RISE-UP 2024 - Project Details

Project ID	Faculty Name	Title of the Project	No. of Interns to be hired	Description of the Project
PROJECT101	Ashok Bera	Development of efficient all inorganic perovskite solar cells.	One	In this project, I will use all inorganic component for making stable perovskite solar cells in environmental conditions.
PROJECT102	Ashok Bera	Energy generation in Interface solar steam generation.	One	In this project, I will maximize the electrokinetic potential generation during solar steam generation that can purify water and generate energy using solar light.
PROJECT103	Mithu Baidya	Structure and Function of G protein coupled receptor	Two	The project focuses on investigating therapeutically significant GPCRs, crucial for drug development due to their role in cellular signalling. It involves computational studies to understand GPCR structure and function, cloning for obtaining target genes, purification for protein isolation, and cell-based assays to assess pharmacological properties.
PROJECT104	Sartaj Ul Hasan	Permutation polynomials over finite fields	Two	We will attempt to construct some new classes of permutation polynomials over finite fields and investigate their cryptographic characteristics, including boomerang uniformity and differential uniformity.
PROJECT105	Pratik Kumar	Bio-product development addressing sustainable development and estimating wastewater parameters for novel aerobic based treatment	Two	The first part of the project, i.e., bio-product development, a biochemical compound would be extracted from the bacterial cells followed by the detection of the compound which would be done using NMR/FTIR and Mass spectrum. The identified compound would be checked for its application in environmental sustainability domain such as eco-friendly products, bioremediation, treatment of pollutants, etc. The second part of the project would be to estimate the parameters in wastewater for its removal/treatment using a novel bioculture in an aerobic-based bioreactor.

Project ID	Faculty Name	Title of the Project	No. of Interns to be hired	Description of the Project
PROJECT106	Gaurav A Bhaduri	Neutraceutical extraction	One	Neutraceutical extraction will be done form biomass and its further purification. Understanding of separation processes like leaching (solid-liquid extraction) and liquid-liquid extraction with analytical chemistry is preffered.
PROJECT107	Gaurav A Bhaduri	Carbon Capture and Storage	One	Immobilised catalyst synthesis and testing would be done for carbon capture and storage.
PROJECT108	B Satya Sekhar	Design of AutomaticTracking system for Solar Dish	Two	The depletion of traditional energy sources and their detrimental consequences on the environment have drawn the attention of researchers from around the world to renewable energy alternatives. Cooking being an integral part of human life is considered one of the major energy resources utilized. In the case of under-developed and developing countries, people largely rely on cooking using firewood or cow dung as a main source of thermal energy, which results in potentially hazardous emissions and leads to a toxic environment (Khatri et al., 2021). Meantime, there is abundant solar energy available on the earth's surface, which is widely accessible and can be efficiently utilized as a source of thermal energy in both household and commercial settings. This project aims to design the Automatic Tracking system for Solar Dish.

Project ID	Faculty Name	Title of the Project	No. of Interns to be hired	Description of the Project
PROJECT109	Samaresh Bera	Performance evaluation of 5G core network	Two	With the advent of software-defined networking (SDN) and network function virtualization (NFV), 5G core network functions can be placed on commodity hardware as virtual network functions (VNFs). However, the placement of VNFs on commodity hardware poses significant challenges to network performance, such as reduced throughput and increased latency. In this project, we aim to study the impact of VNFs on network performance and propose solutions to mitigate the issues. Expected learning benefits: exposure to 5G network, use of open-source networking tools for 5G network deployment, and tools for packet processing, such as DPDK, XDP, and eBPF.
PROJECT110	Dr. Harish	Flow through Respiratory System	Two	Computational modeling of fluid flow characteristics in upper respiratory tract.
PROJECT111	Chembolu Vinay	Satellite imagery based investigations for analyzing the river morphological response to riparian vegetation	Two	The intern will work with Google Earth Engine (GEE) and carry out long term analysis of historical satellite images to identify the changes in river morphological features through morphological indicators in anthropogenic and virgin rivers. The changes in morphological variables will be linked to riparian vegetation changes, flow and sediment variability for studying the process-response mechanisms.
PROJECT112	Karan Nathwani	Direction of arrival estimation	One	Direction of arrival estimation of incoming sounds from drones and its localization is of extremene importance. This will be the major focus of this project.
PROJECT113	Karan Nathwani	Machine Learning based Speech Intelligibility Improvement via bandwidth extension	One	Machine Learning based Speech Intelligibility Improvement via bandwidth extension. This project helps to improve the intelligibility for hearing impaired and normal listening users.

