NEWS LETTER

Vol.1 Issue 1, December 2019

Industrial Consultancy and Sponsored Research Board
(ICSR)

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SARDAR VALLABHBHAI NATIONAL INSTITUTE OF TECHNOLOGY

SURAT-395 007, GUJARAT. INDIA

FORWARD

I am happy to note that office of Dean (Research & Consultancy) has initiated this newsletter with regular frequency. The content is designed to provide a glimpse of various research, consultancy, third party inspection and testing works carried out at the Institute for various clients, both Government organizations and private industries. Apart from that it also provides details of MoUs in Research collaboration, training programs, patents filed, etc. during the period of newsletter. I am sure the content will be useful to the academicians at other Institutes and industries. Any suggestions for improvement are welcomed.

(Prof. S. R. Gandhi)

DIRECTOR

Centre of Excellence

Water Resources and Flood Management

(World Bank Assisted TEQIP-II, MHRD, Government of India)

The Centre of Excellence on 'Water Resources and Flood Management' is one of the CoEs established by World Bank funded TEQIP-II project in the country, and monitored by NPIU (National Project Implementation Unit), MHRD, Govt. of India. The CoE on 'Water Resources and Flood Management' was established in Department of Civil Engineering of SVNIT Surat in August 2013 through a grant of Rs. 4.15 Crore.

Objectives of CoE:

- To develop knowledge centre in the area of water resources Engineering and Flood Management by pooling the expertise from academic institutes and field industries through National and International collaborations.
- To strengthen existing Computational Hydraulics lab and Advanced Hydraulics Lab which would help in water resources management, flood forecasting, flood mitigation and study the behaviour of river models, in general, and flood control measures, in particular, for solving specific field problems.
- To propose the research projects in the priority area of Water Resources Engineering, i.e., climate change, sea water intrusion, rain water harvesting, watershed management and morphological behaviour of the rivers, through National and International collaborations to produce world class research output.
- Regular short-term training courses, Staff development programs (SDP), Workshops, Seminars and Field visits are being conducted through the proposed centre to develop the expertise in the area of Hydraulics and Flood Control Engineering among the faculties of surrounding government, private technical institutions and the engineers of field industries.

LDV Analysis of Air-Water Two-Phase Flow In Horizontal Pipe

Experimental Sediment Transport Tilting Flume

Partner Institutes in CoE:

Lead Academic Institute	Coordinator
SVNIT Surat, Department of Civil Engineering	Dr. P L Patel
Member Academic Institutes	**Members**
SVNIT Surat, Department of Civil Engineering	Faculties of Water resource Engg.
SVNIT Surat, Department of Mechanical Engineering	Dr. J Banerjee
IIT Bombay, Department of Civil Engineering	Dr. V Jothiprakash Dr. R Balaji
VNIT Nagpur, Department of Civil Engineering	Dr. A D Ghare
MANIT Bhopal, Department of Civil Engineering	Dr. Vishnu Prasad
MSU Baroda, Water Resources Engineering and Management Institute (WREMI)	Dr. T M V Suryanarayana
Field Agencies	
Central Water Commission (CWC)	
Central Water & Power Research Station (CWPRS), Pune	
Narmada Water Resources, Water Supply & Kalpsar Department (NWRWS & KD), Govt. of Gujarat	
Surat Municipal Corporation (SMC), Surat	

Research Activities in CoE:

- Development of early warning system for Surat city
- Climate change impacts on water resources of Tapi basin
- Morphological changes in Tapi River
- Flood inundation and flood hazard mapping of Surat city
- Hydrological modelling of Tapi basin
- Two phase air-water mixture study
- Numerical modelling of bed level variation in alluvial channels
- Study of bridge pier scouring
- Study of turbulence characteristics for non-cohesive sediments
- Leak detection in water distribution networks

Recently Sanctioned Research Projects

Performance optimization of air conditioning system for automotive sector using new LOW GWP R1234yf refrigerant	
Dr. Ashok D Parekh	Funding Agency: SERB,DST: IMPRINT
Securing Water for Agricultural and Food Sustainability: Developing Transdisciplinary Approach to Groundwater Management	
Dr. J N Patel	Funding Agency: MHRD
Framework to Measure Sustainability Index Of Transportation Systems In Indian Metropolitan Cities	
Dr. Shriniwas Arkatkar Dr. G J Joshi	Funding Agency: Ministry of Housing and Urban Affairs
Ultrasonic Microreactor for Production of Nano-Micro Particles of Poorly water Soluble Active Pharmaceutical Ingredients (API)	
Dr. Sanjaykumar Rameshbhai Patel	Funding Agency: SERB
FIST Project in Physics Department	
Funding Agency: DST-FIST	
TEC Data ingestion to ionospheric models from Indian EIA region to improve models predictions	
Dr. Sheetal P Karia	Funding Agency: Women Scientist Scheme-WOS-A DST
Investigations on Wear Characteristics of NiCrBSi Overlay Surface on 304 SS with and without Tungsten Carbide Reinforcement	
Dr. V D Kalyankar	Funding Agency : The Institution of Engineers (India)

