

# **International Conference on Design, Automation, and Control (ICDAC 2020)**

IOP Conference Series: Materials Science and Engineering  
Volume 1123

Vellore, India  
6-8 January 2020

## **Editors:**

**R. Vasudevan  
D. Malligarjuna Reddy  
E. Rajkumar  
T. Narendiranath Babu**

ISBN: 978-1-7138-4608-6  
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

Preface	
Peer review declaration	
A Fluid-Structure Interaction Based Simulation Study Of Piezoelectric Micropump For Drug Delivery Application .....	1
<i>Abhijeet B. Vante, R. Ramakrishnan</i>	
An Enhanced Mathematical Model For Cloud Based Data Oriented Job Analysis.....	7
<i>S Manishankar, Santosh Anand</i>	
An Over-View Of The Applications Of Dfa (Design For Assembly) Techniques On Automobile Components For Reducing Assembly Time And Cost.....	17
<i>Shrey Arvind Jaiswal, Gnanaraj S Darius</i>	
Analysis Of Disc Brake .....	26
<i>Nishant Barik, Sayyad Abdul Razak Khadari</i>	
Bio-Composites: A Study On Behavior Of Oil Palm Mesocarp Fiber Reinforced Kgg.....	32
<i>V. Srikanth, K.Raja Narendra Reddy, D.K.Nageshwar Rao</i>	
Characterization of AMCs Produced by Stir Casting Technique .....	47
<i>M Saleem, Nishant Kumar Raj, Yogesh Kumar, Pranav Kumar</i>	
Crash Test Analysis Of Bumpers Of Automobiles Using Ls-Dyna .....	52
<i>Aman Chaure, Gaurav Mathur, Narendiranath Babu T</i>	
Design And Analysis Of Aluminum Matrix Composite Piston.....	61
<i>M. Saleem, Sam Kumar G Shiva, A. Ashique Rosh Suresh</i>	
Design and Analysis of Composite Micro Aerial Vehicle.....	69
<i>M Saleem, Nishant Kumar Raj, Shreshth Gupta, Sunny Ramesh Izate</i>	
Design Of Airfoil For Low Reynolds Number Flights Using Python Automation Code.....	75
<i>V Somashekar, Selwyn Raj A Immanuel</i>	
Design Optimisation Of Spur Gear Using Genetic Algorithm .....	86
<i>K Ajay Pillai, Aritra Guha Ray, Shivam Kaul, Narendiranath Babu T</i>	
Design Optimization of Universal Joints for All-Terrain Vehicles .....	98
<i>Sagar Yanda, Gunji Bala Murali, Siva Shankar Raju, Bill Jason Duckworth, Chandra Sen, Sidakdeep Singh Chadha</i>	
Design, Analysis, Control and Manufacturing of a Head Massaging Machine.....	106
<i>Aman Chaure, E Rajkumar</i>	
Design, Development And Testing Of A Multifunctional Jar And Bottle Opener.....	117
<i>Harshit Kuchhal, E Rajkumar</i>	
Drive Shaft Design and Analysis For Mini Baja .....	128
<i>S Gowtham, V Raaghul, B N Sreeharan, R A Praveen Kumar, S Mohamed Kasim</i>	
Dynamic Analysis of Multi Disc Rotating Stepped Shaft Through Signal Processing .....	136
<i>K Babu Rao, D. Mallikarjuna Reddy</i>	

