehghani (eds), 24 July 2021, pp. 365-379, ISBN (Online): 9780323859301, ISBN(Print): 9780128244630
DOI: https://doi.org/10.1016/B978-0-12-824463-0.00006-9
Co-author: M Mansoor Ahammed

Abstract: *A number of physical, chemical, and biological processes are used for wastewater treatment, and several variables that define these unit operations and processes are controllable. However, wastewater quality and interactions among process variables affect the treatment efficiency. Modeling and simulation of these processes by conventional mathematical modeling techniques are difficult due to complexity of these processes. Artificial neural networks (ANNs) have shown the ability to model complicated and nonlinear processes, including the complex behavior in treatment operation and processes. This chapter presents the use of ANN in modeling wastewater treatment processes. Neural networks such as feed forward backpropagation which are proved to be effective in modeling treatment processes are presented. The models are trained for various types of networks, topography, training algorithms, and transfer functions to obtain a general predictive model. This chapter also summarizes the use of ANN in wastewater treatment showing the better performed models for predictability. Applications of ANN models for prediction and optimization of different processes for removing pollutants, including toxic metals and dyes, and for modeling anaerobic processes, are also presented. Finally, the chapter provides a perspective on the directions for future research in utilizing ANN with other modeling techniques to improve predictability with cost reduction.*

Keywords: *Artificial Neural Network, Artificial Intelligence, Design of Experiments, Multilayer Perceptron-ANN, RBFANN, Water Treatment*

Er S Valai Ganesh, AMIE
Assistant Professor,
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Title of the Book Chapter: **Static and Dynamic Activities Prediction of Human using Machine and Deep Learning Models**
Chapter 1, Innovations in Computer Science and Engineering, Proceedings of 8th ICICSE, Part of the Lecture Notes in Networks and Systems book series (LNNS), Volume 171, Springer, Singapore, H S Saini, Rishi Sayal, A Govardhan & Rajkumar Buyya (eds), First Online: 24 April 2021, pp. 1-7, ISSN (Print): 2367-3370, ISSN (Online): 2367-3389, ISBN (Print): 978-981-33-4542-3, ISBN (Online): 978-981-33-4543-0, https://doi.org/10.1007/978-981-33-4543-0
DOI: https://doi.org/10.1007/978-981-33-4543-0_1
Co-authors: Mohit Agarwal, Suneet Kr Gupta & S Rajakarunakaran

Abstract: *Recent advancement in smart phones and computing technologies has played a vital role in people's life. Develop a model to detect the human basic dynamic activities such as Amble, Climb stairs, coming down the stairs into the floor and human basic static activities like Sitting, Standing or Laying using the person's smart phone and computers are the major work of this paper. Conventional Machine learning models like Logistic Regression, SVC, Decision tree, etc. results are compared with a recurrent deep neural network model named as Long Short Term Memory (LSTM). LSTM is proposed to detect the human behaviour based on Human Activity Recognition (HAR) dataset. The data is monitored and recorded with the aid of sensors like accelerometer and Gyroscope in the user smart phone. HAR dataset is collected from 30 persons, performing different activities with a smartphone to their waists. The testing of the model is evaluated with respect to accuracy and efficiency. The designed activity recognition system can be manipulated in other activities like predicting abnormal human actions, disease by human actions, etc. The overall accuracy has improved to 95.40%.*

Keywords: *Human Activity Recognition, LSTM, Sensors, Smart Phones, Recurrent Neural Network, Gyroscope and Accelerometer*

Publication by Members

Title of the Book Chapter: **Development of Self Governed Flashing System in Automotives using AI Technique**
Chapter 35, Innovations in Computer Science and Engineering, Proceedings of 8th ICICSE, Part of the Lecture Notes in Networks and Systems book series (LNNS), Volume 171, Springer, Singapore, H S Saini, Rishi Sayal, A Govardhan & Rajkumar Buyya (eds), First Online: 24 April 2021, pp. 327- 332, ISSN (Print) 2367-3370, ISSN (Online) 2367-3389, ISBN (Print) 978-981-33-4542-3, ISBN (Online) 978-981-33-4543-0, https://doi.org/10.1007/978-981-33-4543-0
DOI: https://doi.org/10.1007/978-981-33-4543-0_35
Co-authors: N Sankarachelliah, V Rijith Kumar, P Senthilram, T SelvaSundar, S Godwin Barnabas & S Rajakarunakaran