Micro Research Joint Project with MMMUT, Gorakhpur Under TEQIP-III

The Assessment of Existing Building Envelope for Academic Institute: A Case Study of MMMUT, Gorakhpur, UP
Development of Bicycling Index for City Readiness to Implement PBS System in Indian Context.
Flood Modelling of Semi-Arid Region.
Operational Efficiency of Urban Roadway Links using Performance Box.
Study of pairing effect on Mechanical properties of Hybrid composite prepared using varth.
Ergonomic Assessment of workshop operations: A case analysis at MMMUT, Gorakhpur.
Investigating Light weight cryptography algorithms and its applications to various IOT devices.
Development of UAVs for Delivery solutions.
Design an application for land sliding observation using IRNSS.
Optimal Design and Management of Lighting system in existing building.
Experimental study on Fracture Mechanics of Sustainable Concrete.

Notable Achievement

Prestigious award of Bhatnagar Fellowship for the year 2018 by Council of Scientific & Industrial Research (CSIR) awarded to Prof. S. A. Channiwala, Prof., MED, as an individual scientist in recognition of outstanding work.

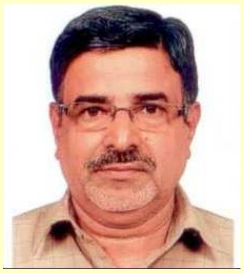
Research Activities

Design Development and Demonstration of an Aerodynamically Advanced UAV Stealth and Heavy Payload Application

Project Summary

This is a synergy proposal between industry partner M/s. Myelin Innovations Pvt. Ltd., Noida & academic partner, SVNIT, Surat. The main goal of the project is development of a low temperature, subsonic wind tunnel at SVNIT for testing of UAV developed by M/s. Myelin Innovation Pvt. Ltd., Noida (industry partner). These UAVs will be for stealth and heavy payload applications. Moreover, Wireless Flow Interaction Facility & Advanced Composite Material Fabrication Facility will be developed by M/s. Myelin Innovation Pvt. Ltd., Noida (industry partner).

The wind tunnel is the most fundamental test equipment for testing air-frames and studying aerodynamics. Because of the complexity of the geometry of air-frames, it is difficult to study the aerodynamic pattern simply based on theoretical calculations. So, to validate designed air-frames as safe design, prototypes of the actual airframes can be tested in wind tunnel. Present work includes design and development of a subsonic, low temperature wind tunnel at SVNIT which can cater flow speeds up to 40 m/s and -40 °C temperature in a test section of 1.5 m x 1.5 m. The developed hybrid wind tunnel will be used for testing UAVs at specified condition. The testing outcome can be validated with theoretical analysis.



Dr.S.A.Channiwala
(PI)

Dr.(Mrs.) B. D. Baloni
(Co-PI)

Dr. A. A. Shaikh
(Co-PI)

Dr. Mukesh A. Zaveri
(Co-PI)

Mr. Janak J. Patel
(Co-PI)

Mechanical Engineering Department

Computer Engineering Department

Electrical Engineering Department

Industry Partner:	Funding Agency:
Mr. Vikash Mishra (Co-PI)	Office of Principal Scientific
Myelin Innovation Pvt. Ltd., Noida	Adviser to the Govt. of India (PSA)

Innovations

The wind tunnel design is conceptualized as a hybrid design i.e. can be used as open channel as well as closed circuit wind tunnel which will allow Aero-thermal testing at low temperatures of -40 °C.

Potential outcome

- ✓ National facility to perform Aero-thermal analysis on any aerodynamic structure at SVNIT
- ✓ National facility to perform flow interaction studies of UAV by M/s. Myelin Innovation Pvt. Ltd., Noida (industry partner).
- ✓ Physics and models of the effect of aerodynamics on the endurance of the UAVs
- ✓ Four advanced, stealth and variable payload (viz. 1 kg to 30 kg) UAV will be delivered to different government agencies, the list of which will be determined by the PSA's office.

Development of Indian Highway Capacity Manual



Prof. G. J. Joshi | Dr. Shriniwas S. Arkatkar | Dr.Ashish Dhamaniya

Transportation Engineering & Planning Section, Department of Civil Engineering

Funding Agency: CSIR, New Delhi

Project Summary

CSIR-CRRI identified seven prominent academic institutes located in different regions in the country for this Supra-Institutional Network Project (SINP) through CSIR. Transportation Engineering & Planning (TEP) section of SVNIT Surat has contributed towards the development of complete set of guidelines on capacity and level of service analysis for four components of roadways and pedestrian facilities.

