

# **3rd International Conference on Advances in Mechanical Engineering (ICAME 2020)**

IOP Conference Series: Materials Science and Engineering  
Volume 912

Chennai, India  
24-29 February 2020

Part 1 of 4

## **Editors:**

**S. Prabhu**  
**M. Cheralathan**  
**Shubhabrata Datta**

**P. Nanda Kumar**  
**U. Mohammed Iqbal**

ISBN: 978-1-7138-4756-4  
ISSN: 1757-8981

**Printed from e-media with permission by:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571



**Some format issues inherent in the e-media version may also appear in this print version.**

This work is licensed under a Creative Commons Attribution 3.0 International Licence.  
Licence details: <http://creativecommons.org/licenses/by/3.0/>.

No changes have been made to the content of these proceedings. There may be changes to pagination and minor adjustments for aesthetics.

Printed with permission by Curran Associates, Inc. (2022)

For permission requests, please contact the Institute of Physics  
at the address below.

Institute of Physics  
Dirac House, Temple Back  
Bristol BS1 6BE UK

Phone: 44 1 17 929 7481  
Fax: 44 1 17 920 0979

[techtracking@iop.org](mailto:techtracking@iop.org)

**Additional copies of this publication are available from:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571 USA  
Phone: 845-758-0400  
Fax: 845-758-2633  
Email: [curran@proceedings.com](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

# TABLE OF CONTENTS

## PART 1

Preface

Peer review declaration

### **DESIGN**

Design and development of an instrument to measure coordinates of spine curvature .....	1
<i>Shreyansh Gharde, Debojit Talukdar, M R Asif, Dinesh Shanmugam, Murali Subramaniyam</i>	
A study of cervical spine morphology variation influence in loading and range of motions using finite element analysis .....	10
<i>P Susai Manickam, Vibin Vinod, V B Yogesh, M S Harin, S Balamurugan</i>	
Numerical simulation of an Indian auto-rickshaw model.....	19
<i>Neha Singh, Saransh Abbey, Pratyush Kumar Singh, B T Kannan</i>	
Flow visualization over an Indian auto-rickshaw model .....	31
<i>Saransh Abbey, Pratyush Kumar Singh, Neha Singh, B T Kannan</i>	
Design and development of a low-cost fluidized bed seeding generator.....	39
<i>M Naresh Kumar, R Gousik, Sri Vijay Prabhu, B T Kannan</i>	
Design optimization of single expansion ramp nozzle using computational method.....	45
<i>Suresh Chandra Khandai, G Ezhilmaran, S Devanandh, P Hari Prasath, G Jesurajanishanth, A Arivazhagan</i>	
Rotary vanes to increase turbulence in a can type combustor .....	52
<i>G Jesurajanishanth, A Arivazhagan, Suresh Chandra Khandai</i>	
Drag measurement of an Indian auto-rickshaw model .....	61
<i>Pratyush Kumar Singh, Neha Singh, Saransh Abbey, B T Kannan</i>	
Design, development and analysis of a conductive fabric based flexible and stretchable strain sensor.....	67
<i>Sayantan Pal, Debadrata Sarkar, Shibendu S. Roy, Arijit Paul, Aman Arora</i>	
Design of automatic side stand and spring compression control system using arduino programming.....	78
<i>S Ramanathan, S Gowtham, E Gugan, K Saisaran, M Guhan</i>	
Smoke based visualization of turbulent swirl jet flow.....	87
<i>Aakash Balachander, Akash Alase, K Adithya Menon, G Mahendra Perumal, B T Kannan</i>	
Control of sonic jets by fluidic injection .....	93
<i>G Kailash, S M Aravindh Kumar</i>	
Numerical study of sweeping jet actuators.....	99
<i>Riya Jethani, M Pranav Nandan Goud, Prayas Bhawalkar, K K Bharadwaj</i>	
Preliminary aero-acoustic measurements of free rotating rotor with predefined imbalance .....	105
<i>Mahima Duseja, B T Kannan</i>	

Preliminary investigation of flapping paper inside a file.....	113
<i>B T Kannan</i>	
Control of mach 2 jet using sonic coflow.....	119
<i>Keshav Ramesh Sharma, A Akash, R Vishal, S Rajkumar, K K Bharadwaj, S M Aravindh Kumar</i>	
Numerical investigation of bubble diameter in branched microchannel .....	124
<i>C S K Balasekhar, P Tanish, Ayush Mishra, Atul Kushwaha, Pankaj Kumar</i>	
Seating comfort analysis: a virtual ergonomics study of bus drivers in private transportation .....	131
<i>S Gowtham, M Ramnaath, S Sudharsan, B V Lalith Kumar, V Praneeth, S. Dinesh, Murali Subramaniyam</i>	
Stress distribution in ceramic orthodontic bracket, tooth, bone and PDL contact assembly - A finite element study.....	142
<i>V Magesh, P Harikrishnan</i>	
A biomechanical study on post-scoliotic deformity correction .....	150
<i>S Balamurugan, Kunal Pandey, Shraddha R Iyer, Appaji Krishnan, Shantanu Patil</i>	
A biomechanical study of the scoliotic thoracolumbar spine .....	156
<i>D Raja, Shraddha R Iyer, Kunal Pandey, Appaji Krishnan, Shantanu Patil</i>	
Investigation and analysis on child rescue system from open bore well .....	162
<i>S Karthik, D K Mohankumar, K Chandramohan, K C Udayakumar</i>	
Effect of nozzle turbulent intensity in multiple round jets using openFOAM®.....	168
<i>B T Kannan, Nikhil Gaur, P Balakrishnan</i>	
Preliminary aeroacoustic measurements of conditioned jet flow from a circular nozzle .....	175
<i>Pujan Dubey, Malandkar Yash Pramod, Lakshya Tiwari, B T Kannan</i>	
Stress analysis of different types of cages in cervical vertebrae: a finite element study .....	185
<i>Sandeep Choudhury, D Raja, Sandipan Roy, Shubhabrata Datta</i>	
Design and analysis of hybrid composite using the finite element method.....	192
<i>Arindam Talukdar, Arnab Ghosh, Sanchari Saha, Sandipan Roy, Shubhabrata Datta</i>	
Synthesis and characterization of cost effective and eco-friendly magneto rheological fluid for aerospace applications .....	203
<i>Ankamreddi Praveen, T Jagadeesha</i>	
Finite element analysis of patellofemoral joint prosthetics .....	211
<i>Shreya Anilkumar, D Ashokkumar, D Raja, Varshini Karthik</i>	
Comparison of deep learning models for predictive maintenance.....	218
<i>R Naren, J Subhashini</i>	
Performance evaluation of unpreprocessed and pre-processed ultrasound images of carotid artery using CNN algorithm .....	229
<i>Shalini Varma, S Dhanalakshmi, S Latha</i>	
Limiting stiffness coefficients analysis of texture foil journal bearing .....	239
<i>S Arokya Agustin, C Shravankumar, T V V L N Rao</i>	

