Call for Applications for IIIT-B Summer Research Internship Program SRIP 2024

Applications are invited from interested students of IIIT Bangalore to the IIIT-B Summer Internship Program (SRIP) 2024. This is a unique internship programme being offered at IIIT-B for giving engineering students an opportunity to work on a real-world funded research project.

Programme Details

Further details regarding SRIP 2024 are as follows:

Name of programme	IIIT-B Summer Research Internship Program (SRIP) 2024
Minimum eligibility	Students who have completed (or completing) 2nd Year in BE/BTech/Integrated MTech can apply. Specific projects may have additional minimum eligibility requirements. Open to IIIT-B students as well as students from other institutions.
Stipend and Certificate	Stipend of Rs. 20,000 for the entire duration of the internship will be paid upon satisfactory completion of the internship. Internship certificate will be issued.
Internship Dates	8 weeks duration between May 15 – July 31, 2024
Hybrid Mode	Mandatory 4 weeks of on-campus work between May 15-June 30 as per availability of project guide. Remaining 4 weeks of work to be completed remotely
ostel Facility	Limited free hostel facility available for on-campus work for outstation candidates
Total positions available	40 (approx..)
Last Date to Apply	April 30, 2024 11.59 PM
Internship web page	https://www.iiitb.ac.in/summer-internship
Call for Applications (This document)	https://drive.google.com/file/d/1cfV9gHJutljtb5RgXzDL-UvVfHQnwoiw/view?usp=sharing
Application Link	https://forms.gle/5hQJnkALUzUvStaU6

Selection Procedure

Project mentors will go through the applications and select interns for the project. Project mentors may optionally choose to interview short-listed candidates. The decision of the project mentors is final.

Application Procedure

1. Carefully go through the list of projects listed in this document.
2. You may apply by filling in the form with all requested details.
3. Prepare and upload a recently updated resume as part of the application form. Ensure there is a section titled "**Skills and Competencies**" in your resume where you list specific skills and abilities.

Project Descriptions

A brief description of the projects is provided for your reference. In order to enable a quick selection process, students are advised to apply only for those projects where the student meets the stated requirements. Go to the application link only after going through project requirements.

Project-Code	SRIP2024-01
Project Mentor	Srinath Srinivasa
Funding source	IUDX project, Data lake project
Project title	Web Science Lab
Brief project description	We have two openings each in the following projects: (a). Consent management for digital public infrastructures, and (b). Modelling Policy Interventions for SDG indicators. The former involves development of a consensual data sharing infrastructure that can convert policy statements into enforceable rules, and supported by relevant primitives. The latter involves development of ML models by integrating data from multiple sources, to perform predictive and prescriptive modelling of policy interventions towards a given outcome.
Mandatory skills (what skills and competencies should they already have)	For (a). Good python programming and backend skills. For (b), some familiarity with tableau and ML
Learning opportunities	Opportunity to work on live projects with social impact in areas like digital empowerment and sustainable development

Project-Code	SRIP2024-02
Project Mentor	Kurian Polachan
Funding source	MINRO
Project title	Connected Devices and Wearables Lab
Brief project description	Lab Name: Connected Devices and Wearables Lab Webpage: https://sites.google.com/view/cdwl/ Our group focusses on researching hardware and systems for connected devices and wearables constituting Internet of Bodies (IoB). IoB is an extension of IoT, wherein connected things in, on and around the human body senses and share vital information about the body to remote servers in the cloud for continuous and long-time monitoring of the individual and surroundings. Specific Project Topics: Wearables for Internet of Bodies: Design of low power wearables capable of harvesting energy from the body (e.g., energy from body heat) for long-term battery free sensing and communication. Ultra-Low Power and Secure Communication: Explore different modalities of secure and ultra-low-power short-range communication between wearable devices and off-body transceivers. (e.g., human body communication, capacitive communication, magnetic communication) Hardware Security: Develop hardware security measures to protect the wearable devices from unauthorized access or replacements (e.g., PUFs for wearables)
Mandatory skills (what skills and competencies should they already have)	Circuit Theory, Microcontroller Programming, Python Programming
Learning opportunities	Hands-On Experience Working with Circuits, Lab Instruments and Scripting

Project-Code	SRIP2024-03
Project Mentor	Pradeesha Ashok
Funding source	Institute
Project title	Algorithms for Graph Problems
Brief project description	Literature survey of Total Domatic and Coupon Coloring problem in graphs and solving the problem in special graphs.
Mandatory skills (what skills and competencies should they already have)	Algorithm Design, Basic knowledge of Graph Theory
Learning opportunities	Systematic approach to solving a problem, Learning about techniques that are specific to Algorithm Design, Learning to do a comprehensive literature survey

Project-Code	SRIP2024-04
Project Mentor	Srinivas Vivek
Funding source	Infosys Foundation Career Development Chair Professorship research grant
Project title	Privacy-Preserving Applications using Homomorphic Encryption
Brief project description	We aim to construct privacy-preserving applications using a cryptographic primitive called homomorphic encryption.
Mandatory skills (what skills and competencies should they already have)	Students are expected to have good mathematical maturity and programming skills. A background in cryptography is not necessary.
Learning opportunities	Good understanding of cryptography, project report, software code, and possibly a research publication.