Use of Inorganic and Hybrid Sorbents/Exchangers for Removal of Toxic Metals from Industrial Waste Water

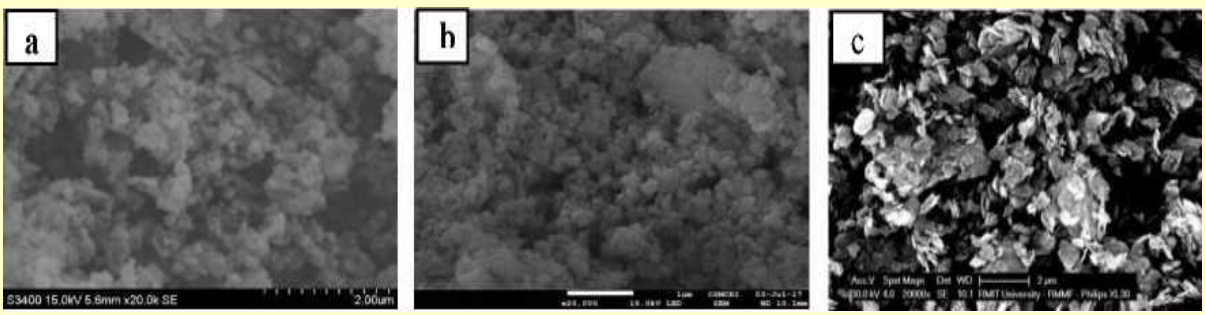
Dr. Kalpana C. Maheria
(PI)
Applied Chemistry Department, SVNIT

Dr. Lalita Choudhary
(Co-PI)
Shree Ramkrishna Institute of Computer, Education and Applied Sciences, M.T.B. College Campus, Surat

Funding Agency: DST, Govt. of India

Project Summary

The project work was focused on, (i) An identification of specific polluted sites nearby Ankleshwar region of Gujarat state, and an assessment of the quality of water of creeks (ii) Synthesis and characterization of zeolite based sorbents and their applications for the removal of toxic metals from water.



SEM images of a) HBM22, b) Parent H-BEA and c) MCM-22

Performance and Design Evaluation of Test Tracks of Flexible Pavements with Waste Materials in Sub base and Base Layers

Dr. Satyajit Patel (PI)

Prof. C. H. Solanki (Co-PI)

Applied Mechanics Department

Funding Agency: DST, Govt. of India

Project Summary

Deficient utilization of industrial wastes in contrast with its colossal generation and the intensifying paucity of natural aggregates paved the way for development of a technology by SVNIT Surat and IIT Delhi for bulk utilization of industrial wastes such as steel slag, copper slag, granulated blast furnace slag (GBFS) and fly ash in the base and sub-base layers of flexible road pavement as a prospective alternative for conventional granular materials, thereby safeguarding the environment.

Wet mixing of copper slag and fly ash mixture

Stacking of the mix on subgrade

SIRMI- Strengthening IRNSS Receiver by Mitigation of Interference

Prof. Upena D. Dalal (PI)

Dr.(Mrs.) Shweta N. Shah (Co-PI)

Electronics Engineering Department

Funding Agency: ISRO, Ahmedabad

Project Summary

Development of SIRMI- Strengthening IRNSS Receiver by Mitigation of Interference by analyzing the 'IRNSS Radio Frequency Interference Monitoring as well as Mitigation Techniques' in Low Latitude and Equatorial Anomaly Indian Region (Surat). The efficient and secure receivers are mandatory for many future applications of IRNSS signal. So different measures are prerequisite for the system to detect and mitigate interference threats such as jammer and Wi-Fi at the various stages like signal processing level at the receiver and at system level.

Novel algorithms on NavIC data against RFI have strengthened the performance of NavIC receiver in presence of intentional (Jamming) and un-intentional (Wi-Fi).

Intentional and Unintentional Interference

TECHNOLOGY TRANSFER

The MOU related to the NavIC receiver data collection has been done between SAC, ISRO, Ahmedabad and SVNIT, Surat from 11/04/2018 for 3 years.

Special Manpower Development Programme Chips to System Design (SMDP-C2SD)


Dr. Anand D. Darji (PI)
Dr. Pinal J. Engineer (Co-PI)
Department of Electronics Engineering

Funding Agency: MeitY, GoI

Bio-signal frontend to acquire surface bio-potential and to sense Bio impedance

(i) Bio Impedance Demodulator

To design and develop frontend module to detect Bio-impedance and Bio-potential for versatile physiological signal monitoring system for healthcare application. This frontend module will be implemented in FPGA and subsequently in ASIC.

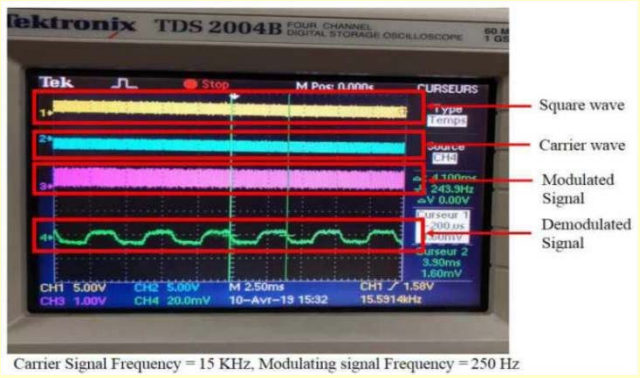
(ii) Artifact suppression for physiological signal and monitoring system

The main target of this project is to design ASIC implementation of artifact suppression module for Bio-signal monitoring system. This frontend module will be implemented in VHDL and validate using FPGA and subsequently in ASIC.