Design and analysis of multi fuel injector .....	244
<i>K Deepak, T Lakshmanan</i>	
Estimation of critical speeds of a rotor supported on ball bearings .....	253
<i>Pavuluri Uday, J Prabu, M Solairaju, C Shravankumar, K Jegadeesan, T V V L N Rao</i>	
Mathematical simulation of vibration signature of ball bearing defects in a rotor bearing system .....	262
<i>J Prabu, Pavuluri Uday, M Solairaju, C Shravankumar, K Jegadeesan, T V V L N Rao</i>	
Characterization of fully lamellar Ti6Al-4V alloy .....	268
<i>Srihari Dodla, M Anirudh, E Rohith, S Vinay Kumar Reddy</i>	
Vibration analysis of metal – polymer sandwich structure incorporated in car bonnet.....	273
<i>S Deepak, K Vigneshwaran, N Vinoth Babu</i>	
Bio-Mechanical behaviour of artificial intervertebral disc in lumbar spine .....	298
<i>B Ajith, J Daniel Glad Stephen, M Prakash</i>	
A review on development of rapid numerical quadrature in finite element method.....	306
<i>V Sai Chandra, P V Jayakarthikeyan</i>	
An experimental studies on strength properties of bacterial concrete .....	313
<i>P Jagannathan, K S Satyanarayanan, Kantha Deivi Arunachalam</i>	
Lateral and torsional vibration analysis of composite shaft.....	326
<i>U Rajkiran, A Vinoth, K Jegadeesan, C Shravankumar</i>	
Analysis of carbon fibre bone plate for “B1” type periprosthetic femoral fracture .....	335
<i>D Raja, Sandipan Roy, Shantanu Patil, Shubhabrata Datta</i>	
Numerical prediction of deflection of a cylindrical hollow structure due to steady wind loads.....	343
<i>C Shravankumar, S Gowham, B V Lalith Kumar, V Praneeth, D Siva Krishna Reddy</i>	
Experimental and analytical stress analysis of spur gear .....	353
<i>K Vigneshwaran, Dinesh Shanmugam, C Balasuthagar</i>	
Design & Analysis of Assembled Teeth Spur Gear .....	362
<i>C T Arun Prasath, Abburi Lakshmankumar</i>	
Spine curvature data measurement and its application on product development .....	372
<i>Dinesh Shanmugam, Murali Subramaniyam</i>	
Finite Element Modeling and Validation of a Human Foot through experimental studies .....	379
<i>E Vijayaragavan, T V Gopal</i>	
Experimental Investigation of Particle Impact Damping On Machine Tools.....	386
<i>E Muthu, Shashwat Dashora, P. Nandakumar</i>	
Design and fabrication of beach cleaning machine .....	392
<i>C Balasuthagar, Dinesh Shanmugam, K Vigneshwaran</i>	
Modelling and design of a drain cleaning robot .....	397
<i>S Fouziya Sulthana, K. Vibha, Sudhanshu Kumar, Sneha Mathur, Tarang Ashutosh Mohile</i>	
Design, Analysis and Development of composite matrix material upright of FSAE vehicle.....	403
<i>R Harris Samuel, Dinesh Choudhary, Nirav Chaudhary, Siddhartha Datta</i>	

Influence of loading in cervical spine motion segment and stress distribution .....	409
<i>P. Susai Manickam, Vibin Vinod, VB Yogesh, M S Harin, S. Balamurugan</i>	
Mechanical response of taper dental implants using finite element analysis.....	419
<i>Vinamra Jain, Vamsi Krishna Dommeti, Emil Nutu, Ali Merdji, Jayanta Kumar Biswas, Sandipan Roy</i>	
Study of Mesh Stiffness of Spur Gear Tooth by Considering Pitting Defect under Dynamic Load Conditions .....	428
<i>M. Chandrasekaran, P. Nandakumar</i>	
Design and CFD analysis of Horizontal Axis Wind Turbine Blade with Microtab .....	437
<i>Manu S Nair, V Arikant, D Bhanu Priya, Murali Subramaniyam</i>	
A Review on Analysis and Development of Mathematical Formulation Interpolants for a 4 Noded Polygon using Wachspress' Interpolation Function .....	444
<i>D Sandeep Kumar, P V Jeyakarthikeyan</i>	
<b><u>MANUFACTURING</u></b>	
Optimization of awj process using fuzzy taguchi method for improving surface characteristics of silicon wafer .....	452
<i>S Oliver Nesa Raj, S Prabhu</i>	
Effect of Heat Treatment and Plasma Arc Welding on the Mechanical and Metallurgical Properties of Hastelloy C276.....	465
<i>U Mohammed Iqbal, S Muralidharan</i>	
Improvement in forming process using Magnetorheological Fluid Assisted Cushion in Hydraulic Press .....	472
<i>A Vijaya</i>	
Process parameter optimization of abrasive water jet machining on monel k400 alloy .....	482
<i>S Senkathir, S Thulasi Prakash, S Sriram, A C Arun Raj, T Geethapriyan</i>	
Design and development of waterless solar panel cleaning system.....	498
<i>Sanjaya Kumar Kar, Atif Akhtar, Anant Singh Gambhir, J Vignesh, Ritesh Nair</i>	
Optimization of turning parameters for Magnesium Silicon Carbide using TOPSIS method .....	505
<i>KR Arun Prasad, Vishnu P Nair, S K Jayant Jaishwin, VK Aryind Narayanan, A Naren, M R Stalin John</i>	
Experimental investigations on the effect of heat input on CO <sub>2</sub> laser welded Ti-6Al-4V plates.....	516
<i>Jai Singh Kurmia, A P Aravind, Vasareddy Mahidhara, K R Sampreeta, Deepan Bharathi Kannan T</i>	
The role of laser in manufacturing of shape memory alloy (sma).....	528
<i>A Karpagaraj, R Ramesh, T Arun Selva Kumar, N Rajesh Kumar</i>	
Investigation on aisi 430 ferritic stainless steel weldment by Tig, Mig welding and continuous drive friction welding .....	535
<i>G Senthil Kumar, R Ramakrishnan</i>	
Selective Breeding Model for Optimizing Multi Container Loading Problems with Practical Constraints.....	546
<i>S K Rajesh Kanna, N Lingaraj, P Sivasankar, J Rebekah, K Geetharani, C Akash</i>	

Flow analysis of abrasive micro-blasting with glycerol and acrylamideas carrier medium using computational fluid dynamics .....	555
<i>S. Ramanathan, E. Naveen, R.M. Vignesh, S.K. Sudharson, B. Charan</i>	
Controlling an humanoid robot using iot.....	564
<i>U Padhmesh, A Kumaraswamy</i>	
Integrating the automated car manufacturing system based on RFID and analysis using modules.....	577
<i>R. Rahul, A. Kumaraswamy</i>	
Friction welding of dissimilar aluminium 6061and SS 430F steel and its characterizations .....	583
<i>P Periyasamy, Raja, M Kamaraj, M. Balachandar, N Ramanan</i>	
Error analysis and point data processing of reconstructed surface by reverse engineering .....	593
<i>R Ann Joachim Martin, J Daniel Glad Stephen, A Vinoth, E Muthu</i>	
Optimization of Process Parameters using Taguchi Technique for Drilling Aluminium Matrix Composites (LM6 / B4C) .....	599
<i>C Sarala Rubi, J Udaya Prakash, C Rajkumar</i>	
A study on the combined effect of aging and severe plastic deformation on the mechanical properties of AA6061 alloy .....	608
<i>S Muralidharan, S Arun Kumar, U Mohammed Iqbal</i>	
Optimization of process parameters in friction welding of super duplex stainless steel .....	616
<i>R Manoj Samson, T Deepan Bharathi Kannan, R Aravind, A B Varun Vinayak</i>	
Effect of MQL, wet and dry lubrication on functional behavior of end milled nimonic-263 .....	627
<i>Shubham Shekhar, S Gowthaman, T Jagadeesha</i>	
Optimization of Cutting Parameters Based on Surface Roughness and Cutting Force During End Milling of Nimonic C-263 Alloy.....	639
<i>P Giridhar Reddy, S Gowthaman, T Jagadeesha</i>	
2d finite element analysis of inconel 718 under turning processes.....	648
<i>G Chandra Mouli, K Prakash Marimuthu, T Jagadeesha</i>	
Structural design of zoomorphic robot .....	659
<i>D Durga Prasad, CH Vasanth Kumar</i>	
Multiple oriented robots for search and rescue operations .....	672
<i>M Ahamed Ali Firthous, R Kumar</i>	
IoT based dual-axis solar tracking system.....	680
<i>R Vinodhkumar, Stalin John</i>	
Zero Defect Assurance of Three-Wheeler Product Using IoT Systems .....	685
<i>Muddubhai Asif Hussain, U Mohammed Iqbal</i>	
Comparative study of tungsten inert gas and friction stir welding of aluminium alloy aa5083 (armour grade) aluminium alloy joints .....	693
<i>Mouriya Srinivasan, R Saravana Kumar, T. Rajasekaran</i>	
Automated quality monitoring system for Ceramic Tiles.....	707
<i>R Murugesan, T Ragul, Jibin Edison, T Vinoth</i>	

