Faculty name, Designation and Contact Details	PhD degree received from	Topics	Few Lines/Description on Project Title
Prof. Vishvesh Badheka HoD & Professor Vishvesh.Badheka@spt.pdpu.ac.in 079-2327-5441	The M.S.University of Baroda, Vadodara	Development of bimetallic cylinders (Austenitic Stainless Steel AISI321+AA2219, AISI321+Ti-6Al-4V and AISI304L+Ti-6Al-4V) through friction welding route with suitable inter layers	These materials, which can be difficultand many times impossible to weld with conventional methods, can be joined with the friction welding process. These higher temperature materials, along with the large component size, require large amounts of weld energy and load. In order to meet this increasing demand, higher diameter (>125mm) transition joints in Welding process need to be developed.
		Magnetic Pulse Welding (MPW) of AISI 321 stainless steel to AA2219 Aluminium alloy	The scope of study also includes detailed mechanical and microstructural investigation of the weld joints. Materials (AISI 321, AA2219, Cu alloy for coil) of the trials can be supplied from VSSC. VSSC can also extend support for pressure and leak test.
		Friction and Friction Stir Welding of metal to plastics	Welding of metal to plastics using FW and FSW welding may have various applications inlcuding automotive. Effect of offset and FSW varaibles in joint formation between Nylong and Al will be investigated in the project.
		Ultrasonic welding of dissimilar plastics and plastics to metal	Ultrasonic welding used for batter terminal applications and other automotive applications.In this project various plastic, plastic-metal and dissimilar metal combinations will be studied. Efffect of ultrasonic welding variables on mechnical and metallurgical properites will be of great interest.
		Superplastic behaviour of copper using FSP.	Superplastic bheavior of Al, Mg for varity of applications has been reported.Effect of FSP on Copper using various varibles including number of passes, assisted cooling will be explored in this topic
		A-TIG, FB-TIG & FZ-TIG for P91 and LAFM steels	Effect of various varints of A-TIG on mechnical and metallurgical properties of LAFM and P91 steel. In order overcome the probleom of poor impact property of A-TIG welds new variants has been developoed.
Prof. Surendra Singh Kachhwaha Professor Surendra.Singh@sot.pdpu.ac.in 079-2327-5442	IIT, Delhi	Application of process Intensification techniques for biodiesel production using II and III generation feedstocks and CI engine performance testing with combustion modelling	India has a large feedstock of Waste Cooking Oil and non-edible oils (such as Castor) which can be converted into biodiesel. Development of PI techniques provides a huge scope for R & D work in Applied research and Industry.
		Application of process Intensification techniques for bioethnol production using I and II generation feedstocks and SI engine performance testing with combustion modelling(a topic of national importance for preparation of Sanitizer in reference to Covid-2019 scenario)	Bioethanol is a direct substitute for petrol in SI engine. Use of PI techniques have a huge scope of interdiciplinary R & D and much easier method to produce alcohol as compared to conventional methods. These methods will also assist to produce sanitizer at low cost.
		Application of PI techniques for Aviation fuel production using PI techniques	Despite the fast growth of Aviation industry, the indegeneous production of aviation fuel is limited. PI techniques can play and important role to utilize large feedstock of non-edible oil to convert into Aviation fuel.
		Castor oil biorefinery in Gujarat: conceptual process design, simulation and Techno-economic analysis	The castor has highest production in Gujarat having many derivatives and energy related end products. Biorefinery concept will enhance the proper utilization of Castor as a resource, improve the income for farmers and enhance the local employment. Therefore there is a need for technoeconomic analysis to develop biorefinery concept for Castor (as an example) in India and Gujarat in particular.
Dr. Anurag Mudgal Associate Professor Anurag.Mudgal@sot.pdpu.ac.in 079-2327-5439	IIT Delhi	Design and development of Solar energy driven integrated Batch-RO/ FO unit for water desalination with minimum specific energy consumption	An integrated Batch-RO/ FO unit will be modelled, designed and fabricated to handle an estimated flow volume of one cubic meter in one hour. The unit will be equiped with all automation and sensors. Attempts will be made to create electricity free operation and unit to run on solar PV concept so that rural applaication of this concept may be explored in future.