Abstract: *Developing an intelligence system to automatically turn ON or OFF the indicator in automotive (particularly four wheeler) by drawing input from sensors. Almost 50% of drivers failing to use indicators while changing lanes or overtake a vehicle. This leads to vehicle accidents and may cause some serious issues. The proposed system comprises of a steering angle sensor, optical sensor for vehicle detecting and tracking and also incorporates open CV (AI tool) for lane detection and this system is adaptable to the current situation.*

Keywords: *Vehicle, Indicator, Intelligence System, Automatic, OpenCV*

Dr Selvakumaran T, FIE
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Title of the Paper: **Comprehensive Survey on Image Processing and Identification Techniques for Detect and Classification of Adulteration in Food Products**
Design Engineering, Toronto, Volume 2021, Issue 08, pp. 5159-5167
Link: http://www.thedesignengineering.com/index.php/DE/article/view/5467
Co-authors: Om Prakash C, Prabhu A, S Shanmugapriya & D Velmurugan

Abstract: *Food adulteration is a serious phenomenon that has existed for hundreds of years. By adding extra chemicals that may be dangerous to human health, the food's quality is degraded. Adulteration can refer to contamination of a food item during storage or distribution as well as the inclusion of an ingredient. Food adulteration was be a lucrative business. Foods that we eat, such as fruits and vegetables, are infused with toxic compounds those are exceedingly injurious to health. As a result, a variety of illnesses are more prevalent. The goal of this review is to study the several image processing methods used to diagnose adulteration in widely eaten foods. rice granules milk, almond powder, virgin olive oil and turmeric powder are among the foods mentioned in this study.*

Keywords: *Nonlinear, Mathematical Model, Random Runway, Landing Gear, Active Control*

Prof Sreenivasa V, MIE
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Title of the Paper: **Water Quality Index of Tunga River in Shivamogga**
JNNCE Journal of Engineering & Management, Volume 5, No.1, 30 September 2021, ISSN 2582-0079
DOI: https:www.doi.org/10.37314/JJEM.2021.050106
Co-author: Bindiya K

Abstract: *River Tunga flowing near Shivamogga City, Karnataka State, India, receives waste water discharges from villages located on the bank of River and industries located along the stretch. The present study involves to determine the water quality index of polluted our selected stretch of River. Water samples were collected from different locations and analyzed for physical-chemical parameters like pH, Alkalinity, total hardness, Electrical Conductivity, Calcium ions, magnesium ions and total dissolved solids. All the physical and chemical parameters were compared with the standard Values of IS. These chemical and physical parameters substituted in the WQI equation. WQI facilitates a single numeric value that defines overall water quality for a definite location. The WQI of Tunga River in Shivamogga city vary from 50.38 to 85.48.*

Keywords: *Shivamogga, Water Quality Index, Assessment*

Publication by Members

Dr Ramachandran K K, FIE
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Title of the Paper: **Crystallinity and Wettability induced Osteogenic Behaviors of Commercially Pure Ti and Ti-6Al-4V Alloy Implant Surfaces having Multiscale Surface Topography**

Materials Today: Proceedings, International Mechanical Engineering Congress 2019, K R Balasumbramanian, R Anand, S Suresh & Ashok Kumar Nallathambi (eds), Elsevier, Volume 46, Part 19, 2021, pp. 9405-9411, ISSN 2214-7853
DOI: https://doi.org/10.1016/j.matpr.2020.03.057
Co-authors: Abhijith N V, Priyanka C P & Sudeep U

Abstract: *The influence of multiscale topography imparted through laser texturing of titanium based bioimplant surfaces on osteogenic behaviours is investigated. The synergistic effects of surface topography, surface physical and chemical behaviours appear to have improved the initial cell adhesion and proliferation. Micro grooves having embedded nano ripples as periodic surface structures were micro-fabricated on two different grades of specimens; commercially pure titanium and Ti-6Al-4V titanium alloy. The response of osteoblasts cells seeded on the laser textured surfaces in standard controlled conditions was investigated using fluorescence microscopy and SEM. The results showed that the presence of multiscale topography enhances cell adhesion and provide a definite orientation for osteoblast cells to grow along the direction of the micro grooves. Surface oxidation states of titanium along with the presence of crystalline phase and improved hydrophilicity appeared to have a major role in the preferential integration of bone tissues on the laser textured specimen surfaces.*