## PART 2

Experimental Study and Optimization of Residual Stresses in Machining of Ti6Al4V Using Titanium and Multi-layered Inserts .....	714
<i>V Veeranaath, Ritik Kumar Das, Sushil Kumar Rai, Sukhveer Singh, Prabudh Sharma</i>	
Optimization of FSW Parameters to Improve the Mechanical and Metallurgical Properties of Aluminium Alloy AA 5083 Joints.....	733
<i>R Saravana Kumar, T Rajasekaran, Sahil Deep Singh, Sameer Kumar, Prakar Mishra, Priyanshu Shrivastav, Shashank Ravishankar</i>	
Prediction of Optimum Welding parameters for Friction stir welding of Aluminium Alloy AA5083 Using Response Surface Method.....	746
<i>R Saravana Kumar, T Rajasekaran, Varun G Prasad</i>	
Design optimization and development of an Automated Storage and Retrieval System.....	761
<i>T Ajay, A Vinoth, J Daniel Glad Stephen</i>	
Experimental Study and Finite Element Analysis of the Impact of Tool Edge Geometry in Orthogonal Machining of Super Alloy Inconel 718 .....	769
<i>V Veeranaath, Aakash Anshuman, Suryaansh Sethia</i>	
Characteristic Study of Friction Stir Welding of Aluminium Alloy AA7075 Using H13 Surface Hardened Tool Steel with Variable Tool Pin Design .....	786
<i>R Saravana Kumar, T Rajasekaran, S Sivasubramanian, Dhruv Garg, Debasis Gouda, Ritwik Tiwari, Akashendra Singh</i>	
Enhancement of ductility and strength in 410 stainless steel through cyclic heat treatment .....	794
<i>R Manoj Samson, N Harshavardhana, R Nirmal, R Ranjith</i>	
Optimization of welding parameters in CMT welding of Al 5083 alloys using VIKOR optimization method.....	806
<i>A P Aravind, S Suryaprakash, S Vishal, M Sethuraman, T Deepan Bharathi Kannan, M Umar, Sonu Rajak</i>	
Performance analysis of process variables on laser beam machining of inconel-718 alloy .....	815
<i>R Manoj Samson, R Ranjith, R Nirmal, T Geethapriyan</i>	
Experimental investigation of milling operation on GFRP composites .....	823
<i>I Infanta Mary Priya, Anshul Singhal</i>	
Effect of Process Variables on Electrochemical Micromachining of Titanium Alloy (Ti-3Al-2.5V).....	839
<i>T Geethapiriyam, Gowtham Kumarasamy, T Lakshmanan, R Manoj Samson, J Silkson John</i>	
Performance Characteristics of Electrochemical Micromachining on Pure Titanium using coated tool electrode .....	844
<i>T Geethapiriyam, A Arul Jeya Kumar, A C Arun Raj, Gowtham Kumarasamy, J Silkson John</i>	
A novel three axis Semi Elliptic Manipulator Configuration for simultaneous Multi Point Operations .....	851
<i>Shylesh Srinivasan, Shilpa Thakur</i>	
Direct ink writing of ceramics for bio medical applications – A Review.....	862
<i>Utsav Golcha, A S Praveen, D L Belgin Paul</i>	

Failure of adhesively bonded single lap joints with MWCNT and Fullerene C <sub>60</sub> in the adhesive due to tensile loading .....	869
<i>R Amit Kumar, R Asokan, Kanu Priya Jhanji, Battula Nagapavan, P Sujith Kumar Reddy, M Venkata Gireesh</i>	
Friction welding of dissimilar metals (aluminium AL 6061 T6 and stainless steel AISI 304).....	877
<i>S Senkathir, V B Siddharth</i>	
Robot Nano Spray Painting - A Review .....	886
<i>J R V Sai Kiran, S Prabhu</i>	
Investigations on the machinability of titanium alloy using low frequency vibration assisted turning under minimum quantity lubrication .....	895
<i>V G Umasekar, M Gopal, C Shravan Kumar</i>	
Two-Dimensional Nanomaterials and its Application as a Reverse Osmosis Membrane: An Overview .....	901
<i>M Thirugnanam, G Rajasekaran</i>	
Modeling and analysis of residual stresses in castings using AlSi12(Fe) and NiCu30(Fe) materials .....	908
<i>Manikyam Sandeep, M. Sandeep</i>	
Taguchi based Optimization of Coated and Uncoated Tool Insert for Turning Ti6Al4V using Grey Relation Analysis .....	915
<i>R Ambigai, S Prabhu, Raj Gandhi</i>	
Robotic Gripper With Force Feedback System .....	927
<i>Ashutosh Kumar, Abburi Lakshman Kumar, V Aravindan, R Arunachallam</i>	
Acoustic Emission Analysis for Damage Mechanism in Fiber Reinforced Polymer Composite under Torsional Behaviour .....	932
<i>G. Hemanth Raj, M. Prakash, Abburi Lakshman Kumar</i>	
Experimental study on end milling parameters of Ti6Al4V Titanium superalloy in different cutting environment.....	946
<i>S Vignesh, U Mohammed Iqbal</i>	
Design and Fabrication of Abrasive Jet Machining Systems .....	958
<i>R Saravana Kumar, S Sampath Kumar, S Rajendra Kumar</i>	
Literature review on friction stir welding of magnesium alloys.....	969
<i>Rajesh, T Rajasekaran</i>	
Path Planning of Serial Two Link Planar Manipulator for Avoidance of Steam Generator Plugged Tube.....	982
<i>G Perumalsamy, Deepak Kumar, P Visweswaran, S Joseph Winston, S Murugan</i>	
Experimental studies on magnesium metal matrix composites processed by Twist Extrusion .....	993
<i>U. Mohammed Iqbal, S. Muralidharan, PV Abhishek</i>	
A study on influence of peak current and ultrasonic vibration during powder mixed electrical discharge machining process .....	999
<i>J V Rajesh, Abimannan Giridharan</i>	
Comparison on machining characteristics of AISI 304 steel during micro and nano powder mixed electrical discharge machining process .....	1008
<i>J V Rajesh, Kushpreet Singh, Abimannan Giridharan</i>	

Optimization approaches of industrial serial manipulators to improve energy efficiency: A review .....	1017
<i>G Lakshmi Srinivas, Arshad Javed</i>	
Selection of optimal capacity for reconfigurable machines during lean manufacturing.....	1026
<i>L N Pattanaik, Pooja Munda, Jyoti, Amit Kumar</i>	
Effect of hot corrosion demeanour on aerospace-grade Hastelloy X made by pulsed and constant current arc welding in molten salts at 820 °C.....	1034
<i>M Sathishkumar, P Subramani, M Natesh, M Venkateshkannan, N Arivazhagan, M Manikandan</i>	
Condition based monitoring for fault detection in windmill gear box using artificial neural network.....	1048
<i>N Abishekraj, G R Jeeva Prashanna, M S Suriyaa, T Barathraj, D Mohanraj</i>	
Design and Development of Bio-Sensitive Robotic Arm using Gesture Control.....	1054
<i>Subhodeep Bakshi, Karan Ingale, Atishay Jain, S Karuppudiyian</i>	
Development and Workspace Analysis of Smart Actuation based Planar Parallel Robotic Motion Stage.....	1066
<i>Deep Singh, Rutupurna Choudhury, Yogesh Singh, Manidipto Mukherjee</i>	
Rectification of the improper mating of the rack and valve assembly using Six Sigma methodology at a steering manufacturing & assembly plant.....	1076
<i>Aftab A. Pathan, E Vijayaragavan</i>	
Evaluation of microstructure and mechanical properties of magnesium alloys by stir casting process .....	1085
<i>A Razal Rose, R Harris Samuel, Tirth Makawana, Raj Makawana, Somnath Pal</i>	
Identification of tool wear status and correlation of chip morphology in micro-end milling of mild steel (SAE 1017) using acoustic emission signal .....	1093
<i>M Prakash, M Kanthababu, A Arul Jeya Kumar, N Arun, V Prasanna Venkadesan</i>	
Experimental investigation and modeling of drilling process parameters for surface roughness of Al6061/SiC/Gr hybrid composite using RSM .....	1103
<i>P Sai Tarun Kumar, A. Muniappan</i>	
Deep Learning – A Review .....	1111
<i>Vamsi Madhav Kota, V Manoj Kumar, C Bharatiraja</i>	
Microstructure and Mechanical Behaviour of AZ91d Magnesium Composite Reinforced With B <sub>4</sub> C and Graphite by Casting Process .....	1120
<i>I Aatthisugan, A Razal Rose</i>	
Effect of Sintering Temperature on Microstructure and Mechanical Properties of Aluminium Composites .....	1126
<i>I Aatthisugan, Aishik Banerjee, Mohammed Moinuddin Hasan, Aditya Singh Patel, Kumar Pushkar, Suraj Dey, Saud Bin Sohail, Syed Mohammad Khateeb, Animesh Das</i>	
Effects of grinding α–β Titanium with 3% CNTs in CBN grinding wheel: An Experimental Study.....	1135
<i>Deborah Serenade Stephen, Prabhu Sethuramalingam</i>	
Experimental investigation and Modeling of Drilling Process Parameters for MRR of Al6061/SiC/Gr composite using RSM .....	1145
<i>K. Asha, A. Muniappan, N. Karunagaran, G. Bharathiraja</i>	