Project ID	Faculty Name	Title of the Project	No. of Interns to be hired	Description of the Project
PROJECT114	Badri Narayan Subudhi	Deepfake Detection using deep learning architecture	Two	With the rise of artificial intelligence and machine learning technologies, the creation and dissemination of deepfake videos have become increasingly prevalent. Deepfake videos are the product of artificial intelligence or machine-learning applications that merge, combine, replace, and superimpose images and video clips onto a video, creating a fake video that appears authentic. The existence of deepfake videos not only erodes trust in video evidence but also adversely affects its probative value in court. The pervasiveness of deepfake videos in today's digital landscape has brought forth a pressing need for robust and reliable detection methods. The capacity for these fabricated videos to deceive viewers and spread misinformation has highlighted the urgency of developing sophisticated detection techniques. Deepfake videos are engineered with a level of precision that makes them visually indistinguishable from authentic content. They seamlessly integrate manipulated elements into videos, making it challenging for traditional analysis methods to identify them accurately. Moreover, as the technology used to create deepfakes continues to advance, the complexity of detection only intensifies. In response, research efforts have turned to machine learning as a means to confront this intricate problem. By leveraging machine earning algorithms and training them on diverse datasets encompassing genuine and deepfake videos, researchers aim to impart these systems with the acumen to discern subtle visual cues that betray the authenticity of a video.
PROJECT115	Padmini Singh	Variable Pitch Quadrotor	Two	Quadrotor Control in Presence of Fault

Project ID	Faculty Name	Title of the Project	No. of Interns to be hired	Description of the Project
PROJECT116	Riya Bhowmik	Landslide Susceptibility Studies	Two	The project aims to delineate areas prone to landslides along NH 44 in the Jammu and Kashmir region. This involves employing field surveys, satellite imagery, and GIS techniques to evaluate various factors including slope, geological and lithological composition, land usage, and precipitation patterns to gauge the likelihood of landslides. Additionally, statistical trajectory analyses will be conducted to assess the potential for rockfall on susceptible slopes. These efforts will facilitate hazard assessment along this road section and inform strategies for mitigating risks.
PROJECT117	SRISHILAN C	Slag recycling and utilization studies.	Two	Slag, being the byproduct of Iron and Steel Industry, is a potential alternative raw material for ceramic applications based on Alumino-silicates. The physical properties and phases involved in such slags vary from process to process. These slags are presently being researched to be utilized as raw material for construction alternatives like, clinker, cement, bricks, pavement materials, hollow-blocks, glass-based ceramics, ceramic fibers etc. The process developed for such utilization of slag depend on the physical properties and metallurgical characterization of slag at the processing temperature for optimization. In the proposed work, the team will involve in (i) slag remelting studies, or (ii) computational simulation, or (iii) Cold model experiments, to characterize the slag phases, estimate the thermophysical properties at the required temperature of Slag processing, using the various characterizing techniques and literature data.
PROJECT118	Nitesh Kumar	Materials for biomedical and hydrogen storage applications	Two	One intern will be working on synthesis, processing and characterization of biomaterials. Other intern will work on designing polymer composites for hydrogen storage applications.

Project ID	Faculty Name	Title of the Project	No. of Interns to be hired	Description of the Project
PROJECT119	Aditya Shankar Sandupatla	Technology development for transforming agricultural waste to biodegradable cutlery	Two	Agricultural waste is biodegradable. However most of it is burnt. It is possible to repurpose the agricultural waste by using physical and chemical processes. Agricultural waste can be shredded, dried, and made into a pulp. This pulp can be moulded into biodegradable cutlery. In this project, interns would be expected to develop the preliminary process to make pulp suitable for making cutlery. On successful creation of pulp, it can be moulded into biodegradable cutlery.
PROJECT120	Ankit Tyagi	Green hydrogen production	One	Student has to work on the development of electrolyzers through 3D printing techniques.
PROJECT121	Ankit Tyagi	Hybrid supercapacitors	One	Student has to work on the development of Zn ion hybrid supercapacitors
PROJECT122	Navneet Kumar	Heat transfer enhancement in perforated plates	One	Horizontally heated plates with perforations provides additional pathways for the slowly moving bottom thermal boundary layers to move through the perforations. This additional path should lead to a higher heat transport at the same heat load. The higher heat transport should reflect in a lower (cooled) surface temperature. The work is experimental in nature.
PROJECT123	Pankaj Chauhan	Development of New Substrates for Photo-, electrochemical and organocatlytic Reactions	Two	This project involves the design and development of substrates for carrying out sustainable chemical reactions by employing visible light and electricity. Alternatively substrates will be developed to carry out organocatalytic enantioselective reactions.
PROJECT124	Dharitri Rath	Electrochemical Sensors	One	Our lab focuses on design and development of smart sensors that envisions to be portable, point-of-care amenable, as well as affordable, and could be deployed for various diagnostic purposes including that of the medical diagnostics. The deployable solutions at hand includes a multidisciplinary approach using the domain knowledge of chemical engineering, material engineering, biotechnology, as well as electronic and data sciences.