Keywords: *Bioimplants, Surface Texture, Osseointegration, Wettability, Femtosecond Laser*

Title of the Paper: **Effect of Tool Axis Offset and Relative Position of Materials on the Performance of Dissimilar Friction Stir Welded Aluminium Alloy Joints—An Overview**

IOP Conference Series: Materials Science and Engineering, IOP Publishing Ltd, Volume 1114, March 2021, 6th Biennial International Conference on Emerging Trends in Engineering Science and Technology (ICETEST 2020), 17th-19th December 2020, Kerala, ISSN 1757-899X
DOI: https://doi.org/10.1088/1757-899X/1114/1/012066
Co-authors: Subrahmanian K & Rajeev V R

Abstract: *At present most of the manufacturing sectors are looking for high strength lightweight structures with high specific stiffness and good corrosion resistance. In this context, efficient joining of dissimilar aluminium alloys by fusion welding techniques is very difficult due to their poor weldability. It is reported that FSW being a solid state welding technique can avoid problems associated with fusion welding and is a potential candidate for joining difficult to weld materials including dissimilar aluminium alloys. In this article, a comprehensive discussion on the influence of tool axis offset and relative positioning of the materials on the joint performance that reported in the literature is presented. The literature showed that there is no uniqueness in the value and sign of the tool axis offset that can result defect free joint with good joint properties. With regard to relative positioning of the materials also, conflicting arguments are reported in the literature.*

Keywords: *Friction Stir Welding, Dissimilar Joint, Aluminium Alloys, Tool Axis Offset, Relative Position*

Title of the Paper: **Microstructural, Mechanical and Tribological Characterization of Vacuum Stir Cast Mg-4Zn/Si_3N_4 Magnesium Matrix Nanocomposite**

Materials Today: Proceedings, Elsevier BV, International Mechanical Engineering Congress 2019, K R Balasumbramanian, R Anand, S Suresh & Ashok Kumar Nallathambi (eds), Volume 46, Part 19, 2021, pp. 9387-9391, ISSN 2214-7853
DOI: https://doi.org/10.1016/j.matpr.2020.03.053
Co-authors: Anand N & Bijulal D

Abstract: *Stir casting route is a relatively easy, cheap and popular method to produce metal matrix composites. Vacuum stir casting method uses pressure values, which comes intermediate to the gravity and squeeze casting variants of the stir casting process. This article presents the mechanical properties, the microstructural and the wear characteristics of the as-cast nanocomposite of Magnesium. The Magnesium nanocomposite was produced by the vacuum stir casting process with Mg-4Zn alloy as the matrix and Si_3N_4 nanoparticles as the reinforcement. Microstructural characterization was carried out by optical microscopy and scanning electron microscopy. The results showed that the Mg-4Zn/Si_3N_4 nanocomposite possesses mechanical and wear properties comparable to other Mg-based materials reported in the literature.*

Keywords: *Mg Nanocomposite, Nano Si_3N_4, Mechanical Properties, Microstructure, Wear*

Publication by Members

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Title of the Paper: **Estimation of Tribological Performance of a Hybrid Al-Si/Al_2O_3/ MoS_2 Composite via Taguchi Orthogonal Array**

AIP Conference Proceedings, Volume 2327, Issue 1, February 2021, article id.020013
DOI: https://doi.org/10.1063/5.0039469
Co-author: Hota Ravi Sankar

Abstract: *This work illustrated the tribological performance of molybdenum disulphide (MoS_2 /alumina (Al_2O_3) particles are rei nforced in Al-Si matrix, and prepared Al-Si/2MoS_2, Al-Si/ 12 Al_2O_3/ 2MoS_2 composites via stir casting. Mechanical properties such as hardness, tensile strength, density, and tribological efficiency of composites were identified. Mechanical properties of composites are observed to increase with weight percentage MoS_2 and Al_2O_3 increase. The Al-Si/ 12Al_2O_3 composite exhibited better hardness and tensile strength. The tribological experiments are formulated using the Taguchi approach (L27). Tribological responses such as wear rate and friction coefficient are controlled primarily by three factors such as sliding velocity, sliding distance, and contact pressure. For Al-Si/2MoS_2 and Al-Si/ 12 Al_2O_3/ 2MoS_2 composites, pressure is the most influential parameter on wear rate. Sliding velocity is also a factor affecting the friction coefficient for Al-Si/2MoS_2, revealed by Analysis of variance (ANOVA). The surface morphology of worn-out samples is examined using SEM and results are corroborated with findings.*