Enhancement of surface quality in Wire EDM machining of Magnesium alloy using ANN modeling approach .....	1153
<i>M. Sreenivasulu, A. Muniappan, G. Bharathiraja, N. Karunagaran</i>	
Influence of Shot Peening on Surface Characteristics of Case Hardened SAE9310 Gear Material .....	1160
<i>S Karthick, S Oliver Nesaraj</i>	
Application of principles of a Artificial Intelligence in Mechanical Engineering.....	1177
<i>S. Anush Lakshman, D. Ebenezer</i>	
Surface roughness evaluation in machining titanium alloys using non-textured and textured cutting inserts .....	1184
<i>N. Abishekraj, T. Gowtham, V. Krishnaraj, R. Bibeye Jahaziel, B. Geetha Priyadarshini</i>	
An Experimental and Characteristic Study of Abaca Fiber Concrete .....	1193
<i>Reynold Anthony, Surya Yash Awasthi, Prakhar Singh, V.R. Prasath Kumar</i>	
Experimental Studies of Different thick Steel sheets and variable clearance in MIG Brazing.....	1202
<i>K Muthuraju, Abburi LakshmanKumar</i>	
Product Design & development of High-Pressure moulding machine and analysis of various mould properties.....	1211
<i>M Lavakumar, S Arokya Agustin</i>	
Fabrication and characterization of Magnesium Metal Composite by Stir Casting .....	1219
<i>A Razal Rose, I Aatthisugan</i>	
An Experimental Study on the Effect of Magnetized Water on Mechanical Properties of Concrete .....	1226
<i>S Venkatesh, P Jagannathan, V R Prasath Kumar</i>	
<b>APPLICATION OF MULTI CRITERIA DECISION MAKING OF SETTING INPUT PROCESS PARAMETERS FOR DRILLED PRODUCT QUALITY OF Al Si<sub>7</sub> Cu<sub>4</sub> .....</b>	
<i>S Balasubramanian, G Asvath, S P Sundar Singh Sivam</i>	1235
Effect of heat input on TIG welding of hastelloy C-276 .....	1242
<i>Vasareddy Mahidhar, K R Sampreet, Chiguluri Shai Vinay, C B Maheswaran, T Deepan Bharathi Kannan</i>	
RETRACTION: Effect of Stone-Thrower-Walls Defect on Mechanical Properties of Bi-layer Graphene - A Molecular Dynamics Study.....	N/A
<i>Mukul Joshi, Ekant Sharma, Ankur Anand, M. Thirugnanam, G. Rajasekaran</i>	
Autonomous staircase climbing robot for rescue application.....	1260
<i>J Daniel Glad Stephen, Coena Das, Vyom Khanna, Vvishvesh Negi, K S Harikrishnan</i>	
Combined Drilling and Reaming Operation in Robot and CNC .....	1269
<i>P Giridharan, Stalin John</i>	
The effects of cutting environment on surface roughness and tool life in milling of AISI 4340.....	1275
<i>Shalina Sheik Muhamad, Jahaarah A. Ghani, Che Hassan Che Haron, Hafizal Yazid</i>	
Contouring reflective plates through image resizing and Iterative Intensity Integration Technique (IIIT).....	1284
<i>A Vijaya, G Subramanian</i>	

Experimental Exploration on Surface Roughness in Abrasive Water Jet machining using Response Surface Methodology .....	1293
<i>S Venkata Ravi Kumar, A Muniappan, G Bharathiraja, N Karunagaran</i>	

## **THERMAL**

How to Burn? Straight vs Horizontal vs Suspended.....	1301
<i>M Rakshantha, Yeleti Bunny Venkat, S Sanjana, R Gousik, B T Kannan</i>	
Smoldering Combustion of Hexagonal Incense Material with Forced Airflow .....	1309
<i>Yeleti Bunny Venkat, M Rakshantha, S Sanjana, R Sri Vijay Prabhu, B T Kannan</i>	
Design and development of impinging jet facility for flow visualization studies .....	1319
<i>Abdul Hamid Rather, B T Kannan</i>	
A review on thermoelectric cooling technology and its applications .....	1332
<i>Suhani Baru, Sonal Bhatia</i>	
A Detailed Review on Electric Vehicles Battery Thermal Management System.....	1343
<i>Sourav Singh Katoch, M Eswaramoorthy</i>	
Effect of Internal Heat Generation on Solidification of Molten Fuel Droplet during its Interaction with Coolant in a Nuclear Reactor .....	1353
<i>M Chandra Kumar, A Jasmin Sudha, D Ponraju, S Athmalalingam</i>	
Effect of Nozzle Hole Number on Diesel Engine Using Diesel and Biodiesel Blends .....	1361
<i>S Sabareesh Kumaran, P Raghu</i>	
Comparison of a thermal barrier coated engine using eucalyptus oil methyl esters and azadirachta indica methyl esters .....	1371
<i>N. S. Senthur, S. Bala Murugan, H Ram Ganesh, A M Avudaiyappan</i>	
Experimental investigation of effect of CI-engine fuelled with camphor-oil diesel blend with additive of DTE (Diethyl-Ether).....	1381
<i>Aditya Sharma, Harshit Shukla, A Sathish Kumar, G Manikandaraja, S Malarmannan</i>	
Solar powered waste segregation system .....	1389
<i>Nehal Mahuli, Madhulika Goswami, G. Manikandaraja, Harshita Sarmah, Shubham Aditya, Kshetrimayum Christopher</i>	
Heat transfer analysis of the DOT 4 brake fluid using a double pipe heat exchanger .....	1395
<i>C Sharma, M Siddiqui, Md Imran, G Manikandaraja</i>	
Solidification characteristics of phase change material in a rectangular finned spherical capsule .....	1405
<i>D Premnath, P Chandrasekaran, L R Ganapathy Subramanian</i>	
Investigation of Cu-ZSM5 catalyst for the Emission Reduction in ethanol-gasoline blends using iso-butanol as an additive in SI engine .....	1413
<i>G. Elavarasan, D. Karthikeyan, T. Rajasekeran</i>	
Mathematical modelling and analysis of solar water collector with flat and V-groove absorber plate with helical and plain water flow path tubes .....	1427
<i>S Navakrishnan, P Sudhakar</i>	

Efficiency improvement in thermal power plants using waste heat recovery of flue gas – simulation study.....	1435
<i>Aniket Chandrakant Nemade, S Ponsankar</i>	
Studies on the performance of 150W solar photovoltaic module with evaporative cooling .....	1443
<i>M. Suresh, R. Shanmadhi</i>	
Heat and mass transfer studies in a finned tube heat exchanger employed with evaporative cooling technique .....	1451
<i>M. Suresh, S. Viveknath, B. Karthikayan, V. Krishnan, K. Sowmya</i>	
Elementary characterization of smoke tunnel using flow over a circular cylinder.....	1461
<i>K Keerthana, B T Kannan</i>	