Project ID	Faculty Name	Title of the Project	No. of Interns to be hired	Description of the Project
PROJECT125	Dharitri Rath	Smart Biosensors	One	Our lab focuses on design and development of smart sensors that envisions to be portable, point-of-care amenable, as well as affordable, and could be deployed for various diagnostic purposes including that of the medical diagnostics. The deployable solutions at hand includes a multidisciplinary approach using the domain knowledge of chemical engineering, material engineering, biotechnology, as well as electronic and data sciences.
PROJECT126	Ankit Dubey	Drone Technology/IoT Applications/AI-ML Applications	Two	Development of drone technologies, IoT and AI-ML Based Applications. Facility for development available.
PROJECT127	Srinivasan N	Numerical investigation of biaxial testing of composites using miniature specimen geometry	Two	Woven fabric and laminated composites (fabric-reinforced) have gained significant attention in recent times, due to high specific strength, good corrosion resistance, low thermal expansion coefficient and low cost, respectively. Fabric and fabric-reinforced materials can be easily stamped/shaped into any complex contours, in contrast to metallic counterparts and can be employed in range of applications such as automotive, transportation, defence and construction, respectively. However, mechanical testing and characterization of these materials are essential, for reliable performance during its service. For instance, biaxial strength of the laminated composites and fabrics under various biaxial load ratios remain unexplored, which is vital for stress analysis of high-altitude airships and fabrics used in architectural membranes. In this work, numerical analysis technique will be employed for the optimization of the miniature specimen geometry for composite biaxial testing.
PROJECT128	Rajendra Varma	Development of prestressed precast concrete panels for Roads	Two	The precast concrete panel can be a sustainable solution for hilly roads and its development is critical. The tests and their simulation will be part of this project.

Project ID	Faculty Name	Title of the Project	No. of Interns to be hired	Description of the Project
PROJECT129	Gaurav Varshney	Anti-Phishing and Digital Forensics	Two	The intern will work on advanced technology and protocol proposals to take care of Anti Phishing. Digital forensic applications and challenges will be studied and worked upon.
PROJECT130	Joby Varghese	Ethical issues concerning the design and deployment of AI systems	One	Although AI technologies are developed to make our daily lives smoother and easier, their uses might generate several ethical concerns with respect to some other aspects of our lives. There are multiple ethical, and social issues which may generate undesirable consequences. In this project, we will try to understand the technological basis of ethics in AI and obtain clarity on key problems of AI, such as bias and opacity in the decisions of AI systems.
PROJECT131	Ashutosh Yadav	High-throughput screening of hypothetical metal-organic frameworks	Two	Molecular simulations and machine learning will be used screen MOFs for applications related to industrial separation of gases.
PROJECT132	Tanmay Sarkar	Evolution equations and its well-posedness	One	We look for evolution equations in Partial Differential equations and aim to address its existence and uniqueness issues.
PROJECT133	Sudhakar Modem	Performance analysis of Communication networks	One	The project is related to Communication Engineering and Internet of Things (IoT). The selected intern will work on the mentioned fields based on their interest. For the performance analysis of communication projects, student should have known digital communication, probability and analysis, wireless channel modelling, etc.
PROJECT134	Sudhakar Modem	Smart agriculture and autonomous electric vehicles	One	For IoT related projects of smart agriculture and autonomous EV, the students need to know the basics of Arduino programming, Raspberry Pi, web designing, IoT communication protocols, etc.