Project-Code	SRIP2024-05
Project Mentor	V. Ramasubramanian
Funding source	MINRO (Multi-lingual Speech Technology Project)
Project title	Foundation-Model design based on Few-shot Learning (Multi-lingual Speech Technology Project)
Brief project description	This project will involve building components for the design of Foundation Models for End-to-End Automatic Speech Recognition (E2E ASR) based on Few-shot Learning, set in Self-Supervised Learning frameworks. Specifically, we will be proposing and experimenting with new methods within the paradigm of Matching-Networks (MN), a Meta-/Metric-Learning based Few-Shot Learning algorithm, to come up with Foundation Models, completely derived from Unsupervised Data. This is in contrast to the original MN algorithm which is essentially a Supervised FSL paradigm.
Mandatory skills (what skills and competencies should they already have)	Pytorch, Machine Learning, Deep Learning
Learning opportunities	Acquire theory of and working knowledge in Few-shot Learning, Self-supervised Learning, Foundation Model deisng, E2E ASR.

Project-Code	SRIP2024-06
Project Mentor	Madhav Rao
Funding source	Micron
Project title	AI based Placement and Routing Tool
Brief project description	AI based Placement and Routing Tool for VLSI System Design / System on Chip Design.
Mandatory skills (what skills and competencies should they already have)	AI -ML, Reinforcement Learning, Optimization Algorithms
Learning opportunities	Demonstrate a working tool which could be adopted by the Industry and possible Publication in a good international conference or reputed journal

Project-Code	SRIP2024-07
Project Mentor	B. Ashok
Funding source	Quantum computing with nonlinear oscillator networks, funded by the Mphasis Center for Cognitive Computing (C3), IIIT Bangalore
Project title	Quantum computing with nonlinear oscillator networks / Complex Systems & Soft Matter Physics (CSSMP) lab
Brief project description	The project is an ongoing one on aspects of quantum computation. It involves theoretical (analytical & computational) studies where dynamical systems theory & mathematical modelling are used along with quantum mechanics in investigating systems in the context of quantum computation & quantum sensing. Lab page: https://www.iiitb.ac.in/cssmp/
Mandatory skills (what skills and competencies should they already have)	Sound knowledge of basic quantum mechanics, with good coding skills. Knowledge of nonlinear dynamics is desirable.
Learning opportunities	Exposure to aspects of theoretical quantum computing & applications of nonlinear dynamics

Project-Code	SRIP2024-08
Project Mentor	B. Ashok
Funding source	Institute / MINRO funding is requested
Project title	Machine Learning applications in condensed matter & complex systems / Complex Systems & Soft Matter Physics (CSSMP) lab
Brief project description	The project would involve investigating applications & uses of machine learning techniques in certain condensed matter and complex systems, concurrently with methods from statistical physics & nonlinear dynamics.
Mandatory skills (what skills and competencies should they already have)	Good coding skills, with previous exposure to machine learning techniques. Should ideally have taken a course in statistical physics as part of course-work.
Learning opportunities	Expected outcomes include applying ML techniques in diverse complex systems and hopefully gaining new physical insights into accurately predicting system behaviour.

Project-Code	SRIP2024-09
Project Mentor	Madhav Rao
Funding source	Sony SSUP
Project title	Assistive Robotics
Brief project description	Assistive Robotics for Post Stroke Patients. The rehabilitation includes the following components- Eye-Tracking, Wrist and Finger movements, Holding and Gripping Tasks, and upper & lower limb movements.
Mandatory skills (what skills and competencies should they already have)	Electronics, Circuit Design, Signal Processing, Basic AI
Learning opportunities	Demonstrate a working prototype and possible publication in international conference or reputed journal.

Project-Code	SRIP2024-10
Project Mentor	Dr. Madhav Rao (IIITB) & Dr. Subasree Ramakrishnan (NIMHANS)
Funding source	ICMR Project
Project title	Decoding Speech Imagery using EEG signals
Brief project description	Demonstrate a working model to detect different speech phonemes and words. Efficiently characterizing the EEG consumer grade devices and extracting the appropriate signals.
Mandatory skills (what skills and competencies should they already have)	Signal Processing, Electronics, Basic AI-ML knowledge
Learning opportunities	Possible publication in international conference or reputed journal.