### PART 3

Modeling and simulation of an active solar water heating system for Maiduguri, Borno State, Nigeria.....	1469
<i>L Raji, S Shodiya, G M Ngala, M T Baba</i>	
On the effect of repulsive magnetic field on partially premixed flames.....	1479
<i>A V Revanth, G Malaikannan, Vinayak Malhotra</i>	
Combust-o-Acoustics: Energy Transition and Implications.....	1507
<i>Aarohi Anmol Mudholkar, Mohammed Shazaan Hussain, Vikram Ramanan, Vinayak Malhotra</i>	
Experimental investigation of light weight cementitious material for thermal insulation .....	1518
<i>S Pradeep, S Anuwar Husain, M D Nithish Kumar</i>	
Combustion and propulsive characteristics of potential hybrid rocket propellant.....	1525
<i>Rahul Sunil, Aditya Virkar, M Vignesh Kumar, Iynthezhuthon Krishnamoorthy, Vinayak Malhotra</i>	
Self-inducing fires: the heat source effect .....	1538
<i>Sneha Gayen, Pritha Pal, Prayas Bhawalkar, Vinayak Malhotra, T Selvakumaran</i>	
Numerical investigation of flow field over four in-line circular cylinders for different spacing ratio .....	1555
<i>D S K Reddy, R Iyer, K Luthora, A Rana, P Kumar</i>	
Experimental investigation on Preheating of Azadirachta indica biofuel and their performance analysis in a CI engine.....	1566
<i>V Praveena, S Karthikeyan, M Ilakkia, S Vijay Ganesh</i>	
Experimental Analysis of Aerodynamic Performance on asymmetric NACA 23018 Aerofoil incorporating a Leading-Edge Rotating Cylinder.....	1573
<i>Md Abdus Salam, MA Taher Ali, Md Quamrul Islam</i>	
Exploration of Zeolite 5A as a catalyst in the after-treatment system of a CI engine powered by plastic oil blend .....	1581
<i>S Premkumar, G. Balaji</i>	
1-D mathematical modeling of a diesel oxidation catalyst for transient hot start drive cycle .....	1591
<i>Sreeharsh Nair, Mayank Mittal</i>	

A Numerical Approach to Study the Steady State Heat Transfer Characteristics of an Annular Porous Heat Exchanger .....	1601
<i>Subhankar Ghosh, S. Senthilkumar, Dewanshu Deep, K. J. Bharanitharan</i>	
A computational study and experiments to investigate the combustion and emission characteristics of a small naturally aspirated diesel engine through changes in combustion chamber geometry, injection parameters and EGR.....	1612
<i>Pradeep Menon, Tushar Kamble, Mayank Mittal</i>	
Development of a CFD Model and Validation with PIV-data to Study the Fluid Motion in a Small PFI SI Engine .....	1637
<i>Afaque Alam, Gaurav Shinde, Mayank Mittal</i>	
Aerodynamic Characteristics of Flow over Two Unsymmetrical Tandemly Arranged Airfoils – Numerical Simulation .....	1643
<i>Saransh Abbey, Kevin Dankhara, S. Senthilkumar</i>	
Design and Fabrication of a Turbine having NACA 2415 Blades and Feasibility Study of its Application in Cooling Tower.....	1655
<i>Md Wakil Ur Rahman, Fazlur Rashid, Sufwan Bin Jahangir, Iftekhar Anam</i>	
Preparation and characterization of green synthesized cerium oxide nano particle doped with biodiesel blends .....	1664
<i>A Murugesan, R Prakash, S Srinithi, L Ranjith Kumar, S Parthiban, K Pavithran</i>	
Analysis of concentrated solar powered conical reactor with coal ash as catalyst .....	1671
<i>Chittibomma Uday Kiran, G. Balaji</i>	
Development and test of a new carbon capture system using Zeolite with addition of Activated carbon and Monoethanolamine for IC engines.....	1681
<i>P S Ajith Kumar, Akhil Varghese, S S Vaishanth, G Balaji</i>	
Experimental investigation of performance and emission characteristics of CI engine fuelled with pine oil and cotton seed oil.....	1690
<i>Mohd Quasim Khan, Jitendra Joshi, Harshit Singh, Ayatuallah, Anurag Singh, G Manikandaraja, S Malarmannan</i>	
Study of expansion ratio on dual bell nozzle of LOX-RP1 engine for replacing the existing bell nozzle to dual bell nozzle .....	1698
<i>Ashis Kumar Samantra, K S Santhosh, Khalid Rashid, A Jayashree</i>	
Experimental Study on GNP Based Nanofluid Phase Change Material for Cooling Application.....	1710
<i>Thode Ranjith, A Sathishkumar</i>	
Analysis and Performance improvements of Photovoltaic system by using fins for heat reduction by CFD .....	1721
<i>Mundrathi Karthikeyan, Joji Johnson</i>	
Fresnel Lens Technology for Distillation of Water with LDR Sensor Based Tracking System.....	1729
<i>Joji Johnson, Arjun Srinivas</i>	
Investigation on NO <sub>x</sub> control in SI Engine Assisted with Hot and Cold EGR .....	1736
<i>R Akash, C G Hariharan, S M Suriya Dharshan, G Balaji</i>	
Numerical study on fin and tube heat exchanger by using elliptical tube-vortex generator .....	1747
<i>M Sudharsan, M D Kathir Kaman, M Cheralathan</i>	

A Review on Solar Tracking Methods .....	1755
<i>D V Nithin Kumar, M R Stalin John</i>	
Influence of geometric and operating parameters on the performance of the helical capillary tube for the R744 refrigerant .....	1772
<i>P Jadhav, N Agrawal, A Sahu, S Patil, D Aldar, A Tapase</i>	
Numerical simulation of flow field over slender bodies at transonic Mach number and low angle of attacks.....	1783
<i>Jai Makhija, D Siva Krishna Reddy, Rishabh</i>	
Performance analysis of solar concentrator dish by various reflector and absorbent.....	1794
<i>T Lakshmanan, G Leela Prasad, Akashdeep Ghosh, Abhik Kumar, H K Aniketh Vittal</i>	
Comparison of the effect of 1 <sup>st</sup> order and 2 <sup>nd</sup> order fluctuating temperature field on convective heat transfer coefficient in an unsteady laminar-boundary layer .....	1802
<i>S B Gupta</i>	
Experimental examination on physicochemical properties of the Tamarind seed biodiesel in comparison with petroleum diesel fuel.....	1810
<i>Ganesh Bharathi Ravikrishnan, S Venkatesan, Bright Samuel</i>	
Design, analysis and fabrication of lanthanum strontium manganite catalytic converter.....	1820
<i>Pushpit Jain, Abhishek Tibrewal, Vignesh Krishnakumar, R K Barathraju</i>	
Numerical investigation of flow field over four cylinders in square arrangement for different spacing ratios.....	1831
<i>P. Goutam, D Siva Krishna Reddy</i>	
Design of integratedsinglestagephotovoltaic solar inverter(stand-alone) .....	1843
<i>Souvik Nanda, P Sudhakar</i>	
Development and integration of oxygen generator for home air conditioner .....	1852
<i>S K Sameer, P Eswaran</i>	
Experimental investigation on reducing the solidification time of NFPCM by reducing sub cooling for different heat transfer fluid temperature for cooling applications.....	1865
<i>S. Malarmannan, P Chandrasekaran, Mohd Quasim Khan</i>	
Design and analysis of shell and tube heat exchanger for low temperature applications using CFD .....	1874
<i>R S Anand, Shabin David, M. Gajendiran, Kingston Stanley</i>	
Preliminary Studies of Compressible Jet Flow from a Pipe with Hexagonal Cross-section .....	1883
<i>S Avinash, K Tinesh, B T Kannan</i>	
Preliminary Studies on Compressible Jet Flow from a Pipe with Square Cross-section.....	1890
<i>K Tinesh, S Avinash, B T Kannan</i>	
Design and Development of a Modular Atmospheric Boundary Layer Wind Tunne .....	1899
<i>Murukesh Muralidhar, Saneesh C Joy, Mohammed P Akhil, B T Kannan</i>	
Assessment of Turbulence Models on a Backward Facing Step Flow Using OpenFOAM® .....	1907
<i>Anugya Singh, S Aravind, K Srinadhi, B T Kannan</i>	
Thermal Property Enhancement on Water based PCM in Spherical Container for Cold Storage Applications.....	1915
<i>Saven Jude Sajen, P Sundaram, Cyriac Tomy Yogyaveedu</i>	