Project ID	Faculty Name	Title of the Project	No. of Interns to be hired	Description of the Project
PROJECT135	Ajeet Sharma	Investigating the trade-off Between Speed, Energy Efficiency, and Accuracy in DNA Replication	One	During cell division, our cells produce an identical replica of the daughter DNA molecule. However, the high accuracy in producing the exact same copy of the DNA molecule demands significant energy expenditure and can reduce the replication speed. Through computational analysis, our project seeks to unravel these trade-offs between replication speed, energy expenditure, and accuracy of DNA replication.
PROJECT136	Ajeet Sharma	Unraveling Gene Expression Regulation Through Bioinformatics and Machine Learning	One	By harnessing the power of bioinformatics tools and machine learning algorithms, we plan to decode the complex regulatory mechanisms governing gene expression. Leveraging diverse datasets such as RNA-seq, Ribo-seq, and Hi-C data, our research aims to illuminate the intricate pathways controlling gene expression dynamics.
PROJECT137	R T Durai Prabhakaran	Sensor based prosthetics and ankle foot design	Two	ML and AI Algorithm development for prosthetics and ankle foot are considered along with hardware. Design and fabrication is planned.
PROJECT138	Rimen Jamatia	Size Effect in Confined Concrete under Cyclic Loading/Eccentric Loading	Two	Effect of specimen size of concrete columns under cyclic compression loading/eccentric compression loading on nominal strength will be investigated numerically using ABAQUS finite element software
PROJECT139	Suman Banerjee	Profit Maximization in Social Networks	Two	In this project we will be interested to develop efficient algorithms for social media marketing problems. We will validate our algorithms with real world publicly available datasets. Students applying for this project should have basic understanding about Data Structure, Algorithms, and excellent coding skill in python.
PROJECT140	Deepak Yadav	Performance of lateral force resisting systems	Two	Seismic performance of moment-resisting frame system and braced frames. Nonlinear modeling of the structure is required to be done on software.
PROJECT141	Sidharth Maheshwari	RISC V based System-on-Chip Design for Genomic Workloads.	One	Developing energy-efficient many-core architecture for genomic workloads. Parallel.

Project ID	Faculty Name	Title of the Project	No. of Interns to be hired	Description of the Project
PROJECT142	Sidharth Maheshwari	Parallel and Distributed Computing for Embedded Genomics	One	Using embedded cluster for parallel and distributed execution of genomic workloads. Requires knowledge of Computer Architecture, C/C++ and Algorithms.
PROJECT143	Archana Rajput	Design of Rectennas for wireless power transfer/energy harvesting	One	Various antenna designs along with rectifier circuits are needed to harvest energy from the surrounding space electromagnetic wave. Different components of the design and improvement in performance parameters of the will be carried out for the applications at microwave range.
PROJECT144	Archana Rajput	Low RCS Antenna for Stealth Technology	One	Low RCS antenna designs will be achieved by integration of conventional antennas with Transmissive/Reflective Absorptive Frequency Selective Surfaces
PROJECT145	Anup Shukla	Estimation of the Grid Stability with the Increased Penetration of the Renewable Resources and Electrical Vehicle in the Power Network.	Two	The objective of this project is to assess the stability of power grids amidst the growing integration of renewable energy sources and electric vehicles. As renewable energy and electric vehicles become more prevalent in the power network, their intermittent nature and varying power demands pose challenges to grid stability. This project focuses on developing estimation techniques to analyse the dynamic behaviour of power systems under increased renewable energy penetration and electric vehicle charging loads. By evaluating grid stability metrics and assessing the impacts of renewable resources and electric vehicles on system dynamics, this study aims to provide insights and solutions for maintaining stable and reliable power grid operation during the transition towards achieving net-zero carbon emissions.

Project ID	Faculty Name	Title of the Project	No. of Interns to be hired	Description of the Project
PROJECT146	Jayaramulu Kolleboyina	Multifunctional Hybrid Porous Materials for Energy and Environmental Technologies	Two	Metal-Organic frameworks are crystalline materials that comprise metallic clusters and organic ligands with great potential for a diverse range of applications, including but not limited to gas separation and storage, electrocatalysis, water purification, batteries, and supercapacitors. However, their poor conductivity, inaccessible pores, and limited stability hinder their maximum utilization. To overcome these challenges, one solution to this problem is to integrate MOFs with two-dimensional (2D) layer materials to create emerging multifunctional hybrid two-dimensional porous materials. In this project, 2D materials to create hybrid materials with improved electro and physicochemical properties, broadening their potential in (organic-photo-electro) catalysis applications
PROJECT147	Pragati Shrivastava	Securing Software-Defined Networks	Two	The project aims to design and develop the in-network intelligent solutions for various security vulnerabilities in SDNs. It includes the in-depth study of SDN and P4 technologies, and analysis of various threats. Furthermore we develop the efficient solutions which can be deployed in the data plan devices.