Keywords: *ANOVA, Al_2O_3, MoS_2, Wear Rate, Coefficient of Friction*

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Title of the Paper: **A Novel Stress-based Formulation of Finite Element Analysis**

Journal of Zhejiang University — SCIENCE A, Special Issue (Part I) on Machine Learning Based Solutions of Partial Differential Equations, Guest Editors-in-Chief: Timon Rabczuk, Xiaoying Zhuang, Volume 22, Issue 6, June 2021, pp. 481-491, ISSN 1862-1775
DOI: https://doi.org/10.1631/jzus.A2000397
Co-authors: Lema Dakssa, Mahmoud Dawood & Nitin Kumar Samaiya

Abstract: *This paper demonstrates a novel formulation of structural analysis. A novel stress-based formulation of structural analysis for material nonlinear problems was proposed in earlier work. In this paper, this methodology is further extended for 3D finite element analysis. The approach avoids use of elastic moduli as the material input in the analysis procedure. It utilizes the whole stress-strain curve of the material. It can be shown that this analysis procedure solved the nonlinear or plasticity problem with relative ease. This paper solves a uniaxial bar, in which the results are compared with the solutions of Green-Lagrange strain and Piola-Kirchhoff stresses. The uniaxial bar is also solved by a regression model in the 'scikit-learn' module in Python. The second problem solved is of a beam in pure bending for which the energy release rate is measured. For the beam in pure bending, the bending moment carrying capacity of the beam section is evaluated by this methodology as the crack propagates through the depth of the beam. It can be shown that the methodology is very simple, accurate, and clear in its physical steps.*

Keywords: *Computational Methods, Machine Learning, Regression Method, Material Non-linear Analysis, Finite Element Analysis*

Publication by Members

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Er Amutha J, AMIE
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and Engineering, PSR Engineering
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Title of the Paper: **Development of Optical Fiber Monitoring in Communication Systems**

International Journal of Creative Research Thoughts (IJCRT), Volume 9, Issue 9, September 2021, pp.b690-b697, ISSN 2320-2882
DOI: http://doi.one/10.1729/Journal.28162

Abstract: *Fiber optic technology has dominated the market due to its high data rate and ability to transmit data over great distances it has been proven that fiber optics is a significantly superior technology over metal wires. Fiber optics has reduced signal loss and is less vulnerable to interference. Optical fibers can be used in light transmission applications since they are waveguides. An outer layer of glass or plastic surrounds the optical fiber core, which has a lower refractive index than the fiber core. The complete internal reflection phenomena are necessary to achieve fine confinement of light within the waveguide. The majority of telecommunication networks use fiber optics as a data transmission medium. (1) Today's fibers are made from chalcogenide glasses, fluoroaluminate crystalline materials, and fluorozirconate materials. (2) In the last few decades, the field of fiber optic sensors has advanced dramatically. A higher sensor quality ensures greater data reception. (3) New improvements are being made in technology, such as in free-space technology.*

Keywords: *Fiber Optics, Silica, Chalcogenide, Fluoroaluminate*

Members in the NEWS

Er Amit Bhatnagar, FIE
Senior Principal Surveyor & Vice President,
Indian Register of Shipping, Kolkata
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He has been elected as **Vice President** for **The Institute of Marine Engineers (I)** for the session **2021-23** on 1st October 2021

Er Arunangshu NathSarkar, MIE
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He has cleared **The Institution of Structural Engineers' Chartered Membership Examination (UK)** which was held on 08 April 2021. His name was presented to the **Membership Committee** on **23 August 2021**.

Announcement

36TH

Indian Engineering Congress

Theme

Engineers for Viable Technology and $5 Trillion Economy

Organised by

The Institution of Engineers (India)

Hosted by: Delhi State Centre | *Date:* 26-28 December 2021

Venue: Vigyan Bhawan, Maulana Azad Road, New Delhi 110003

Announcement

36th Indian Engineering Congress

Registration

Category	Registration Fee
Corporate Members of IEI	₹ 3500 + 18% GST*
Non-members	₹ 4500 + 18% GST*
Industry/Research Organizations	₹ 5000 + 18% GST*
Sr. Technician*/Technician Members*, Students** of Engineering College and paper presenters in Technical Sessions	₹ 1500 + 18% GST*
Foreign Participants	$ 500
Certificate of participation in Online Technical Sessions	₹ 200 + 18% GST
For Spouse	₹1500 + 18% GST

*(*To be certified by Head of the Institution)*

*(**Attested Xerox copy of Identify Card; and Bonafide Student/Study Certificate issued by the Head of the Department / Principal of College must be attached with the Registration Form)*

The fee payable by each delegate is as mentioned above and the amount should be mentioned in the enclosed Registration Form.