Numerical study of thermal performance with nanoparticles and grooves in Microchannel .....	1925
<i>Ayush Mishra, Amit Varakhedkar, Vishnu Teja Mantripragada, Pankaj Kumar</i>	
Experimental characterization of a Sensible Heat Thermal Energy Storage using pebbles for charging.....	1934
<i>P Sharma, C Kshetrimayum, T A Faruqui, A Chauhan, P Kumar</i>	
Effect of surfactants on solidification characteristics of DI water based PCM for Cold Thermal Energy Storage .....	1939
<i>Abhinav Saboo, Mohd Tauseef Ansari, Vivek Vijayan, P Sundaram</i>	
MEMS based Heavy Metal: Mercury and Cadmium Ion Detection in Laminar flow of water.....	1948
<i>Rahul Gowtham Poola, A. Vimala Juliet, S. Akshya</i>	
Performance Evaluation of Bifacial and Monofacial modules in vertical and latitude mounting at South India using PVsyst.....	1963
<i>M Varun, S. Manikandan</i>	
Heat transfer enhancement with titanium nitride nanofluid in a shell and tube heat exchanger.....	1974
<i>S Arulkumar, V Mathanraj</i>	
Analysis of flow characteristics for different shapes of cylinder at lower subcritical regime .....	1982
<i>Ponsankar Soundararaju, Pankaj Kumar</i>	
Analysis on impact of energy efficient techniques to enhance the building performance.....	1989
<i>Prerna Sharma, V.R. Prasathkumar, R. Senthil Kumar, L. Krishnaraj</i>	
Experimental Investigation of Performance and Emission Characteristics of CI Engine Fuelled With Mahua Oil – Pine Oil Blend .....	2001
<i>Chittiboyina Sai Jaideep, K Hemanth, D Sudhakar, P Prakhyath, M Rohit, G Manikandaraja</i>	
Experimental investigation of performance and emissions of CI engine fuelled with mahua oil blended camphor fuel .....	2009
<i>K V R Tanay, M Vikram Kumar, J Sreenath Reddy, K Manideep, Khyathi Krishna, Manikandaraja</i>	
Experimental investigation of performance, combustion and emission characteristics of CI engine fuelled with turpentine oil diesel blend, camphor oil diesel blend, lemongrass oil diesel blend, mahua oil diesel blend, karanja oil diesel blend .....	2015
<i>G. Manikandaraja, P. Chandrasekaran</i>	
Experimental investigation on performance and emission characteristics of CI engine fuelled with linseed oil and Ethyl-Tert-Butyl-Ether (ETBE) as additive .....	2027
<i>Harshit Shukla, Aditya Sharma, A. Sathish Kumar, G Manikandaraja, S Malarmannan</i>	
Economic evaluation of grid connected and standalone photovoltaic systems using PVsyst.....	2034
<i>K N B Akshai, Ramalingam Senthil</i>	
Performance and emission characteristics of CI engine fuelled with turpentine oil-diesel blend with diethyl ether as additives .....	2041
<i>R V Nanditta, S R Deenadayalan, G Manikandaraja, P Udayakumar</i>	
Experimental investigation of performance and emissions of CI engine fuelled with neem oil blended turpentine fuel.....	2048
<i>Chittiboyina Saijaideep, Koribilli Hemanth, M Anirudh, K V V Sai Charan, S Lalithesh, S Vinay Kumar Reddy, P Udayakumar, G Manikandaraja</i>	

Experimental investigation of CI engine fuelled with diesel blended neem oil with methanol as additives .....	2056
<i>N R Ramanathan, C S K Balasekhar, P Tanish, G Manikandaraja, S Malarmannan</i>	

Effect on solidification of deionized water based PCM in a spherical encapsulation-An experimental study .....	2064
<i>P Sundaram, A Kalaiselvane</i>	

Comparison of freezing characteristics of phasechange material in metallic and low density polyethylene spherical capsules.....	2074
<i>D. Premnath, Srivaths Balaji, Juswen Mathew, Rahul Joseph</i>	

Experimental investigation of performance and emissions of CRDI engine fuelled with kapok ester oil blended with diesel.....	2084
<i>Mehul Rawat, Aayush Virat Deo, P Gokul Krishna, P Udayakumar</i>	

PERFORMANCE AND EMISSION OF CI ENGINE FUELED BY TURPENTINE AND COTTONSEED OIL BLENDS AT VARIOUS INJECTION PRESSURES.....	2094
<i>P. Udayakumar, G Kasiraman</i>	

## **MATERIALS**

Comparison of lamellar nanostructured cubical and spherical statistical volume elements in terms of crystallographic texture and deformation behaviour .....	2102
<i>Srihari Dodla</i>	

Effect of fibre alignment on mechanical properties of natural fibre reinforced polymer composites .....	2110
<i>M Kamaraj, V Vishnu Vardhan, K S Charan, M Lalith Lochan</i>	

Comparison studies on mechanical and wear behavior of Stir Cast Al-SiC-B <sub>4</sub> C metal matrix composites.....	2119
<i>A C Arun Raj, S Vishal, S Senkathir, T Geethapriyan</i>	

Simulation of high velocity impact test on GFRP .....	2126
<i>Yash Mishra, N Haresh Kumar, I Infanta Mary Priya</i>	

Designing age-hardenable Al alloys using ANFIS and GA .....	2137
<i>Sanchari Saha, Swati De, Shubhabrata Datta</i>	

Experimental study on behaviour of nano material concrete columns .....	2146
<i>S Natarajan, S Senthil Selvan</i>	

Prediction of corrosion behaviour of reinforced concrete with manufactured sand using artificial neural network.....	2156
<i>B Vijaya, S SenthilSelvan</i>	

Comparison study on dry and wet sliding wear behaviour of aluminium/nano composites.....	2162
<i>A Jayapragash, G G Solamannan, I Guganeswaran</i>	

Experimental investigations on the effect of copper on the microstructure and shape memory characteristics of NiTi alloys.....	2168
<i>S Santosh, V Sampath</i>	

Effect of saw dust, rice husk, and groundnut shell on properties of mubi vimtim clay in Adamawa State Nigeria .....	2178
<i>C Nathan</i>	

Optimization of Laser Parameters and Dimple Geometry for the Improved Tribological Behaviour of Titanium Alloy .....	2188
<i>M Prem Ananth, S Ponnvel, V Sridharan, A Karthikeyan, R Mithun Krishnan</i>	
Evaluation of mechanical behavior for animal fiber Reinforced hybrid fiber composite for marine application .....	2194
<i>S Dinesh, C Elanchezhian, B Vijayaramnath, A Adinarayanan, S Guru Anantha Raman</i>	
Development of innovative flow visualisation methods to investigate the stages of Wet Compression Moulding (WCM) process.....	2205
<i>Balaji Muthuvel, Debes Bhattacharyya, Simon Bickerton</i>	
Thermal Fatigue Cycle Shock Effects on Physical and Structural Properties of H13 Tool Steels before and after Heat Treatments .....	2213
<i>P. Karthikeyan, Sumit Pramanik</i>	
Development of natural fibre reinforced hybrid composites and its characterization .....	2221
<i>M Kamaraj, P Periyasamy, N Ramanan, Sethu Vellapan, M A Venkatasubramanian</i>	