Project-Code	SRIP2024-11
Project Mentor	Prof Chandrashekar Ramanathan
Funding source	RASP/CTRI-DG
Project title	RASP/CTRI-DG
Brief project description	The interns will be working on the RASP platform. RASP is a platform for Automated full stack code generation from models. The interns will use the platform to build web applications from model definitions. The interns will use the model definitions to build a React based front end that manipulates the resources as well as adheres to a specified UI definition. The RASP platform is built using Spring Boot and the UI is being developed in React. The platform offers automated full stack code generation, automated test case generation, automated CI/CD and deployment. The interns will be expected to understand all the phases and contribute towards front end development.
Mandatory skills (what skills and competencies should they already have)	HTML, CSS and Javascript. Knowledge of React will be good.
Learning opportunities	Good understanding of building Web applications with a focus on the Front end development. React skill set development along with Javascript and Typescript.

Project-Code	SRIP2024-12
Project Mentor	Prof Chandrashekar Ramanathan
Funding source	RASP/CTRI-DG
Project title	RASP/CTRI-DG
Brief project description	The interns will be working on the RASP platform. RASP is a platform for Automated full stack code generation from models. The interns will use the platform to build web applications from model definitions. The interns will port the platform to be used with different databases like MySQL, Postgres etc. The platform currently uses NoSQL (mongo) to manage the data. The RASP platform is built using Spring Boot and the UI is being developed in React. The platform offers automated full stack code generation, automated test case generation, automated CI/CD and deployment. The interns will be expected to understand all the phases and contribute towards porting the platform to use multiple DBs.
Mandatory skills (what skills and competencies should they already have)	Java, SQL. Knowledge of SpringBoot will be an added bonus
Learning opportunities	Very good understanding of server-DB interaction. Hands on experience in writing WebServer code in SpringBoot. Working with both NoSQL and relational DBs

Project-Code	SRIP2024-13
Project Mentor	Chandrashekar Ramanathan
Funding source	MINRO
Project title	Campus Analytics Dashboard
Brief project description	Integrated dashboard for academia using tools like Tableau, ETL processing for providing campus insights to the leadership comprised of Director, Deans, CFO, etc
Mandatory skills (what skills and competencies should they already have)	Good knowledge of data handling using SQL and Excel. Exposure to Tableau, PowerBI, etc. desirable
Learning opportunities	Ability to set up Business Intelligence dashboards by integrating data from a wide variety of sources

Project-Code	SRIP2024-14
Project Mentor	Madhav Rao
Funding source	TiH-IoT
Project title	Agri-IoT System
Brief project description	An agricultural-rover and an IoT stand to detect physical tampering and pest attacks
Mandatory skills (what skills and competencies should they already have)	Circuits and Systems
Learning opportunities	Demonstrate a working prototype and possible publication in international conference or reputed journal.

Project-Code	SRIP2024-15
Project Mentor	Prof. B. Thangaraju
Funding source	CTRI-DG
Project title	Accelerating Software Delivery: Implementing a DevOps CI/CD Pipeline for Rapid Development
Brief project description	In today's fast-paced software development landscape, speed and efficiency are paramount. The "Accelerating Software Delivery" project focuses on implementing a DevOps Continuous Integration/Continuous Deployment (CI/CD) pipeline to streamline the software development lifecycle and enable rapid iteration and deployment of software applications. By leveraging DevOps principles and best practices, this project aims to enhance collaboration between development, testing, and operations teams, ensuring seamless integration and delivery of high-quality software products. The CI/CD pipeline automates the process of building, testing, and deploying code changes, reducing manual errors and accelerating time-to-market. Key components of the project include: Setting up a DevOps development environment with version control, issue tracking, and collaboration tools. Designing and implementing CI/CD workflows using popular tools like Jenkins, GitLab CI/CD, or GitHub Actions. Integrating automated testing, including unit tests, integration tests, and end-to-end tests, into the pipeline. Implementing containerization with Docker and orchestration with Kubernetes for scalable and efficient deployment. Establishing monitoring and feedback mechanisms to track performance metrics, identify bottlenecks, and continuously optimize the pipeline. The "Accelerating Software Delivery" project aims to empower development teams to deliver software updates faster, with higher quality and reliability, enabling organizations to respond rapidly to changing market demands and stay ahead of the competition.
Mandatory skills (what skills and competencies should they already have)	1. Proficiency in software development languages such as Python, Java, or JavaScript. 2. Familiarity with version control systems like Git. 3. Understanding of DevOps principles and practices. 4. Experience with containerization technologies such as Docke
Learning opportunities	1. Proficiency in implementing DevOps practices and principles in software development workflows. 2. Hands-on experience designing and implementing CI/CD pipelines using industry-standard tools. 3. Ability to automate software testing, deployment, and mon