		Design and development of thermal energy driven- high recovery, cascade Reverse Osmosis system	A thermal energy-driven Cascade-RO system for water desalination will be designed and modelled. A pair of Steam Rankine Cycle and Organic Rankine Cycle will drive a high-pressure RO pumps coupled with the turbine and expander. The heat rejected by the condenser of the SRC is utilized by the ORC. R245fa is used as working fluid for ORC unit while water for Steam Rankine Cycle. The design of recycling loop in Reverse Osmosis system increases the recovery rate and also reduces the specific energy consumption.
		Thermal energy driven Multi effect Distillation system for commercial applications	Small scale and medium sclae sized MED units has its own challanges with maintenance and economic viability ground. A novel design with high thermal efficiency and gained output ratio with having ease of maintenence will de desigened and fabricated.

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Dr Ramesh Guduru Associate Professor Ramesh.Guduru@sot.pdpu.ac.in 079-2327-5352	NC State University	Nanocoatings (e.g. graphene based) on machining tools for solid lubrication and enhanced life	Graphene and c-BN based coatings with inherent texture on the tools are expected to provide solid state lubrication as well as good thermal dissipation and thereby help enhance the tool life. This project is focused on texture based nano coatings with graphene and cBN and evaluate their performance for long term longevity.
		EDM process with variations in dielectrics	EDM process utilizes either kerosene or deionized water as the dielectric media. However, designing new dielectric media with controlled dielectric properties and dielectric loss factors can enable enhanced EDM machining process in terms of material removal rate and obtaining smooth surface finishes. This project will focus on tailoring the dielectric properties of liquid media used in the EDM process and investigate their effect on the machining process.
		Li-ion batteries for automotive applications	Li-ion batteries of high energy and high power density are of a great choice for automotive applications. However, selection of their chemistry and correspnding performance in a battery pack along with battery management systems, and their cooling under the Indian subcontinent environmental conditions is yet to be thoroughly analysed while advancing the knowledge of impact of temperature, humidity and vibrations on the performance of the battery packs. This project will focus on developing thermal cooling systems for battery packs while investigating new, energy efficient and low cost cooling mechanisms.
		Coatings for corrosion applications	Corrosion of industrial infrastructure is a perennial problem throughout the globe. However, encountering those problems with suitable coatings that can not only prevent the corrosion attack of the working environment but also enhance the life time of the industrial infrastructure and thereby save billions of dollars every year. Therefore, this project will develop on low cost hydrophobic coatings that would not only enhance the corrosion resistance but also help decrease pollution pile up and minimize the cleaning process of the industrial infrastructure.
		Micro and Nano fabrication	Micro and nano textured materials of great importance for many practical applications with superior hydrophobic and corrosion resistance characteristics and reduced drag for water bodies (e.g. ships/boats) and industrial infrastructure applications. This project will focus on developing nano textured surfaces following micro and nano fabrication technologies and evaluate their performance for hydrophobic and reduced drag characteristics for practical application purposes.
		Water treatment	Treatment of waste and non-potable high TDS water can be of a great help for the population where the water scarcity prevails all along the year. This project will focus on developing novel water treatment solutions for production of highly purified water without any wastage, and investigate their performance for different types of ground water available in Gujarat and India.
		Machining of amorphous materials	Machining of amorphous metallic materials will be quite contrasting with respect to the crystalline counter parts because of their differing deformation mechanisms. This project will focus on understanding the machining behaviour of amorphous metallic materials while evaluating the machined chips, material removal rate and heat dissipation rates. This data will open up a new arena of machining of materials with varying crystal structures and their influence on the machining parameters.