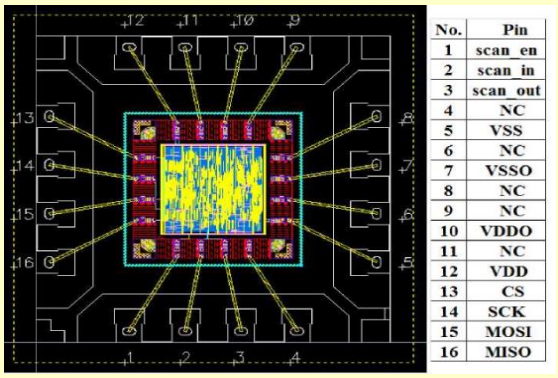
Error-Correcting Code (Low power High Speed Serial Data transceivers)

Project Summary

To design & develop ASIC for Error-Correcting Code with low power and high speed of 1Mbps-5Gbps for serial data transceivers in space applications. The module is first implemented in FPGA and later in ASIC.



Embedded Solution based Hardware Results



No.	Pin
1	scan_en
2	scan_in
3	scan_out
4	NC
5	VSS
6	NC
7	VSSO
8	NC
9	NC
10	VDDO
11	NC
12	VDD
13	CS
14	SCK
15	MOSI
16	MISO

Chip Design of Artifact Suppression

NEW PRODUCT/PROCESS DEVELOPMENT:

GDS of artifact suppression in ECG signal and Bio impedance demodulator have been submitted for the fabrication at SCL India.

Extended Wright type Hyper Geometric Functions

Dr. Ranjan Kumar Jana

Department of Applied Mathematics & Humanities.

Funding Agency: SERB

The main objective of this project is to investigate some properties, including generating functions, integral representations of extended Wright type hyper geometric functions and explore their applications in Mathematical Physics, probability and distribution theory, theory of integral transform, differential calculus of fractional order etc.

FPGA Based Adaptive Filter Algorithm Implementation for External Noise Cancellation

Dr. Anand D. Darji

Dr. Jignesh N. Sarvaiya

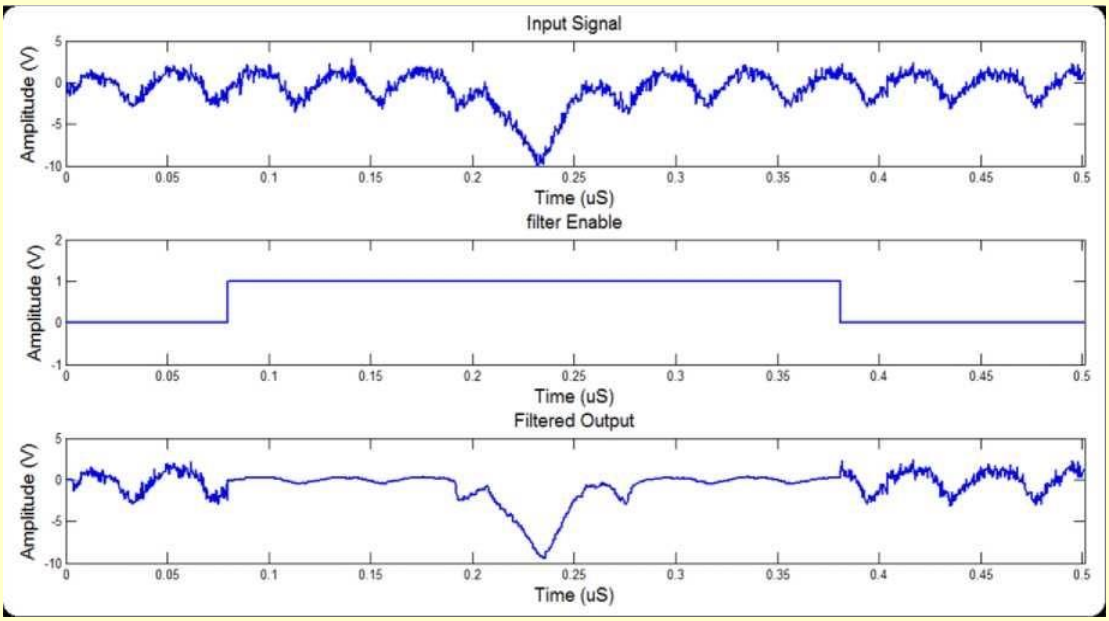
Department of Electronics Engineering

Funding Agency: BRNS

Project Summary

The main goal of the project is to remove the different types of noise present in the PLASMA temperature measurement signals while performing the LASER diagnostic experiments. The GUI must be design in order to configure the filters parameters and remove the different types of noise with use of GUI tool.

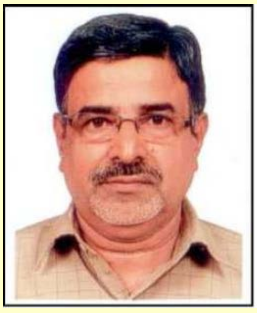
NEW PRODUCT/PROCESS DEVELOPMENT: FPGA based prototype design for noise cancellation system had been designed and developed, which can be useful at LASER diagnostic LAB.