Finite Element Analysis Of Thermal Fatigue Loading Of Nano Materials Coated Turbine Blade For Critical Applications.....	144
<i>Kiran Ashok, C K Aswin, Ben Abraham Samuel</i>	
Fmea Analysis on Offshore Wind Turbines Using Fuzzy Multimooramethod .....	155
<i>Nitin Kotkunde, Mayank Chauhan, Karthick Chetti</i>	
Fuzzy Logic based Digital Hydraulics Control of Blade Pitch Angle in Wind Turbines.....	167
<i>V. Lakshmi Narayanan, R. Ramakrishnan</i>	
Improving The Efficiency of Stationary Concrete Pumps Using Whitworth Quick Return Mechanism .....	176
<i>Suraj Shyam, Shivam Kaul, Johnson Jesudoss, Narendiranath Babu</i>	
Investigation On Smart Materials For Light Duty Goods Vehicle Chassis Frame Using Fea.....	185
<i>K.G. Saravanan, S.Lakshmana Kumar, S. Vetrivel</i>	
Life Cycle Assessment of Nickel Cadmium Battery .....	203
<i>Nitin Kotkunde, K V Amrith Ashwin, Abhishek Gosavi, Mayank Gaur</i>	
Mechanical Properties of Graphene Reinforced Abaca Fiber Composites.....	214
<i>Shreyash Singh, Harsh Khatri, Shobhit Deshlahra, T. Narendiranath Babu</i>	
Modelling and Simulation of an Upper Hand Prosthetic.....	225
<i>Gaurav Mathur, Aman Chaure, Devyani Biswas, DRS Raghuraman</i>	
Optimization Of Process Parameters For Peak Temperature During Friction Stir Welding Of Aluminum Alloy.....	233
<i>Gurunath Shinde, Ganesh Jadhav, Vahid Jamadar, Sarafaraj Mulani, Rachayya Arakerimath</i>	
Optimizing a Piezoelectric Energy Harvesting System.....	238
<i>Anant R. Voleti, Shivam K. Singh, D. R. S Raghuraman, Niranjana Vijayakumar, D Tanushree, A.S.S Balan</i>	
Optimizing the process parameters in Friction stir Spot Welding Of Dissimilar Aluminum Alloys Using Genetic Algorithm .....	244
<i>R Suryanarayanan, V.G. Sridhar</i>	
Refreshable Braille Module Using Cam Actuated Mechanism.....	251
<i>Aryan, Rajkumar E, Shivam Doshi</i>	
Robust Fractional Order Controller for sn Expendable Launch Vehicle.....	258
<i>Elizabeth Varghese, S Dasgupta, J S Savier</i>	
SIMULATION OF BALLISTIC IMPACT ON DIFFERENT COMPOSITE SAMPLES OF BULLET PROOF VEST .....	267
<i>Babu T Narendiranath, Anhad Preet Singh, Nagireddy Sudershan Reddy, Dhairya Murpani</i>	
Soft Computing Approach To Design Energy Efficient Protocol In Wireless Sensor Network .....	277
<i>Santosh Anand, Somnath Sinha</i>	
SMART SOLAR POWERED TENT.....	283
<i>Rahul Sridharan, Maruti Sriram, E Rajkumar</i>	
Suitability Of Standard Fracture Test Specimens For Low Constraint Conditions.....	291
<i>Nagaraj Ekabote, Krishnaraja G. Kodancha, S.K. Kudari</i>	

Tensile behavior of lotus natural fiber and e-glass fibers reinforced with epoxy composites .....	299
<i>A V Abhijith, Abhishith Dharmarajan Thayyil, T Narendiranath Babu</i>	
TOPOLOGY OPTIMIZATION OF THE BELL CRANK & BRAKE PEDAL .....	310
<i>Tanmay Nandanwar, Keyour Waghela, Eshaan Gupta, T Narendiranath Babu</i>	
Trust Based Fake Node Identification in Social Networking Sites .....	320
<i>A S Spoorthy, Somnath Sinha</i>	
USE OF CORRUGATED PIPE HEAT EXCHANGERS IN WASTE HEAT RECOVERY STEAM GENERATORS.....	329
<i>Sukanta Nayak, Satyasreet Jena, Abu Sharique Shamshad Khan, Mani Kant Paswan, Vinod Kumar Sharma</i>	
Vision Based Self Adaptive Algorithm for 6 Axis ABB Industrial Welding Robot .....	341
<i>R Parameshwaran, A Tony Thomas, V Madhu Vishal</i>	
IMPROVED SENTIMENT ANALYSIS FOR DRAVIDIAN LANGUAGE-KANNADA USING DECISION TREE ALGORITHM WITH EFFICIENT DATA DICTIONARY .....	351
<i>P Ranjitha, K N Bhanu</i>	
Analysis Of Low-Velocity Impact Response In Aa5083 Plate.....	360
<i>V. Sairam, S. Kishor Kanna, P.S. Samuel Ratna Kumar</i>	
Investigation of aluminium LM6 metal matrix composites reinforced with graphene flakes using stir casting process.....	367
<i>T Narendiranath Babu, Yadhukrishnan, Ishaan Rahul Saxena, Drumit B Modi</i>	
Design of battery pack & controller for combined auto driven mini-harvester .....	381
<i>Rahul S Warghane, E Rajkumar</i>	
Design And Analysis Of Modified Four Stroke Four Revolution Engine.....	391
<i>Prashant S. Jadhav, Chinmaya P. Mohanty</i>	
Improvement of hot corrosion resistance of dissimilar weldments by current pulsing in a simulated power plant environment.....	400
<i>S M Muthu, M Arivarasu, Saurav Mohanty, N Arivazhagan</i>	
Numerical investigation on air-cooling enhancement of a motor cycle engine by varying fins geometry .....	409
<i>Bibhuti B Sahoo, Chandrakanta Nayak, Mukul Shrivastava</i>	
Design and value engineering of a high temperature high pressure multifunctional compression moulding unit to manufacture zero defect parts .....	416
<i>K V Gopinath, K Padmanabhan</i>	
Speech Recognition based Industrial Cloud Robot for Service-Oriented Sustainable Manufacturing.....	427
<i>G Kalaiarassan, C Franklin Prashanth, M Prakash, Shreya Phirke</i>	
Effect of fiber orientation on the tensile and flexural properties of vetiverfiber reinforced epoxy composites.....	434
<i>Senthilnathan Natarajan, Narendiranath Babu Thamba, Sukalpan Nandi, K.V.N Kavitha, Srinath Ayyagari</i>	
Application of active vibration control on single stage spur gear.....	441
<i>Manas Raman Menon, Tanay Hariprasad, Karun Thomas, Ramesh Babu Vemuluri, Siva Prasad Darla, P Edwin Sudhagar, B Ashok</i>	