#### **PART 4**

Experimental and Numerical Studies on The Mechanical Characterization of Epdm/S-Sbr Nano Clay Composites.....	2229
<i>K. Mohamed Bak, G Raj Kumar, N Ramasamy, R Vijayanandh</i>	
Investigating suitability of natural fibre-based composite as an alternative to asbestos clutch facing material in dry friction clutch of automobiles .....	2240
<i>G Sundarapandian, K Arunachalam</i>	
Synthesis, Characterisation and Mechanical Behaviour of In-situ Al <sub>7</sub> SiMg/TiB <sub>2</sub> Composites Prepared by Salt-Metal Reaction.....	2254
<i>Niranjan Oommen, Sanjay Ajayan, Chellam Sundaraman, S Sasikumar</i>	
Multi-Objective Genetic Algorithm Based Optimization of Age Hardening for AA6063 Alloy.....	2261
<i>Aluru Praveen Sekhar, Supriya Nandy, Swati Dey, Subhabrata Datta, Debdulal Das</i>	
Wear and corrosion behavior of electroless Ni-P- TiO <sub>2</sub> - Al <sub>2</sub> O <sub>3</sub> nanocomposite coatings on magnesium AZ91D alloy .....	2267
<i>V Krishnakumar, R Elansezhan</i>	
Designing Fe-based high entropy alloy—a machine learning approach .....	2275
<i>B Debnath, A Vinoth, M Mukherjee, S Datta</i>	
The flexural properties of self healing fiber reinforced polymer composites .....	2282
<i>Kanu Priya Jhanji, R Asokan, R Amit Kumar, Sahil Sarkar</i>	
Ballistic Impact analysis of 2D woven Kevlar/Basalt reinforced composite.....	2290
<i>K. Kalai Thendral, D. Abraham Antony</i>	
Wear testing of polypropylene termina chebula fibres.....	2299
<i>S Ravindran, N Mani, M Kannan, S Santhosh, R Kamal</i>	
Study of age hardening process on Al/SiC/Al2O3 hybrid composite .....	2308
<i>Kolli Balasivarama Reddy, Chiguluri Shaivinay, T Jeevan Naidu, Shri Lekhaz, Nived Akula</i>	

Influence of core and matrix modifications on the mechanical characteristics of sandwich composites.....	2319
<i>D Selwyn Jebadurai, A Razal Rose</i>	
Characterization and Applications of Titanium alloy with Nickel and Niobium based Shape memory alloys by Molecular Dynamic Simulation–A review .....	2326
<i>G. Naresh, G. Rajasekaran</i>	
Mechanical Properties of Graphene with Defects and Its Application in Nanocomposites–Brief Overview.....	2331
<i>S Arun Prasath, G Rajasekaran</i>	
Vibration Analysis Of Nitinol Shape Memory Alloy In Carbon Fibre Reinforced Polymer Composites .....	2335
<i>R Manoj Samson, M Prakash, R Nirmal, Gaurav Vajpayee</i>	
Wear performance of UHMWPE reinforced with basalt fibre for total disc replacement.....	2342
<i>J Daniel Glad Stephen, M Prakash</i>	
A Comparative Study of Sandwich and Hybrid Sandwich Composites using Jute and Kevlar Fibers.....	2348
<i>B Ramprasath, R Murugesan, Abhik banerjee, Abhinav Anand, Shashank</i>	
Fire and mechanical properties of polymeric composites with keratin-based flame retardants .....	2356
<i>D Jung, H Lee, N K Kim, D Bhattacharyya</i>	
Processing and testing of Aluminium composites with flyash and SiC as hybrid reinforcements .....	2364
<i>Vaddi Thulasikanth, Prasannjeet Das, Atchan Naidu, Ikrar Basha</i>	

## **MULTIDISCIPLINARY**

Locating the Economic and other Performance Centres of Asia using Geodetic Coordinates, Haversine Formula and Weiszfeld's Algorithm .....	2371
<i>A Baskar</i>	
Design and evaluation of a Self-charging Battery electric two wheeler.....	2383
<i>N M Govindarajan, V A Kashyap, S Siluvaimuthu, P B Sethupathi, J Chandradass</i>	
A Bayesian Model for Prediction of Stroke with Voice Onset Time .....	2391
<i>Seung Nam Min, Se Jin Park, Jung Nam Im, Murali Subramaniyam</i>	
Rice husk ash based cementitious material for concrete canoe .....	2395
<i>S Pradeep, P Deepak, S Dheepak</i>	
Experimental Investigation of Low Density Sound Insulated Concrete Fabricated Wall Cladding Tiles .....	2404
<i>S Pradeep, R Karthikeyan, N Rajmohan</i>	
Brain Monitoring Net (Brainternet).....	2420
<i>D Muruganandham, J Jayapriya, A Abdul Wahid, K Seyatha</i>	
Emotional Detection and Music Recommendation System based on User Facial Expression.....	2426
<i>S Metilda Florence, M Uma</i>	
Optimization of shopping product strategy using automatic billing and machine learning enabled smart trolley.....	2434
<i>S Vidhya Kamala Lakshmi, R V Elatchiya, S Balamurugan, Vignesh Shanmugam</i>	

A Systematic Review on Visual Fatigue Induced by Tiny Screens (Smartphones) ..... <i>D Bhanu Priya, Murali Subramaniyam</i>	2444
Analysis of Gesture Recognition to Evaluate Hand Signals..... <i>M Uma, S Prabhu, S Metilda Florence</i>	2453
Landmark Detection Using Squeeze and Excitation Residual Neural Networks ..... <i>M Uma, Anirudh Mugundhan, Pooja</i>	2459
Comparative Review of Structural Optimization Approaches on Rectangular Concrete Beams ..... <i>Junaid Nabi, A Abdul Rahim</i>	2466
Path Planning of an UAV with the Help of Lidar for Slam Application..... <i>C Aakash, V Manoj Kumar</i>	2473
A session key authentication system for smart homes .....	2480
<i>K Jeremy Varghese, A Vinnarasi</i>	
Hospital/Home Medical Assistant Robot .....	2491
<i>K S Harikrishnan, Daniel Glad Stephen</i>	
Measurement Possibilities of Thoracic (C7-T12) and Lumbar (L1-L5) Curvature..... <i>S Surya, Dinesh Shanmugam, Murali Subramaniyam</i>	2500
Muscle Fatigue and Head Flexion Angle Analysis while using Smartphone .....	2513
<i>M Ramnaath, S Sudharsan, K Sanjay Yadhav, D Bhanu Priya, Murali Subramaniyam</i>	
Point of care device for diagnosing and treatment of diabetes related peripheral arterial disease..... <i>K Srivishnuprasath, Varshini Karthik, D Ashok Kumar</i>	2526
Postural discomfort analysis of EOT crane operators .....	2531
<i>R Anandakumar, K R Balasubramanian, S P Sivapirakasam, Kuruva Gopanna</i>	
Development of patient specific 3D printed mandible implant..... <i>S S Aarthi @ Priyatharshini, S P Angeline Kirubha</i>	2543
Fuzzy environment replacement model..... <i>M Balaganesan, K Ganesan</i>	2552
Thermal imaging method in the evaluation of obesity in various body regions—A preliminary study .....	2561
<i>Richa Rashmi, U Snehalatha</i>	
SHAKO—Smart Helmet Arduino Kindled Optimization .....	2572
<i>Tuhin Sengupta, U Snehalatha, T Rajalakshmi</i>	
Posture alert system for prolonged neck flexion while using smart phones .....	2580
<i>S Zindahi, K S Rashmi, Varshini Karthik, Ashok Kumar</i>	
Affordable human motion analysis system..... <i>P Rajesh, P Pranav Anand, C Rupesh Babu, Varshini Karthik, Ashok Kumar</i>	2585
Thermal imaging method in the evaluation of psoriasis in upper limb region .....	2591
<i>Meghna Sampath Raman, U Snehalatha, K Nelufur, Sakshi Srivastava, Murali Narasimhan</i>	