Delegates may deposit fees online also as per Bank details given below and forward us the UTR number as a confirmation of the deposit.

Souvenir

A Souvenir (in colour) will be published on this occasion. Rates for advertisement in the Souvenir are follows:

Category	Registration Fee
Back Cover Page	₹ 1,00,000 (3 delegates complimentary)
Inner Back Cover Page	₹ 75,000 (2 delegates complimentary)
Inner Front Cover Page	₹ 75,000 (1 delegate complimentary)
Full Page	₹ 50,000
Half Page	₹ 25,000

** GST as applicable*

Exhibition

On this occasion, an exhibition is being organized to provide ample opportunities to industries to exhibit their products & services diversified stakeholders at Vigyan Bhawan, New Delhi.

Cost of each stall	₹ 50,000 + GST as applicable

Stalls will be allocated on first come first served basis.

Sponsorship Opportunities

Platinum Sponsor	₹ 25 lakhs + GST as applicable
Gold Sponsor	₹ 15 lakhs + GST as applicable
Silver Sponsor	₹ 10 lakhs + GST as applicable
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Sponsor	₹ 2 lakhs + GST as applicable

Company Logo of all the Sponsors will be suitably displayed at the Backdrop the other suitable places. The other opportunities to sponsors are also available such as sponsoring the Congress Lunches, Cultural Program, Congress Dinner & Kit Bag etc.

Facilities/Benefits to Sponsors

Sl No	Category of Sponsors	Free Delegates	Advertisement in Souvenir	Stall in Exhibition
1	Platinum Sponsor	15	Full Page Coloured	One
2	Gold Sponsor	10	Full Page Coloured	One
3	Silver Sponsor	5	Full Page Coloured	–
4	Bronze Sponsor	3	Half Page Coloured	–
5	Sponsor	2	–	–

Note:

GRANT OF SPECIAL CASUAL LEAVE FOR GOVERNMENT OFFICERS ATTENDING MEETINGS OF SCIENTIFIC INSTITUTIONS

An extract from Notification No. 74(4) /50-SR.III dated July 28, 1951 printed in the Bulletin Vol. I No. 1 September 1951, p-28 and No. 227(7) / 50-SR, III dated December 10, 1953 printed in the Bulletin, Vol. 3 No 3 March 1964, p-14, issued by the Ministry of Natural Resources and Scientific Research, Government of India in regard to the grant of casual leave to such officers who desire to attend Meetings of scientific associations

Payment

Payments for delegate Fees, Advertisement & Sponsorship will be accepted through NEFT / RTGS / Online transfer / Bank Draft / Banker's Cheque to be made in favour of "**The Institution of Engineers (India) A/c IEC 2021**"; Bank Account No. : 212205500308; ICICI Bank Ltd.; Bank Branch : Mayur Vihar Phase-II, Delhi; IFS Code: ICIC0002122; PAN No. : AAATT3439Q; GST No. : 07AAATT3439Q1ZW.

For further enquiry / information regarding Sponsorship / Exhibition / Advertisement / Delegate etc., please contact :

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Call for Papers

Full-length papers for the **Annual Technical Volumes** (**ISBN numbered**) of different Engineering Divisions are invited by The Institution of Engineers (India) from eminent engineers, technologists, professionals, and researchers on identified themes as appended below.

These volumes intend to accommodate original Research articles; Review articles, Brief communications, Case studies and Articles of Professional Interest. Submitted manuscripts should not have been published previously, nor be under consideration for publication elsewhere. All manuscripts will be subjected to a suitable review process and thereafter accommodated in the Technical Volumes if found suitable. The release of the Annual Technical Volumes will be communicated to the authors once it is finalized.

The paper (full length) should be submitted to respective email ids as indicated against each engineering disciplines on or before **31st December 2021**. The paper should be prepared following our standard paper template and must be accompanied by the duly filled-in 'Declaration Form' both of which are available on our website **(URL: *https://www.ieindia.org/webui/IEI-Publication.aspx#annual-technical-volume*)**.