Dr. Vivek K Patel Associate Professor VivekP@sot.pdpu.ac.in 079-2327-5457	SVNIT, Surat	Development of thermal modelling and experimental investigation of hybrid solid+liquid desiccant based air conditioning system	Air conditioning system handle sensible and latent heat load of the air. The portion of latent heat load is of considerable amount based on the application. Desiccant {either solid or liquid) will used for handle the latent heat load. In that way incorpotrating desssicant system with conventional air conditioning system results in energy saving. The proposed work deals with the development of thermal modelling of hybrid solid+liquid based AC system followed by the small scale system development for the exerimental investigation to identify the commercial viability and payback period.
		Thermal modelling, optimization and experimental investigation to identify the cooling rate behavior of battery operated vehicle with different phase change materials	Battery is one of the essential equipment in electrical vehcile. Generallly serious of battery are used in the electircal vehicle. One of the challenge associate with the electircal vehicle is the thermal management (i.e. cooling behaviour)of the battery. Lack of proper thermal managment results is explosion. Propsed work deals with the cooling rate identificatin of various battery arrangment incorporating phase change material and other technologies
		Modelling , optimization and experimental investigation of hybrid adsorption refrigeration system.	Small scale adsorption resfrigeration system along with phase change material can be considered as one of the substitute for produce the cooling in certain applicatins. Present work deals woth the thermal modelling of small scale adsorption refrigeration along with phase change material followed by its optimization and experimental investigation to estimate the payback period of the proposed system

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Dr. Jatin Patel Assistant Professor Jatin.Patel@spt.pdpu.ac.in 079-2327-5471	Hemchandracharya North Gujarat University, Patan	Sustainable post processing of food crops using solar drying for different climatic conditions in India.	Solar drying system integrated with Phase Change Material for thermal energy storage. The pre-treatment study of food, drying charactristics and post drying food quality assesment study is to be carried out.
		Design, development and Investigations of a multi-functional HVAC system.	Single VCR system or VARS system can be modeled, developed and investigated for cooling, heating and water generation.
		Investigations on direct expansion solar assisted heat pump for water heating applications.	The proposed system can overcome the limitations of solar water heating, can provide hot water round the clock irrespctive of season
Dr. Nirav Patel Assistant Professor Nirav.Patel@sot.pdpu.ac.in 079-2327-5446	Nirma University, Ahmedabad	Numerical modelling of 3D/4D composite plate subjected to Ballistic Impact Loading	This project includes the numerical modelling and simulation of damage behavior of 3D/4D laminated composites under various levels of ballistic threats based on National Institute of Justice (NIJ) Standards.
		Progressive Damage modelling of Structure in Blast Loading	To obtain the optimum design of Glass based Composite Plate subjected to different NIJ based levels of Blast Loads considering ballistic limit (energy absorption) as objective function and stacking sequence as design variable
		Experimental and numerical Investigation on Tensile Behavior of a Plate containing multiple holes	This objective of this project is to calculate stress concentration around multiple cut-outs present in plate that is subjected to in-plane loading. Project involves development of mathematical formulation as well as experimental work
		Composite based Design and Development of Bio-inspired Armors	The projects includes design and development of Armors from nature inspired phenomenon.
		Experimental Investigation of Tensile Behavior of Additive Manufactured Plates	The aim of this project is to analyze the tensile behavior of Additive manufactured plate using Digital Image Correlation.
Dr Ojas Satbhai Assistant Professor Ojas.Satbhai@sot.pdpu.ac.in 079-2327-5325	IIT Kharagpur	Multi-scale, multi-physics solidification models for manufacturing processes.	Project involves multi-scale numerical investigation of solidification process in a manufacturing process (casting/welding/surface remelting/cladding, etc.). The Macroscopic model is a t continuum scale will be based on Finite Volume Method to obtin the temperature field after solving the mass, momentum and energy equation. The obtained temperature field is coupled to the lower scale model (meso-scale/micro-scale) for simulation of meso-structure (grain-structure) or micro-structure. The lower scale model comprises of two phenomena 1. Nucleation 2. Growth and is based on cellular automa algorithms. The multi-scale, multi-physics simulations will be used to perform parametric studies to relate process parameters with the micro-structure and characterize the morphology transitions.