Design and manufacturing of mimosa pudica inspired smart window and analysis of scale dependent constraints .....	2598
<i>Bhavana Komaraju, Anudeep Battu, K Pavan Kumar, Sudhir Varadarajan, Jayachandra Bingi</i>	
Application of Machine learning Algorithms in Autonomous Vehicles Navigation System .....	2608
<i>G D Suriya Prasath, M K Rahgul Poopathi, P Sarvesh, A Samuel</i>	
Current Research and Future Prospects of Neuromorphic Computing in Artificial Intelligence .....	2615
<i>R Vishwa, R Karthikeyan, R Rohith, A Sabareesh</i>	
Development of Advanced Driver Assistance Systems for Indian Cars .....	2621
<i>Swaroop Balaji, R Sivaprakash, S Sabareesh, M Sivasundar</i>	
Method of finding an optimal solution for interval balanced and unbalanced assignment problem .....	2627
<i>G Ramesh, G Sudha, K Ganesan</i>	
Comparative study on flow characteristics, strength and durability of GGBS based geopolymer concrete .....	2635
<i>Dodda Sravanti, Y Himath Kumar, B Sarath Chandra Kumar</i>	
Service life prediction of geopolymer concrete with respective to chloride ion penetration.....	2646
<i>A Raziya Tasneem, B Sarath Chandra Kumar, Y Himath Kumar</i>	
Portable non-invasive glucose and haemoglobin level monitoring incorporated along with multi paramonitoring system .....	2656
<i>A Kevin Amos, T Rajalakshmi, D Raja</i>	
Strengthening of RC Beams with M-Sand using external bonding of steel plates .....	2663
<i>Pulikonda Suman, B Sarath Chandra Kumar, K Ramesh</i>	
A handheld device to monitor physiological changes using sweat.....	2675
<i>Gayathri Natarajan, Shaik Mohamed Badhusha, R Monish, T Rajalakshmi, U Snehalatha</i>	
Effect of ferrocement wrapping system on strength and behaviour of geopolymer concrete beam .....	2680
<i>Vaddeswaram Sangeetha, B Sarath Chandra Kumar, Y Himath Kumar</i>	
Solving interval linear programming problem using generalized interval lu decomposition method .....	2693
<i>K Nirmala, T Nirmala, K Ganesan</i>	
A new approach for optimality of fully fuzzy assignment problems.....	2699
<i>G Krishnaveni, K Ganesan</i>	
An efficient alternative approach for the solution of an interval integer transportation problem.....	2705
<i>G Sudha, K Ganesan</i>	
Influence of carbon steel fibers on the flexural crack width of RC beam.....	2716
<i>Paruchuri Venkata Rao, B Sarath Chandra Kumar, K Ramesh</i>	
Develop the climatic condition ratio for typical building in India.....	2729
<i>P Payal Jain, K Naga Chaitanya</i>	
Game Theory in Military Decision: An Anecdote.....	2737
<i>T. Karthy, S. Vaishnavi, A. Barath</i>	

Analysis of Green Building Certification Attainment through LEED System for SDC Block at KLEF, India.....	2746
<i>Leela Krishna Siva Prasad Alapati, Naga Chaitanya Kavuri</i>	
Analysis of Green Building Certification Attainment through GRIHA System for R & D Block at KLEF, India.....	2753
<i>Manaswini Bondili, Naga Chaitanya Kavuri</i>	
A solution approach for a fully fuzzy assignment problem.....	2759
<i>E. Melita Vinoliah, K. Ganesan</i>	
An Alternate Method for Finding Optimal Solution to Solid Transportation Problem under Fuzzy Environment.....	2765
<i>V. Vidhya, K. Ganesan</i>	
Fuzzy Unconstrained Optimization Problems with Triangular Fuzzy Numbers .....	2772
<i>P Umamaheswari, K Ganesan</i>	
Feasibility study and implementation of BIM in small scale projects.....	2781
<i>Devi Priya Munagala, Venkatesh Kone</i>	
Performance And Cost Analysis Of Modified Bitumen Binder For Flexible Pavement.....	2789
<i>Haravindh Vijay Kumar, Bodapati Gnana Rahul</i>	
Optimization and Experimental investigation of High-Performance concrete.....	2793
<i>N Ganapathy Ramasamy, M LakshmiPathy, P R Kannan Rajkumar</i>	
Isometric Path Partition Number of Butterfly Network and X-Trees .....	2801
<i>R Prabha, R Kalaiyarasi</i>	
Conceptual Model Analysis on Effects of Detain in Construction Industry by Identifying Various Causes - A Case Study .....	2808
<i>Florance Alami, L. Krishnaraj</i>	
Characterization of zeolite influence to improve the performance of concrete .....	2821
<i>Anmol Basnett, Preerna Sharma, L Krishnaraj, P T Ravichandran</i>	
A Case Study on Impact of Labours Sleep Deprivation in Construction Project using Application Method .....	2835
<i>S Sathvik, L Krishnaraj</i>	
Analysis the effect of chromosome and generation count on genetic algorithm in construction projects: a case study .....	2842
<i>R Aarthy Reddy, M Balasubramanian, Gopinath Selvam</i>	
<b>APPLICATION OF FGC BLOCKS FOR SUSTAINABLE INFRASTRUCTURE DEVELOPMENT .....</b>	<b>2847</b>
<i>M S Guru Kumar, M Balasubramanian, A Arul Jeya Kumar</i>	
<b>EXPERIMENTAL STUDIES ON REPLACEMENT OF STEEL STIRRUPS BY SISAL FIBER REINFORCED POLYMERS.....</b>	<b>2855</b>
<i>S Dinesh Kumar Raju, M Balasubramanian, A Arul Jeya Kumar</i>	
Experimental Investigation on Concrete Using Treated Recycled Aggregate.....	2862
<i>J Rajprasad, N Pannirselvam</i>	

Study on Ultimate Strength and Buckling Modes of Cold Formed Steel Structures.....	2867
<i>A Manimaran, L Sathish, P T Ravichandran</i>	
Study of piled and disconnected piled raft system with raft foundation in cohesionless soil.....	2878
<i>D Kaavya, K Divya Krishnan, P T Ravichandran</i>	
Investigation on Industrial Waste Material for Stabilizing the Expansive Soil .....	2891
<i>K Divya Krishnan, P.T. Ravichandran</i>	
Effect of pyrophyllite on behavioural strength of clayey soil.....	2899
<i>B Arun, P T Ravichandran, K Divya Krishnan</i>	
Different Type of Nasties Using in Linear Programming Problem .....	2910
<i>P Sumathi, N Indhumathi</i>	
Minimizing the cost using an inventive proposal in transportation problems .....	2915
<i>P Sumathi, C V Sathiabama</i>	
Visual Flow on Eye-Activity and Application of Learning Techniques for Visual Fatigue Analysis.....	2920
<i>D. Bhanu Priya, Jeevanandam Jotheeswaran, Murali Subramaniyam</i>	
GENDER EGALITARIANISM IN WORK PLACE.....	2927
<i>Gilssy Mary Gilbert, S Anandh, S Sindhu Nachiar, P Prakash</i>	
A study on mechanical and durability properties of coconut shell concrete using coconut fiber and sawdust .....	2933
<i>P Prakash, S Anandh, S Sindhu Nachiar, Gilssy Mary Gilbert</i>	
Assessing the spatial impact of urbanization on surface water bodies using remote sensing and GIS.....	2942
<i>M B Sridhar, R Sathyananthan</i>	
Urban Sprawl Analysis Using Remote Sensing Data And Its Impact On Surface Water Bodies: Case Study Of Surat, India .....	2950
<i>M B Sridhar, R Sathyananthan, R Subramani, Karuppasamy Sudalaimathu</i>	
Precipitation analysis for the East and South districts of Sikkim, India .....	2959
<i>R Sathyananthan, S Y Bhutia, K L Jyrwa, T R Jewel</i>	
Spatial and temporal structure of urban heat island in Ludhiana city.....	2970
<i>M B Sridhar, R Sathyananthan, N Sree Shivani</i>	
Hydration Effect of Boric Acid on the Strength of High-Performance Concrete (HPC) .....	2981
<i>Suriyaprakash Rajadesingu, Kantha Deivi Arunachalam</i>	
Experimental Investigation on Partially Additional of Coarse Aggregate with Ceramic in Concrete.....	2993
<i>J Rajprasad, B.K. Sarath, N Pannirselvam</i>	

#### **Author Index**