Project ID	Faculty Name	Title of the Project	No. of Interns to be hired	Description of the Project
PROJECT148	Divyesh Varade	Development of AI/ML based approaches for avalanche outline delineation	One	To further improve the avalanche prediction and the protection of people and develop infrastructure, information about the distribution of avalanche activity is crucial. Nevertheless, this information is missing for large parts of the Himalayan regions. These can be mapped manually using high resolution satellite images. However, optical images are highly affected by clouds and radiometric resolution is another issue for sensors such as the IRS P6, where reflectance saturation is observed for snow. UAV based acquisition yields very low coverage and is not particularly suitable in mountainous regions due to stability issues in windy weather. Thus, space borne radar imagery provides an attractive means for developing techniques for automatic avalanche runout delineation based on ML and DL models. Required skills: 1) Strong in one of the programming language like python, Matlab, R 2) Experience in Machine learning and deep learning Desirable : Candidate should preferably be computer science background
PROJECT149	Divyesh Varade	Development of Snow drought atlas for the Hindu Kush Himalayas	One	The seasonal snow in the Hindu Kush Himalayas over the last decade has shown significant anomalies where critical retreat has been observed in several hotspots. The project proposes development of a webGIS platform for delineating products like critical hotspots for snow droughts at district/sub-basin scale, retreat/forward of snow cover days, snow cover trends, and other products that evaluate the snow drought conditions including SWEI and other indices. Required skills: Experience with development of web platform/webGIS, strong skills in python programming, Desirable : Candidate should preferably be computer science background

Project ID	Faculty Name	Title of the Project	No. of Interns to be hired	Description of the Project
PROJECT150	Ambika Prasad Shah	Design of Radiation Hardened Dual port SRAM Memory	Two	Dual port SRAM are needed which can be used as embedded solution or stand-alone memory chip for space applications. The SRAM to be used in the the space required certain radiation tolerance. The required feature of the proposed memory is as follows: Voltage Level: 1.8 V Access Time : < 5 ns Address Bit Range: 8 Bits Data Bit Range: 8 bits Radiation Tolerance : TID >300 Krad (Si), SEL > 80 MeV-cm2/mg, SEU > 50 MeV-cm2/mg
PROJECT151	Arvind Kumar	The Chebotarev Density Theorem and its Applications	Two	Chebotarev density theorem in algebraic number theory describes statistically the splitting of primes in a given Galois extension of the rational field. It is a fundamental result in number theory with broad implications across various branches of mathematics. The aim of this project will be to deepen our understanding of the Chebotarev Density Theorem, its connections to other areas such as algebraic number theory and Galois theory and its application in modern mathematics especially in modular forms.
PROJECT152	Shanmugadas K P	Development of a novel micro gas turbine engine combustors	One	Project aims to develop a low-emission combustor concept for micro-gas turbines and conduct experiments with the same. Our group has developed a novel injector concept, and numerical simulations are in progress. The next step is the detailed experiments and numerical validation. Candidates who are interested in the Aerospace domain may apply. The nature of work may be experimental or computational depending on the candidates' capabilities.

Project ID	Faculty Name	Title of the Project	No. of Interns to be hired	Description of the Project
PROJECT153	Shanmugadas K P	Reusable liquid rocket engines	One	Project aims to develop a reusable liquid rocket engine combustor concept based on gaseous methane and liquid oxygen propellants. Rapid reusability of the launch vehicle is a key milestone to be achieved to reduce the launch costs. In this regard, the proposed project aims to develop a technology demonstrator with a novel pintle injector. Experiments are being planned to validate the numerical findings. Candidates who are interested in liquid rocket propulsion may apply.
PROJECT154	Prof. Anurag Misra	Evaluation of waste derived surface treatments for improving cover zone properties of concrete.	Two	Concrete durability is largely dependent on the cover zone permeation properties of concrete. There have been several attempts to improve properties of cover zone by using different types of additives in concrete and surface treatments. Silane and acrylic based surface treatments are popular, but they have issues in long term performance and cost of these surface treatments. The present project would explore the development of waste derived surface treatment and its evaluation for improvement of cover zone permeation properties.
PROJECT155	Sameer K S P	Tensile testing of UHPC	Two	The project is aimed at characterizing foam concrete in tension
PROJECT156	Ravi Kumar Arun	Microfluidic battery under subfreezing conditions	One	The primary objective is to develop a microfluidic battery capable to function at sub-freezing temperature conditions. The battery would be fabricated using Ni/C nanocomposite as anode and Carbon as cathode material. The electrochemical performance of this material will be investigated by using it in Nickel-Carbon microfluidic battery in sub-freezing conditions (below 0 °C).
PROJECT157	Ravi Kumar Arun	Fabrication of Microfluidics Channels for Biomedical Applications	One	In this project, the objective is to fabricate complex 3-D microfluidic channels for biomedical application such as cell counter, plasma separation and kidney on a chip. It is an experimental work in which the student will be engaged in advanced fabrication methods.