Aerospace Engineering Division

Volume No 5

Theme : Small Satellites Initiatives in India

On the Theme:

The small satellite is envisaged to provide platform for stand-alone payloads, which facilitate earth imaging and science missions within a quick turnaround time. Small satellites are miniaturized satellites with wider range of users, all over the world. Small satellites have several advantages over large satellites namely cost effective ways to test newer technologies, opportunities for local industry, bigger basket of potential users and thus a large variety of mission possibilities. Small satellites are transforming the dynamics and economics of space industry and ensure that space technology is no longer monopolized by nations, but is accessible to smaller and newer entities. As a space-faring nation for over last five decades, India is set to become the hub for the small satellite launch market, which is projected to be valued a substantial amount in near future. Start-ups will be the key drivers in this space, with a few among them on the final stages of developing low-cost solutions that conform to global standards. The recent reforms by the Government of India will further accelerate private sector participation in the sector. Although small spacecraft have existed for decades, in recent years, small satellites have gained considerable importance, particularly in defense sectors, which have recently gained prominence owing to technological advances in their development and integration into the armed services of the major space faring countries across the world.

Sub-themes:

* Technological Innovations, Business Opportunities and Commercialization of Indian Space Industry
* Role of MSMEs and Start Ups in Small Satellite initiatives and development
* Cryogenic Engine Technology and Indian Space Market
* Design and Advancement in Satellite Launch Vehicle
* Business Initiatives for Components, Sub-assemblies and Spare Manufacturing in Aerospace Startups
* Provisions and Norms to initiate Start Ups and Entrepreneurship in Aerospace Sector

Type of Papers
- *Original Contribution*
- *Case Study*
- *Article of Professional Interest*

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Call for Papers

Marine Engineering Division

Volume No 5

Theme :

Advancements in Ship Building Technology — Way Ahead towards New Normal

On the Theme:

The COVID-19 pandemic has underscored the global interdependency of nations and set in motion new trends, which is reshaping the maritime transport landscape. The Indian maritime sector is at a pivotal moment facing not only immediate concerns resulting from the pandemic but also longer-term considerations, ranging from shifts in supply-chain design and globalization patterns to changes in consumption and spending habits, a growing focus on risk assessment and resilience-building, as well as a heightened global sustainability and low-carbon agenda. The sector is also dealing with the knock-on effects of growing trade protectionism and inward-looking policies. The shipbuilding industry is now witnessing an unparalleled transformation with growing demand to build new vessels and expand geographic routes, tight budgetary measures, and most importantly, the need to deliver reliable designs at affordable costs. The shipbuilding industry is now characterized with complex value chain, which involves construction of large structures. Moreover, rising demand for flexible ships poses a challenge due to the traditional construction approach prevalent in the industry. In the presence of these demanding market requirements, advanced technologies such as Industrial Internet of Things (IIoT) plays a crucial role in modernizing fleets in a cost-effective manner and also within a shorter time span. IIoT addresses various constraints pertaining to capital allocation, design, and build, and more importantly, supports optimal utilization of vessels during the commissioning and decommissioning phase of new and existing ships.

Sub-themes:

* Technological Advancement in Shipping Industry in New Normal
* Global Recovery in Shipping in New Normal: The Way forward
* Maritime Industry 4.0
* Digital Transformation of Ship Building Industry – The Way Ahead
* Advancements in Shipbuilding Value Chain
* Reorientation of post pandemic marine workforce and Seafarers

Type of Papers
- *Original Contribution*
- *Case Study*
- *Article of Professional Interest*

submit your articles to:
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Call for Papers

Mechanical Engineering Division

Volume No 6

Theme :

Applications of Artificial Intelligence and Machine Learning in Mechanical Engineering — The Post Pandemic Pathway

On the Theme:

Amidst the ongoing global crisis, the engineers, scientists, and professionals have so far played a stellar role and have constantly scaling up their efforts and have been responsive to the challenges posed by the COVID-19 pandemic. The application of Machine Learning (ML) and Artificial Intelligence (AI) during the first wave of pandemic encouraged the researchers to outline new angles to explore different fields of mechanical engineering contributing to uninterrupted industrial growth of the country. The rapid advancements in the field of fluid mechanics leads to, unprecedented volumes of data driven experiments, field measurements, and large-scale simulations at multiple spatiotemporal scales. Moreover, Machine Learning algorithms can augment domain knowledge and automate tasks related to flow control and optimization. Tribology is another area which has been empowered with AI, ML, Big Data tools and led to evolution of '**Tribo-informatics / Intelligent Tribology**'. As we embrace the new normal, most of the facets of mechanical engineering will be data driven and AI and ML need to be vectored in to optimize workspace, product and services.