Filter results on software

Technology transfered to Institute of Plasma Research (IPR), Ahmedabad

Combustor Technology Development for Small Gas Turbine/Turbofan Engine



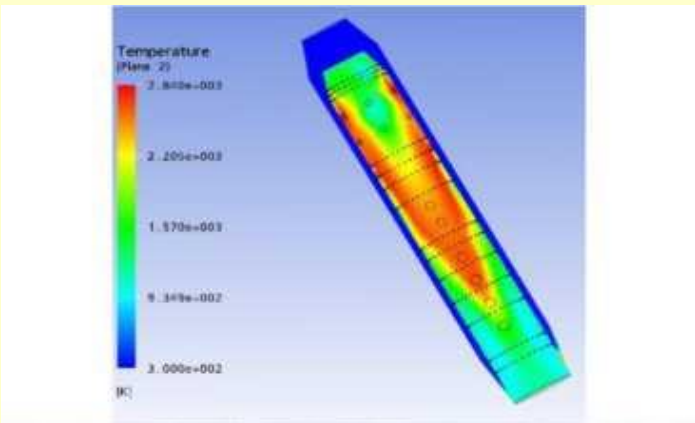
Dr. S. A. Channiwala (PI)
Mechanical Engineering Department
Dr. Digvijay B. Kulshreshtha (Co-PI)
C. K. Pithawalla College of Engineering & Technology, Surat

Funding Agency: Centre of Propulsion Technology, CoPT-DRDO

Project Summary

The main goal of the project is to design and develop gas turbine combustor operating with kerosene and propane as a fuel. A fully instrumented test rig for its performance evaluation will also be developed.

Gas Turbine Combustion Chamber involves a large number of interrelated complex phenomena, such as unsteady three dimensional flows, transport and evaporation of liquid droplets, atomization of high pressure liquid fuel, gas phase mixing, complex chemistry and heat transfer, along with flame structure and stabilization. Hence, in small scale devices, it becomes of primary interest to obtain stable flame at operating conditions. Current work is an attempt towards full scale design, development and testing of combustors for small capacity gas turbine/turbofan engine using Kerosene/Propane as fuel. This will lead towards scientific know how for indigenous GT engine development at national level.



Numerically Optimized Tubular Combustor

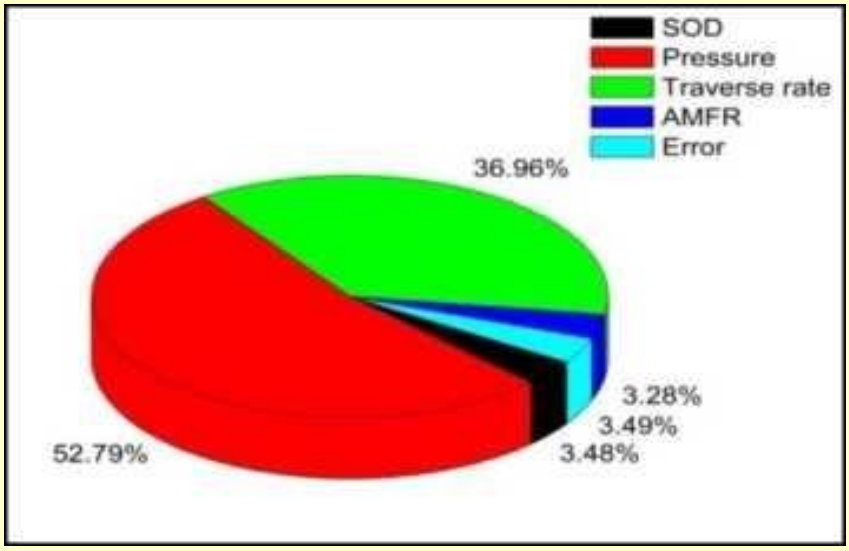
Investigation on the Influence of Machining Parameters in the Machining of Carbon Epoxy Composite with Abrasive Water Jet Machining to Improve Surface Finish and Minimize Defects

Prof. Shailendra Kumar
Department of
Mechanical Engineering

Funding Agency: NRB

Project Summary

The work is focused on experimental study of AWJM of carbon epoxy composite to improve kerf properties and minimize defects. Process parameters namely stand-off distance, pressure, traverse rate and abrasive mass flow rate are considered to study their influence on surface roughness and kerf taper. Defects including delamination, fiber pull out and abrasive embedment observed in machined samples have also been studied.