		Direct Numerical Simulations of phase-change Rayleigh Benard Convection.	Direct numerical simulations will be performed for characterising the Phase-change Rayleigh Benard (PCRB) system in both transient regime and steady-state regimes. The role of solid-liquid interface movemnts on the onset of convection (in transient regime) and on Nusselt number (is steady state) is studied by comparing PCRB system with the classical RB system.
		Studies on Heat-transfer and thermodynamic performance of Latent heat thermal Energy Storage systems.	Performance analysis of Latent heat thermal energy storage systems (LHTES) will be performed by perforing high fidility numerical simulations. LHTES will be explosed for enerygy storage and managemnts applications, waste heat recovery systems, electronic cooling systems, etc.
		Experimental and numerical studies on electron/laser beam surface treatment processes.	Electron/Laser beam surface treatment (remelting/cladding process) will be both studied experimentally and numerically (using multi-scale CFD simulations). Mathematical and numerical models results will be compared with th eexperimental results. The simulations will be based on multi-scale and multi-physics modes and critical modelling parameters will be borrowed from the experimental results. The verified and validated numerical models will be used for performing parametric numerical studies to characterise the results.
		Studies on Solidification and Melting phenomena.	The transport phenomena during the solidification and melting process will be studied both numerically and experimentally. The investigation comprises thermodynamic, heat and mass transfer of the solid-liquid phase-change physics in classical and rapid solidification regime. Here we will consider pure substance, binary alloys, and mul-components solidification/melting systems

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Dr Pankaj Sahlot Assistant Professor Pankaj.Sahlot@sot.pdpu.ac.in 079-2327-5460	IIT Gandhinagar	Experimental and Numerical study of powder bed fusion Additive Manufacturing processes.	The objective of the proposed project is to experimentally and numerically study residual stress for powder bed fusion process. Experimental work also involve to investigate the effect of process parametrs on various AM Mechanical and Microstructral properties.
		Friction Stir based Additive Manufacturing of different materials.	Project object is to perform Friction Stir based Additive Manufacturing of different materials and perform mechanical and microstructral characterization
		Experimental and Numerical study of Wire Arc Additive Manufacturing process.	The aim of the proposed project is to develope a numerical model to predict the residual stresses and optimize the process parameters. Experimental work also involve to investigate the effect of process parametrs on various AM Mechanical and Microstructral properties.
Dr. Pavan Gurrala Assistant Professor Pavan.Gurrala@sot.pdpu.ac.in 079-2327-5482	BITS Pilani	Finite element studies on effect of temperature on FFE manufactured parts	The project involves in investigating the influence of temperature on Fused Filament Extrusion process using FEM techniques, validated using experiments.
		New material modelling and finite element simulations on advanced materials like PEEK/PEI as applied to Additive Manufacturing technologies	PEEK/PEI are the most demanding high performance polymers which need thorough investigation. The investigation includes new materail modeling by performing low, medium and high tstrain ensile testing at various temperatures. The study also involves in numerical simulations in making new mathematcial models for this high perrformace polymers
Dr. Rajat Saxena Assistant Professor Rajat.Saxena@sot.pdpu.ac.in 079-2327-5391	IIT Delhi	Utilization of Phase Change Materials as a sustainable solution to cooling load abatement of buildings in Gujarat.	This research will include developing a model for PCM selection followed by experimentally testing the identified PCMs under actual conditions to quantify the impact.
Dr Simranjeet Singh Assistant Professor Simran.Singh@sot.pdpu.ac.in 079-2327-5275	IIT Roorkee	Static and Dynamic analysis of sandwich functionally graded materials shells.	The project includes deriving the volume fraction functions for varying the material property of the shell across the thickness. The shell is analyzed based on the practical application in nuclear power plant. Thus, static and nonlinear dynamic analysis will be done to predict the behaviour of sandwich FGM shells when working under harsh environment and dynamic loading conditions.