Project ID	Faculty Name	Title of the Project	No. of Interns to be hired	Description of the Project
PROJECT158	Kushmanda Saurav	Microwave Antennas/Frequency Selective Surfaces for Communication/Sensing Systems	Two	Antennas for handheld terminals: Designs of compact and multiband antenna for the hand held terminals will be examined. The MIMO configurations of mobile antennas with polarization/pattern/spatial diversity features with mutual coupling less than 15 dB, envelope correlation coefficient (ECC) less than 0.2 will be explored. Various techniques can be employed to enhance antenna performance within the limited space of a mobile device. Antenna for On-body/Heath care/ Microwave Imaging: The novel designs of wearable and textile antennas for on body applications will be investigated. The studies on specific absorption rate (SAR) and the effect of antenna parameters when used in the practical mobile terminals as well as for on-body applications will be carried out. The SAR has an acceptable range of less than 2W/kg for 10 gm biological tissue. Wideband microwave antenna will be designed for microwave medical imaging (head imaging for brain tumor detection or pancreatic cancer detection). The array of antennas will be surrounding the body to transmit and receive microwave signals from multiple angles. Linearly/Circularly polarized transmitarray (TA)/reflectarray (RA): The transmitarray/reflectarray (TA/RA) is composed of a feeding antenna and a thin transmitting/reflecting panel. This panel is designed with phase shift elements organized according to a specific phase distribution. These elements are engineered to have transmission/reflection coefficients that are finely tuned. This tuning ensures that when an incident spherical wave interacts with the TA/RA surface, it undergoes a transformation, resulting in the emergence of a collimated plane wave directed towards a specific angle.
PROJECT159	Yamuna Prasad	Secure Machine Learning Models using Reinforcement Learning	Two	This project aims to develop an attack resistive ML/DL models under ML-as-a-service framework. The project team will explore various possibilities for attack and defenses in ML models.

Project ID	Faculty Name	Title of the Project	No. of Interns to be hired	Description of the Project
PROJECT160	Arvind Kumar Rajput	Design and optimization of the Energy Efficient Buildings	Two	The project problem deals with the design and optimization of energy efficient building in a specified zone to make it more sustainable. The project will evaluate the energy requirement and losses in the building and optimize the design from the view point of sustainability.
PROJECT161	Shiva S	Additive manufacturing of components for defense applications	Two	The projects focus on design and development of components which are to be used for defense applications. The nature of internship will be on hands on working experience in additive manufacturing. The candidates will be allowed to work on additive manufacturing machines where they will be printing metal components made of steel for real time applications. The candidates will be teaming up with PhD scholars in the lab.
PROJECT162	Surendra Beniwal	Programmable phased array circuit design for SHM applications	Two	Students in this 6-8-week project will have the opportunity to learn the basics of phased array technology and will design a circuit using the hardware support in the SIAM lab at IIT Jammu. The circuit will be demonstrated in a structural health monitoring robotic platform. Candidates in the pre-final year of Electrical/Electronics engineering discipline are eligible to apply. Students must have experience of programming in C/C++ and/or Python/LabVIEW environment and handling hardware.

Project ID	Faculty Name	Title of the Project	No. of Interns to be hired	Description of the Project
PROJECT163	Sarada Prasad Gochhayat	Designing of Post quantum cryptography enabled NTRU KEM based video conferencing system	One	The project introduces the design of a video conferencing system incorporating Post-Quantum Cryptography (PQC) through the NTRU Key Encapsulation Mechanism (KEM). The system aims to enhance security by utilizing quantum-resistant algorithms for key exchange, ensuring confidentiality even in the face of future quantum computing advancements. This approach addresses the growing need for robust security measures in modern communication platforms, particularly in non-face-to-face activities where privacy and data protection are paramount concerns. It ensures that the session key confidentiality even in quantum computing scenarios. PQC stands for Post-Quantum Cryptography. It refers to cryptographic algorithms and protocols designed to resist attacks from quantum computers. As the Quantum computers have the potential to break traditional cryptographic schemes like RSA and ECC by exploiting their underlying mathematical structures. Post-Quantum Cryptography aims to develop new cryptographic algorithms that are secure even against quantum attacks. NTRU is a lattice-based cryptographic algorithm used for public-key encryption and key exchange. NTRU is designed to be secure against attacks from quantum computers, making it a significant candidate for post-quantum cryptography. It is efficient in terms of key size and computational complexity. It addresses the need for secure communication in a post-quantum computing era.