Contribution of process parameters in influencing surface roughness

Application of Benthic Microbial Fuel Cells for Powering Naval Sensors

Dr. Arvind Kumar Mungray (PI)

Dr. Alka A Mungray (Co-PI)

Dr. Suresh Kumar Kailasa (Co-PI)

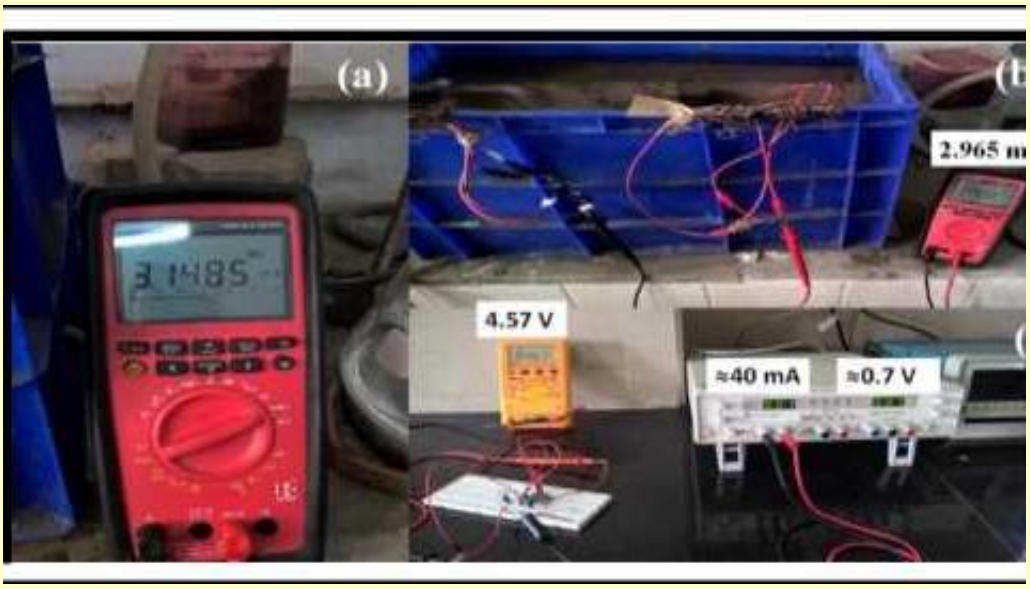
Dept. of Chemical Engineering

Dept. of Chemistry

Funding Agency: NRB

Project Summary

Selection and designing of electrodes by comparing different types of electrode material and coating with metal oxides, conductive polymer and nanoparticles in order to further improve the performance. A deployable BMFC was designed based on the obtained observations by using Fe O /PPy coated carbon felt arranged in the vertical manner and deployed into the lab scale reactor which generated as high as 1.5 mW of power without providing any extra supplement into the sediment.



A Deployable BMFC and voltage booster

Collaborative Data Processing and Resource Optimization for Post Disaster Management and Surveillance using Internet of Things

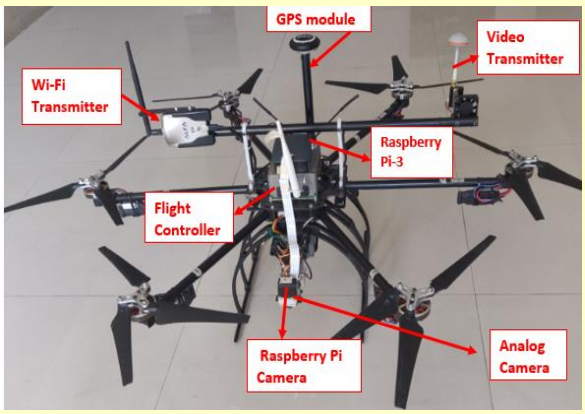
PI
Prof. Mukesh Zaveri
Computer Engineering Department

Funding Agency:
MeitY, GoI

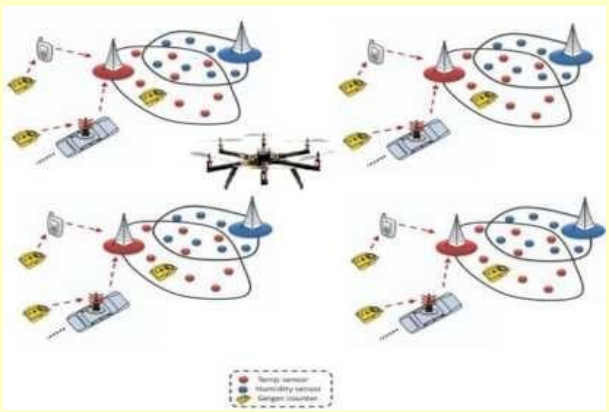
Project Summary

The main goal of the project is to develop

(i) A low cost fast deployable wireless communication infrastructure (ii) A framework for collaborative data processing and resource optimization for managing post disaster situations providing disaster management services (iii) Algorithms for collaborative data processing and optimal resource allocation for rescue operation using Internet of Things and (iv) Algorithms for surveillance of such disaster affected areas and for smart city applications like crowd management, traffic control.



Intelligent and Indigenous UAV



Clustered UAV based IoT System

NEW PRODUCT/PROCESS DEVELOPMENT:

Aerial system consists of sensors which helps in collecting the data as well as acts as the flying base station interfacing with various sensor motes, IoT devices, and cloud for real time collaborative data processing.