Sub-themes:

* Study of IC Engine in light of Artificial Intelligence (AI) and Machine Learning (ML)
* Design, Operation and Maintenance of Turbine: A Machine Learning Approach
* Advancement in Boiler Design, Operation & Maintenance through AI and ML Approach
* Advancement in Machine Design through AI and ML Approach
* Advances in Thermodynamics and Heat Transfer: The Machine Learning Approach
* Neural Network in Kinematics: Challenges and Opportunities
* Predictive Maintenance and Failure Analysis: AI and ML Approach
* Tribology and Condition Monitoring: Supervised and Unsupervised Learning Approach
* Fluid Mechanics and Heat Transfer: A Data Driven Approach
* Application of Machine Learning in Mechanical System Modeling and Simulation
* Assessment of Behaviours of Mechanical Systems through AI and ML
* Machine Installation and Commissioning through Machine Learning Approach
* Artificial Intelligence based Heating, Ventilation and Air Conditioning
* Application of Artificial Intelligence in Oil and Gas Industries
* Bio-medical Engineering: A Machine Learning Approach

Type of Papers
- *Original Contribution*
- *Case Study*
- *Article of Professional Interest*

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Call for Papers

Metallurgical & Materials Engineering Division

Volume No 5

Theme: Integrated Computational Materials Engineering

On the Theme:

Integrated computational materials engineering (ICME) is an emergent field that aims to integrate computational materials science tools into a holistic system that can accelerate materials development, transform the engineering design optimization process, and unify design and manufacturing. Even though in its nascent state, ICME presents a grand challenge laden with prospects of achieving significant economic benefit and accelerate innovation in the engineering of materials and manufactured products. Papers from eminent engineers and technologists on contemporary issues having technical relevance to the theme shall be included in this volume. It is expected that the articles will be of academic values, and reflect experience of professional engineers.

Sub-themes:

* Computer Simulations at Different Time Scales,
* Multi scale Aspects of Materials,
* Creating Newer Materials,
* Thermodynamics of Materials Engineering,
* Principles of Engineering Practice,
* Fundamentals of Materials Science and Engineering,
* Electronic Structure Theory and Methods,
* Applications of First-Principles Methods,
* Molecular Dynamics (MD),
* Material Structures using Finite Element Methods (FEM);
* Crystal Plasticity Theory etc.

Type of Papers
- *Original Contribution*
- *Case Study*
- *Article of Professional Interest*

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mmdb@ieindia.org

Call for Papers

Mining Engineering Division

Volume No 4

Theme: Future of Mining

On the Theme:

The evolution of technology, from advanced data analytics to artificial intelligence (AI), has always had the potential to transform the mining industry by realizing operational efficiency improvements, enhancing productivity, improving safety performance, empowering employees to do more meaningful work, and allowing communities to be more prosperous. The COVID-19 crisis has exposed the siloed nature of mining companies and highlighted the need for integrated operations. This is likely to accelerate the adoption of digital technologies, artificial intelligence, and analytics in the mining industry. This volume will discuss what future has in store for the mining sector and the likelihood of vectoring in the intelligent, integrated operations in mining in a comprehensive manner. Papers from eminent engineers, technologists, professionals and researchers on contemporary issues having technical relevance to the theme shall be included in this volume.