		Active vibration control of FGM plates using non conventional optimization algorithm.	In this project, a novel optimization algorithm for vibration control of FGM Plate will be proposed. Thus, different types of active conventional and non conventional controller will be studied and compared. Various nonlinear dynamics tool will be utilized to obtained the dynamic parameters which will assist in controlling vibration of plate.
Dr. Vinay Vakharia Assistant Professor Vinay.Vakharia@sot.pdpu.ac.in 079-2327-5474	IIITDM, Jabalpur	Fault Diagnosis using Image Processing and Machine Learning Techniques.	Project requires to capture vibration/acoustic signals from machinery and development of signal/Image processing techniques.Faults/abnormality can be determine with the help of various machine learning techniques
		Machine Learning model development to predict surface roughness, material removal rate and tool wear rate.	To develop regression based machine learning model to predict the various machining parameters .Experimental results will be compare with the parmetsr of machine learning models for validation
Dr. Vivek Kumar Assistant Professor Vivek.Kumar@sot.pdpu.ac.in 079-2327-5270	IIT Roorkee	Analysis of parallel and inclined slider thrust bearing operating with Electro-Rheological (ER) Lubricant.	The slider thrust bearing are used in turbomachinery such as turbines, vertical pumps, gear boxes etc. to sustain axial load and positioning of rotors. This project deals with finite element simulation of thrust bearing operating with Electro-Rheological lubricants. The aim of the project to investiagte the influence of surface texturing and ER lubricant on steady state and dynamic performance characteristics of bearing.
		FEM and CFD analysis of textured surface journal bearing operating with non-Newtonian Lubricants.	Commercially available lubricants are often belnded with traces of addtives making them exhibiting non-Newtonian character. In this study effect of non-Newtonian character of lubricant will be examined on rotordynamic coeffcient of textured surface hydrodynamic journal bearing. The lubricant will be modeled using power law and cubic shear stress law to describe flow through bearing clearance space. Numerical simulation of bearing performance will be carried out using finite element method and Computational Fluid Dynamics techniques.
		Analysis of porous surface hydrostatic/hybrid thrust bearing	The projects deals with finite element simulation of hydrostatic/hybrid thrust bearing employing porous layer on the thrust pad. Effect of porous layer, recess shape and thrust pad elasticity will be examined on stiffness and damping characteristics of the bearing.

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Dr. Garlapati Nagababu. Assistant Professor. Nagababu.Garlapati@sot.pdpu.ac.in 079-2327-5494	PDPU	Climate change impact on wind and wave energy in Indian offshore region: technical and economic analysis	The project is intended to assess the impact of climate change on wind and wave energy resources and hence related power generation projects, in terms of power generation and the economics.
		Assessment of renewable energy sources synergy in India	The project aims to investigate the synergy extent among different renewable energy sources, in order to identfy the feasibility of establishing hybrid power projects consisting of two or more type of energy systems.
		Assessment of satellite wind data for wind energy potential in India using machine learning approaches	This project involves the use of different aspects of machin learning techniques for the processing of different satellite datasets, for the identification of the suitable satellite data for indian region.
Dr. Vivek V. Patel Assistant Professor Vivek.patel@sot.pdpu.ac.in 079-2327-5484	Postdoc-NPU (China), PhD-PDPU	Friction stir processing of magnesium alloy	The projects are in active collaborations with International Institues/University/Industry in China and Europe
		Superplastic deformation in high strength Al and Mg alloy	
		Grain refinement using friction stir processing	
		Friction stir welding of Al alloys	
Dr. Jaykumar Vora Assistant Professor jay.vora@sot.pdpu.ac.in 079-23275486	PDPU	Development of welding tehcnologies for Cr-M and Cr-Mo-V steels	the Project is aimed at development of newer welding technologies such as RMD, CMT etc on the widely used Cr-MO and Cr-Mo-V steels/
		Development of alternative farming technology for growing pesticide free vegetables	The project is in colloboration of a startup to develop a way out wherein locally grown, pesticide free and fresh food can be given to the residents
Dr. Vipindas K Assistant Professor, vipindas.k@sot.pdpu.ac.in 079-23275429 Mob: 8301870959	NIT Calicut	Micro / Nano manufacturing	Use of conventional and non-conventional machining technologies for manufacturing micro/Nano features on the workpiece.