Studies on Novel Techniques for Extraction of Essential Oil from Patchouli



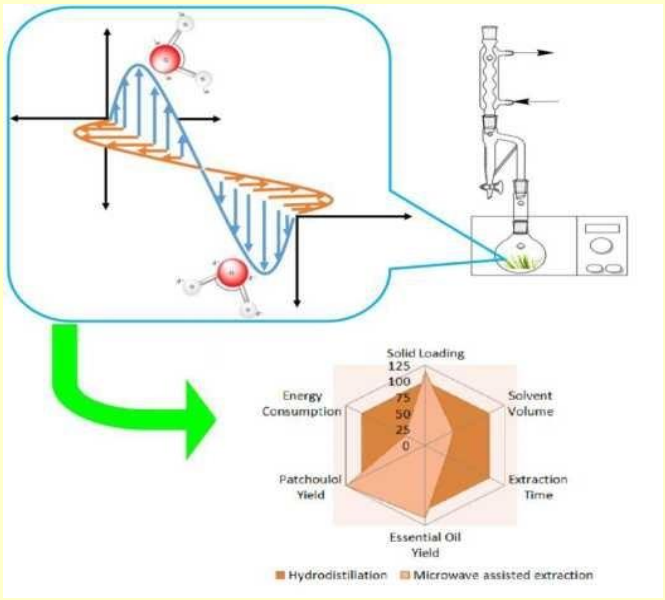
Prof. Jigisha K. Parikh(PI) Dr. Meghal A. Desai (Co-PI) Dr. Girirajsinh C. Jadeja (Co-PI)
Department of Chemical Engineering

Funding Agency CSIR, New Delhi

Project Summary

The primary focus of the project was to isolate essential oil from the leaves of *Pogostemon cablin* (patchouli) using conventional as well novel techniques. Novel techniques like microwave assisted extraction, hydrotropic extraction, extraction using ionic liquids and ultrasound assisted extraction were employed in this project.

Enrichment of the essential oil was achieved with an increase in the patchouli alcohol content. Synergistic impact of sonication and neoteric solvent has resulted in drastic reduction of extraction time with improved selectivity.



Microwave assisted extraction and its comparison with hydro distillation

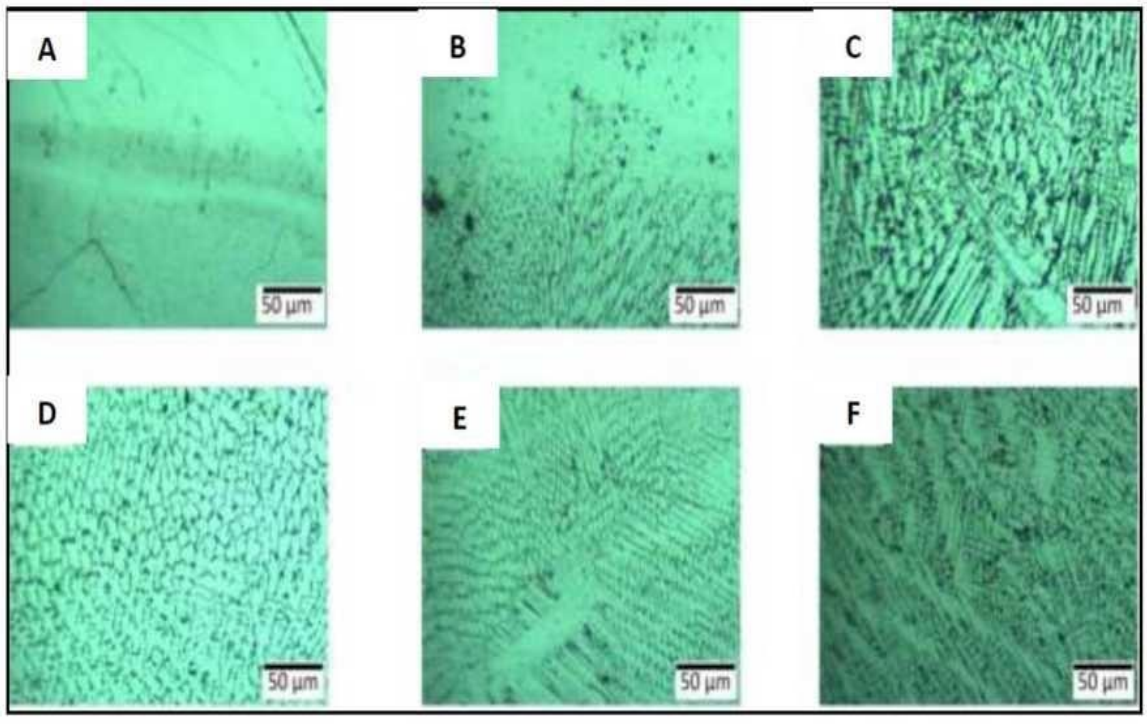
Study of Slurry Erosion Behavior of High Entropy Alloy Coating

Dr. Jyoti V Menghani (PI)
Mechanical Engineering Department

Funding Agency: SERB

Project Summary

The current investigations focus on the erosion behaviour of laser cladded HEA based coatings by impingement of solid particle with the help of slurry jet erosion test rig. The phase Composition, Mechanical properties of coating, the Erosive wear mechanisms and microstructure were also analyzed.