Sub-themes:

* Climate-Smart Mining
* Responsible Sourcing (Decrease environmental footprint, Increase social footprint)
* Adoption of low carbon product strategies
* Collaboration to set new mining standards based on environmental, social and governance (ESG) principles
* Digitalization for more sustainable use of resources & lowering input cost
* Automation for enhancing productivity
* Smart mine power distribution and energy management
* New frontiers: deep sea, space exploration
* Resilient Mining Practices

Type of Papers
- *Original Contribution*
- *Case Study*
- *Article of Professional Interest*

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Production Engineering Division

Volume No 6

Theme :

Applications of Machine Learning, Deep Learning and Artificial Intelligence in Manufacturing — The Way Forward

On the Theme:

The advent of fourth industrial revolution ushered in huge industrial reforms and a paradigm shift in manufacturing from conventional product oriented labour intensive approach to a customer oriented data driven one and reinstated that promoting digital innovations coupled with intelligent decision making is the way forward. With the introduction of IIoT, Digital Twins, Smart Factories, Cyber-Physical Systems, Indian manufacturing sector has created a niche for itself in terms of productivity, efficiency and overall growth. Smart manufacturing revolution has enabled the manufacturing units to achieve timeless manufacturing goal with the objective to produce products with stated degree of precision and accuracy in a cost effective manner. In this context, Artificial Intelligence and Machine Learning are the core technologies which have provided stimulus for this transformation. These technologies, leveraged by Industry 4.0, namely Internet of Things, Advanced Embedded Systems, Cloud Computing, Big Data, Cognitive Systems, Virtual and Augmented Reality needs to be leveraged further as we prepare ourselves for adopting a newer, resilient and a self-reliant manufacturing eco-system.

Sub-themes:

* Data Driven Decision Making in Production Planning and Control
* Advances in Machine Tools: Artificial Intelligence and Deep Learning Approach
* Assessment of Industrial Automation in Machine Learning Environment
* Deep Learning and Smart Manufacturing – The Way forward
* Application of Big Data Analytics in Manufacturing
* Smart Warehousing, Warehouse Optimization and Inventory Management
* Artificial Intelligence and Robotics in Welding Industry
* Lean and Agile Supply Chain: Machine Learning Approach
* Digital Fabrication and 3D Printing
* Industry 4.0 and Project Management: The Way Forward
* Business Analytics and Knowledge Management
* Assessment of System Reliability, Availability and Maintainability through Machine Learning Approach

Type of Papers
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- *Case Study*
- *Article of Professional Interest*

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Call for Papers

Textile Engineering Division

Volume No 5

Theme:

Development and Application of Functional Textiles

On the Theme:

Functional textiles, as we all know, are textiles with integrated functions of controlling or adjusting according to its application area. Functional textiles, over the years, have developed a niche for itself in textile industry and the associated fraternity. This range includes breathable, heat and cold-resistant materials, ultra-strong fabrics (e.g. as reinforcement for composites), new flame retardant fabrics (e.g. intumescent materials), optimized textile fabrics for acoustic properties, etc. Functional textiles became more and more important materials for various applications and interest in them grew year by year. Papers from eminent engineers, technologists, professionals and researchers on contemporary issues having technical relevance to the theme shall be included in this volume. It is expected that the articles will be of academic values, and will provide a comprehensive coverage of the subject.

Sub-themes:

The said volume will cover major sectors of Development and Application of Functional Textile, and will accommodate manuscripts on the following genre:

* Based on the type of garment
  - Active wear
  - Performance wear
  - Ready to wear
  - Seamless wear
* Based on the type of fiber
  - Polyester and advancements
  - Viscose
* Based on the type of functions
  - Anti-bacterial
  - UV-protection
  - Temperature regulating
  - Water and oil repellent
* Based on the application area
  - Geotextiles
  - Personal Protection
  - Medical
  - Hygiene
  - Sports and Leisure
  - Military/ war
  - Industrial textiles

Type of Papers
- *Original Contribution*
- *Case Study*
- *Article of Professional Interest*

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We would like to thank our erudite members for sharing their professional achievements through the IEI Epitome in the process making the content more inveigling and at the same time inspiring many others to share their accomplishments as well. But, it would be our endeavour to accommodate your success stories in a more structured and comprehensive manner so that it can be referred, traced and retrieved by the entire gamut of professionals who are avid followers of this e-Newsletter. To this end, we would request our Members to send the details of their achievements as per the appended formats only.

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(x)	Month & Year of Achievement/ Date of Achievement	
(xi)	Supporting Documents/links [which are clearly indicative of the incumbent's achievement(s)]	

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(xii) Patent No	
(xiii) Date of filing (DD/MM/YYYY)	
(xiv) Date of Grant (DD/MM/YYYY)*	
(xv) Patentee	
(xvi) Details of Patent	
(xvii) Term for which the above (ix) has been granted	
* *Copy of Certificate of the Grant of Patent*	

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(xi) ISBN	
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(xiv) About the book (100-150 words)	
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