Project ID	Faculty Name	Title of the Project	No. of Interns to be hired	Description of the Project
PROJECT164	Sarada Prasad Gochhayat	Blockchain-based framework for cloud storage towards next generation of mobile networks	One	The unprecedented proliferation of IoT devices, edge devices, and multiple number of connected devices per person across different geographic areas, has led to rapid use of cloud storage. The current trend with the expected emergence of the next generation of mobile ecosystem will lead to tremendous increase in the amount of data over clouds. As the dependency on cloud increases with time, it may be possible that greedy or malicious cloud service providers remove the rarely accessed data to amplify their profits. To curb such attempts and ensure data storage as per the service agreement, a decentralized security and auditing mechanism is required which establishes trust in the system. The existing auditing mechanism relies on cryptographically intensive primitives, such as RSA and bi-linear mapping. Additionally, the mechanisms required the user to hold the proof of data stored, which in case of loss of device the proof would also be lost. Thus, we need a mechanism to store all the proof in a tamper-proof manner. In this direction, the aim of the proposed summer internship would be to work towards building a block chain-based security framework for cloud storage.
PROJECT165	Sahil Kalra	Circular Pier Climbing Robot Development	One	The project discuss the development of a mechanism which can grasp circular Pier for structural health monitoring.
PROJECT166	Sahil Kalra	Auxetic Belt Development for Fetal Monitoring	One	The project discusses the development of auxetic belt and integration of RF sensors for RF based health monitoring of fetal. The technology is alternative of currently used ultrasonic technology which is expensive and harmful for the live tissues.

Project ID	Faculty Name	Title of the Project	No. of Interns to be hired	Description of the Project
PROJECT167	Ajay Singh	On the Implementation of Internet of Bio-Nano Things In Future Healthcare Systems	Two	Recently, the interface of computer science and biology —the Internet of Bio-Nano Things (IoBNT) has promises to revolutionize medicine and healthcare. The IoBNT refers to biosensors that collect and process data, nano-scale labs-on-a-chip that run medical tests inside the body, the use of bacteria to design biological nano-machines that can detect pathogens, and nano-robots that swim through the bloodstream to perform targeted drug delivery and treatment. Molecular communication is inspired by the body itself. In its simplest form it encodes "1" and "0" bits by releasing or not releasing molecular particles into the bloodstream — similar to ON-OFF-keying in wireless networks. According to the researchers, molecular communication has emerged as the most suitable paradigm for networking nano-implants. It sends data by encoding it into molecules that then go through the bloodstream and are guided where to go and when to release their treatments, just like hormones. This project envisions the practical implementation of IoBNT and use cases in future healthcare systems.

Project ID	Faculty Name	Title of the Project	No. of Interns to be hired	Description of the Project
PROJECT168	Amitash Ojha	Research on Multimodal Cognition	Two	This project is looking for interns interested in multimodal aspects of Cognition. Multimodal Cognition encompasses how humans perceive, process, and integrate information from different sensory, perceptual, affective, and motor modalities and achieve a coherent understanding of the world around them. Our Lab largely focuses on Multimodal Emotion recognition systems (Gestures, Facial Expressions, and Non-verbal cues); Speech, Voice, and Sentimental Analysis; Cognitive Load, Visual and Embodied 'Forward Flow' (Embodied Creativity); Perceptual Modalities' effect on Learning and Memory retention, etc. We also use Physiological Sensors (GSR, HRV, and Temperature) and Eye-tracking methodology for an integrated understanding of the cognitive processes. Possibilities in the research scope go further from the mentioned areas to cross-modal interactions, technology and multimodal interface, and human-computer interactions. The project topic will be finalized based on the candidate's research skills, mutual interests, and background. Multimodal Cognition research has practical applications in diverse areas such as psychology, neuroscience, human-computer interaction, social robotics, and artificial intelligence, offering insights into human-machine interfaces, and developing intelligent and assistive technologies.
PROJECT169	Subhas Samanta	Organometallic catalysis and bio-inspired transition metal catalysis	Two	Redox non-innocent ligand(s) containing 3d-complexes have been found to be promising to develop efficient, cost effective and sustainable catalytic protocols. In view of this, we are interested to work on a project based on redox non-innocent azo-aromatic and related ligands containing 3d-complexes. The project will be involved with the synthesis, characterizations of geometric, electronic structures and electron transfer series of the designed complexes. Then these will be explored for catalytic applications with a special emphasis on alcohol dehydrogenation triggered organic synthesis and small molecule activation reaction. The project will be involved with both rigorous experimentation and theoretical calculations.