		Surface texturing	Surface texturing is an important research filed in the area of tribology. Thrust area under this topic would by implementing this technology on cutting tool and thereby improving the tool life and its performance. This project will include understanding different methodologies for developing textured surface and its implementation on cutting tool and analyse its performance.
		Coating on cutting tool	Coat cutting tool/insert with different types of materials to improve the machining performance of the tool. This project will involve characterizing the coating on tool and assess its performance during machining by analysing quality of the surface produced, cutting force, residual stress, machining temperature, etc.
		Machining of composites materials	Machining of Metal Matrix Composites (MMC) and Fibre Reinforced Composites (FRP) are a challenging task compared to pure metals or alloys. This project will focus on understanding the machining mechanism of MMC and FRP composites.
Dr.M.B.Kiran, Associate Professor 079-23275438 Mob : 9845688950	IIT, Madras	Surface texture evaluation of machined components using Vision System	Engineering surfaces originated by a diverse manufacturing processes like casting, forging, and secondary processes like turning, milling, etc. Technological advances in the area of manufacturing have resulted in closer tolerances on the parts being produced by all these processes. This, in turn, has resulted in a need to evaluate and control the surface finish of the product which has a significant role to play in its function. Surface roughness evaluation helps in predicting the functionality of machine components.
		Additive Manufacturing & Multi-sensor fusion in CIM	Sensors are used to provide a system with useful information concerning some features of interest in the system's environment. Multisensor fusion and integration refers to the synergistic combination of sensory data from multiple sensors to provide more reliable and accurate information. The potential advantages of multisensor fusion and integration are redundancy, complementarity, timeliness, and cost of the information. The integration or fusion of redundant information can reduce overall uncertainty and thus serve to increase the accuracy with which the features are perceived by the system. Multiple sensors providing redundant information can also serve to increase reliability in the case of sensor error or failure.
		Design and Development of a Lean technology framework for manufacturing company	The concept of lean manufacturing was developed for maximizing the resource utilization through minimization of waste, later on lean was formulated in response to the fluctuating and competitive business environment. Due to rapidly changing business environment the organizations are forced to face challenges and complexities. Any organization whether manufacturing or service oriented to survive may ultimately depend on its ability to systematically and continuously respond to these changes for enhancing the product value. Therefore value adding process is necessary to achieve this perfection; hence implementing a lean manufacturing system is becoming a core competency for any type of organizations to sustain.

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Dr.Abhishek Kumar, Assistant Professor, Abhishek.k@sot.pdpu.ac.in 079-23275478 Mob.:7600652935	BITS, Pilani	Design and Development of various hybrid micro- machining processes	Major research area includes Non-traditional and hybrid micro - machining processes and its applications, Advanced Manufacturing Science and Technology, Finite Element Method, Design of Experiments in Manufacturing. Currently, working on design and development of various hybrid non-conventional micro-machining processes such as Traveling wire-electrochemical discharge machining (TW-ECDM), Electrochemical discharge machining (ECDM), Electrochemical machining (ECM), Wire-Electrical discharge machining (W-EDM), Electrochemical discharge grinding (ECDG) etc.
		Advanced Machining Processes, Electrochemical machining	The micro-components are made from multiple materials and are of complex shapes that demand accuracy at submicron levels. To meet the accuracy expectations, a number of micromachining processes and their integration are required. Electrochemical Machining (ECM) normally used for mass production and is used for working extremely hard materials or materials that are difficult to machine using conventional methods.
		Electrochemical deburring	Electrochemical deburring is a variant of ECM (Electrochemical machining) which uses the principle of electrochemical dissolution to remove burr preferentially on the metallic specimen. In automation and high efficiency processes of deburring cross holes, development of ECD is considered to be of prime importance.