Optical Microscopy of all coating composition of various samples

CONSULTANCY

List of Major Clients

* NTPC Limited, Kawas gas power project, Aditya nagar, Surat
* EPC Construction India Ltd, Hazira, Surat
* Ajay Engineering-Infrastructure Pvt. Ltd., Mehasna
* Geo Design & Research (P) Ltd., Vadodara
* Hitek Engineering Services, Mumbai
* M.S. Khurana Engineering Limited, Mumbai
* Kunal structure (India) Pvt. Ltd., Ahmedabad.
* H G Infra Engineering Ltd., Jaipur
* Western Outdoor Structures Pvt. Ltd., Thane
* Shree Gautam Construction Company, Jaipur
* Airports Authority of India, Civil Aerodrome, Surat
* ONGC Limited, Hazira Plant, Surat
* Gravitas Infrastructure Pvt. Ltd., Lucknow(U.P.)
* Surat Municipal Corporation, Surat
* Indian Red Cross Society, Nani Daman
* J P Iscon Pvt. Ltd., Ahmedabad
* Rachana-KECL JV Ankleshwar, Dist.-Bharuch
* LC Infra projects Pvt. Ltd., Hisar, Haryana
* NBCC India Limited, Gandhinagar
* BHEL-GE Gas Turbine Service Pvt. Ltd., Madhapur, Hyderabad
* Central Water Commission (CWC), New Delhi

* Uttaranchal Jalvidyut Nigam (UJVNL), Ltd.

* THDC INDIA Ltd.

* Larsen & Toubro Ltd, Vadodara

* Howe Engg. Project (I) Pvt. Ltd., Thiruvananthapuram, Vizhinjam, Kerala

* Rail Vikas Nigam Limited, New Delhi

* Administration of Dadra and Nagar Haveli, U.T., P.W.D. Civil Division, Silvassa

* Dilip Buildcon Limited, Bhopal

* Indian Institute of Technology, Jammu

* KONSTELEC Engineering Pvt. Ltd., Mumbai

* JBF Industries Limited, Sarigam

* Surat Urban Development Authority (SUDA)

* Kinsfolk Excellence Limited, Surat

Consultancy Services during 2018-19

441 Assignments

Amount: Rs. 12.10 Crore

Consultancy at ABROAD

With PT Indo Bharat Rayon (Aditya Birla) & K H Mas Mansyur, Kav.1426, Jakarta-1020220, Indonesia

On stability issues of Hazardous waste Land fills

MOUs Signed

CHUNG-ANG UNIVERSITY, REPUBLIC OF KOREA

In the area of Joint Research Projects, Conferences and Educational activities.

EN-VISION ENVIRONMENTAL SERVICES, Surat, Gujarat

Towards Joint Research in following major Thrust areas

- Water and waste water quality treatment
- Air quality and pollution control
- Sustainable solid waste management and Noise pollution

MAN MADE TEXTILE RESEARCH ASSOSIATION, Surat

To focus on Research in Engineering application to Textile Machineries,

with state of the art infrastructure of both institutes.

SAHJANAND MEDICAL TECHNOLOGIES P. LTD, Surat

In the area of Creating Manpower in specific area for developing

Medical Devices.

Citation Achievement:

Prof. Jigisha Parikh of Chemical Engineering Department has been recognized as the highly cited author (Top 10% citation 2018) for the papers published in the Royal Society of Chemistry Journals.

Patent Granted

2018

"3-Halo Derivatives of Thiomaleic Anhydride and Process for the Preparation Thereof"

1.Dholakiya Bharatkumar Zaverbhai 2.Patel Jigarkumar Rameshbhai

Granted on 16/5/2018

Technique for measuring oil film thickness between piston ring and liner in an unfired i c engine & reciprocating compressor using strain gauge

1.Bhatt Dhananjay Vishnuprasad 2.Bulsara Mukesh Amrish

3.Mhatre Dinesh 4.Mistry Kishore N.

Granted on 29/06/2018

An improved process for the preparation of dihydropyrimidin-2-ones

1.Maheria Kalpana Chaturbhai 2.Mistry Sunilkumar Rameshchandra 3.Joshi Rikesh Rameshchandra 4.Sahoo Suban Kumar

Granted on 28/09/2018

2019

The off-set levers-gears

1.Dr.Bhatt Dhananjay Vishnuprasad, 2.Mr.Shah Atulbhai Shantilal.

3.Mr.Trivedi Paragkumar Jyotischandra 4.Multani Abdul Nanji

Granted on 06/08/2019

Two fluid double well type u tube manometer

1.Parth Dilipkumar Shah 2.Dr. S.A. Channiwala 3.Mr. Taha Yunus Poonawala

4.Mr. Hardikkumar Bharatkumar Modh

Granted on 9/7/19

Stacked minichannel heat sink

1. H.B. Mehta 2. Nirav Kumar M Patel

Granted on 12/7/2019