Front, rear and side impact analysis of backbone chassis of a compact sports car .....	450
<i>Umang Bharatkumar Ramaiya, Ramesh Babu Vemuluri, Siva Prasad Darla, P Edwin Sudhagar, B Ashok</i>	
A review on Graphene Reinforced Composites for Ballistic applications .....	459
<i>Tanay Kuclourya, Shubham Mudliar, Mohit Kumar Jain, Narendiranath Babu Thamba</i>	
Influence of CNTs grading and reinforcement on dynamic characteristics of composite Plates in thermal environment.....	468
<i>Vasuraj Garg, Sanidhya Saxena, Gaurav Goyal, Sourabh Kumar Soni, Benedict Thomas</i>	
Robotic Assembly Sequence Generation Using Improved Fruit Fly Algorithm By Applying Gross And Fine Motion As Fitness Equation .....	480
<i>Gunji Bala Murali, Sridharan, BBVL Deepak, Rajashekara Reddy Muthra, Biswal BB, MVA Raju Bahubalendruni</i>	
Static structural analysis of hip joint with various profiles by finite element method.....	488
<i>Abhinav Nemmani, Rajasekhara Reddy Mutra, Gunji Balamurali</i>	
Performance Enhancement of Rotary Desiccant Wheel using Novel Homogenous Composite Desiccant Designs .....	493
<i>Selvaraji Muthu, N Sekarapandian, K Ashok</i>	
Integration of Virtual Reality and Digital Human Model Simulations for Ergonomic Analysis of CAD Models.....	503
<i>S Senthil Kumar, Denis S Ashok</i>	
Nitrogen enriched air for Nox reduction in Diesel engine.....	512
<i>Ponnusamy Baskar, S Prithivi Rajan, Maggi Saraf</i>	
Conceptual designs for solving problems.....	521
<i>S Darius Gnanaraj</i>	
Industry 4.0 transformation initiatives in a small scale mill board unit through sustainable manufacturing: A case study .....	526
<i>R Vezhavendhan, S Senthil Kumar, K Jayakrishna, S Aravindraaj</i>	
Design and topology optimization of a rack and pinion steering system using structural and vibrational analysis.....	532
<i>T. Narendiranath Babu, E Rajkumar, Tanmay Joshi, Vedant Patil, Wasif Mukaddam</i>	
Influence of Multiwalled Carbon Nanotubes in the Structural Performance of the Curved Composite Beam .....	541
<i>S Mageshwaran, S Rajeshkumar, R Manoharan</i>	
Manufacturing and Analysis of Banana-Epoxy Composite fibre .....	546
<i>U Narendra Kumar, Giriraj Mannayee, C Thiyagu, G Karthik Reddy, P Sai, Yogesh Reddy, V Kanishka, G Venkatachalam</i>	
Effects of pulsing current and filler materials on the mechanical and metallurgical properties of DSS 2205 weldments .....	555
<i>M Sathishkumar, Sawan Nagpal, Harshit Gupta, Sanjalp Bhargava, S A Nithin Joseph Reddy, K Gokul Kumar, M Manikandan, N Arivazhagan</i>	
Fuzzy Logic-based Digital Hydraulics Control of Blade Pitch Angle in Wind Turbines.....	564
<i>V Narayanan Lakshmi, R Ramakrishnan</i>	

Influence of CNTs in protecting Air Plasma Sprayed Al <sub>2</sub> O <sub>3</sub> -3wt%TiO <sub>2</sub> Coated Surface .....	573
<i>G Mohammed Thalib Basha, B Venkateshwarlu</i>	
A Study on Reliance of Artificial Intelligence Embodied Robots roles in Health Applications .....	582
<i>Mohan P Kumar</i>	
Design of a Sub-Surface Drilling Mechanism through Solid Modelling and Analysis .....	590
<i>Kaustubh Mohta, Samarth Yelvande, S Venkatesan</i>	
Fabrication of Bio-Scaffold by Additive manufacturing technique for Bone Synthesis using Generative Design .....	600
<i>S Renold Elsen, T Mahendran, Piyush P Atkare, Amit A Bhosale</i>	
Modelling and Numerical Simulation of Fluid Flow and Heat Transfer through Open Celled Metal Foam.....	610
<i>K Gokul Kumar, C D Naiju</i>	

**Author Index**