Project ID	Faculty Name	Title of the Project	No. of Interns to be hired	Description of the Project
PROJECT170	Satyadev Ahlawat	AI assisted Hardware trojan detection in VLSI chips	Two	The objective of the project is to develop an AI/ML based framework to detect presence of hardware trojans in modern day integrated circuits. The project will explore various aspects of circuit such as testability, topology, rare nodes etc. to identify potential locations of trojan insertion and generate vectors which can activate trojan payload and propagate its effect on detectable nodes.
PROJECT171	Vijay Kumar Pal	Stretchable micro-electronics, Robotic skin, Strain sensors	Two	Fabrication and application of Stretchable micro-electronics, Robotic skin, Strain sensors etc.
PROJECT172	Pervaiz Fathima Khatoon M	Understanding fire resistance of concrete	One	This project explores the mechanical behaviour of various types of concrete subjected to high temperatures with the objective to propose a concrete with better resistance against fire.
PROJECT173	Goutam Dutta	AI-ML analysis of nuclear reactor	Two	Mathematical model to analyse thermal-hydraulic analysis is already there. This model is to be used to generate data. First, a lot of data is to be generated using the mathematical model for the training purpose of the AIML model. Next, different AIML models are to be developed to find the best representative one in comparison to the mathematical model.

Project ID	Faculty Name	Title of the Project	No. of Interns to be hired	Description of the Project
PROJECT174	Ankit Kathuria	Investigating the Influence of Cognitive Load on Truck Driver Performance: An Experimental Simulation Approach	Two	The project aims to investigate the impact of cognitive load on the performance of truck drivers using an experimental simulation approach. The study requires participants to complete a driving task while simultaneously performing a secondary cognitive task. The goal is to determine how cognitive load affects the drivers' ability to perform their duties safely and effectively. The findings of the study could be used to develop interventions aimed at reducing cognitive load and improving the performance of truck drivers.
PROJECT175	Arun Kumar Verma	The role of AI/ML in social media and PR activities	One	
PROJECT176	Arun Kumar Verma	The Media, Communication, and Digital Design with AI	One	
PROJECT177	Vinit Jakhetiya	Multimedia Quality Assessment	One	The project on Multimedia Quality Assessment focuses on developing methodologies and techniques to evaluate the quality of multimedia content, including images, videos, and audio, through computational models and perceptual metrics.
PROJECT178	Vinit Jakhetiya	Stereo Super-resolution	One	The Stereo Super-Resolution project focuses on enhancing the resolution of stereo image pairs to improve the visual quality and detail level of 3D scenes. This involves the development of algorithms and techniques that leverage information from multiple images captured from different viewpoints to reconstruct high-resolution stereo images.

Project ID	Faculty Name	Title of the Project	No. of Interns to be hired	Description of the Project
PROJECT179	Yogesh M. Nimdeo	Optimization and Synthesis of Fertilisers Microsphere by Emulsification Techniques	One	Humans now reside on every continent on Earth, with a population of eight billion. With this humongous growing population, there is an unprecedented food requirement that is being fulfilled through the application of fertilizers. Excessive use of these fertilizers results in soil, water as well as air pollution, thus vandalizing the environment. The objective of the study is to reduce the use as well as the frequency of application of commercially used fertilizers sustainably.
PROJECT180	Yogesh M. Nimdeo	Green Synthesis of Silver Nanoparticles, Structural Characterization, and their Industrial Applications	One	Metallic nanoparticles are particularly interesting in nanotechnology because of their distinct electrical, magnetic, chemical, and mechanical capabilities. Silver nanoparticles (Ag-NPs) have grown in popularity among academics and industry owing to their multiple uses in consumer items and biomedicine, such as antimicrobial effectiveness, anti-inflammatory properties, and wound healing.