Project-Code	SRIP2024-16
Project Mentor	Jaya Sreevalsan Nair
Funding source	Institute
Project title	Graphics-Visualization-Computing Lab (GVCL)
Brief project description	There is uncertainty inherent in the geospatial data obtained using earth observation data. This uncertainty has been indirectly addressed through the use of consensus voting. One such application is flood extent estimation using traditional methods using difference images. This project is on uncertainty-aware deep learning algorithms for flood extent estimation from SAR images. The baseline paper for this work is at https://ieeexplore.ieee.org/document/9688390
Mandatory skills (what skills and competencies should they already have)	Background in machine learning and deep learning
Learning opportunities	Uncertainty estimation in spatial application and image datasets

Project-Code	SRIP2024-17
Project Mentor	Madhav Rao
Funding source	MINRO
Project title	Hardware Acceleration of Genome sequence
Brief project description	Exploring different VLSI/FPGA architecture acceleration techniques to accelerate Genome sequence.
Mandatory skills (what skills and competencies should they already have)	VLSI Architecture Design & Algorithms
Learning opportunities	Demonstrate FPGA demonstration and possible publication in international conference or reputed journal.

Project-Code	SRIP2024-18
Project Mentor	Madhav Rao
Funding source	EHRC - MINRO
Project title	Fall Prediction & Prevention Systems
Brief project description	The project is to develop Fall Prediction using multi-modal sensors and design wearable assistance system
Mandatory skills (what skills and competencies should they already have)	Circuits and Systems , Electronics Circuits Lab
Learning opportunities	Demonstrate a working prototype and possible publication in international conference or reputed journal.

Project-Code	SRIP2024-19
Project Mentor	T K Srikanth &. Madhav Rao
Funding source	IBM-Mental Health Project
Project title	Developing Psychology Expert Models
Brief project description	Analyzing forum posts and flagging users who may require immediate professional attention is a requirement in this work.
Mandatory skills (what skills and competencies should they already have)	NLP, RL, AI
Learning opportunities	Developing Robust model and any outcomes to be published.

Project-Code	SRIP2024-20
Project Mentor	Vinod Veera Reddy
Funding source	Non-contact cross-medium communication
Project title	Non-contact cross-medium communication, Radar Sensing Lab
Brief project description	Communication from underwater to over-the-air communication is considered. We want to establish the same using OFDM scheme.
Mandatory skills (what skills and competencies should they already have)	Modulation schemes
Learning opportunities	Strong foundation on OFDM scheme; Experience with experimentation; Signal processing

Project-Code	SRIP2024-21
Project Mentor	Dr. Sushree S. Behera
Funding source	Institute
Project title	Generative AI-Driven Text-to-Image Synthesis for STEAM Education
Brief project description	STEAM learning integrates Science, Technology, Engineering, Arts, and Mathematics and encourages students to explore, understand, and apply concepts from these disciplines in an interdisciplinary and practical manner. Generative AI can enhance STEAM learning by providing innovative tools and approaches to visualize complex concepts simply and stimulate creativity among students. Some of the key focus directions include the utilization of Generative AI for the visualization of abstract concepts, interactive learning tools, creative applications, problem-solving and project-based learning, AI-driven problem-solving and critical thinking and so on. Text-to-vision synthesis using Generative AI involves generating images or visual content based on textual descriptions. This technology combines natural language processing (NLP) with computer vision techniques to create visual representations of text inputs.
Mandatory skills (what skills and competencies should they already have)	Computer Vision (Beginner Level), Large Language Models, Python
Learning opportunities	The intern would gain proficiency in the fields of Generative AI, NLP and Computer Vision and develop skills of problem-solving in a collaborative environment.

Project-Code	SRIP2024-22
Project Mentor	T K Srikanth
Funding source	TeleMANAS
Project title	TeleMANAS - E-Health Research Center
Brief project description	Evaluation of usage, adoption, and impact of Tele MANAS tele-counselling services for mental health care
Mandatory skills (what skills and competencies should they already have)	Background in field research, public health and digital systems
Learning opportunities	Understanding advantages and challenges in use of technology for large-scale public health interventions

Project-Code	SRIP2024-23
Project Mentor	Madhav Rao & T K Srikanth
Funding source	IBM
Project title	Autism behavioural straits
Brief project description	Detect ASD behavioral through video streams
Mandatory skills (what skills and competencies should they already have)	AI, Edge computing
Learning opportunities	Working on the model and also visiting ASD schools to understand different behaviours exhibited by the ASD individuals. Possible publications.

Project-Code	SRIP2024-24
Project Mentor	Prof. Srikanth/ Ramesh Kestur
Funding source	MINRO
Project title	Telemanas, eHRC
Brief project description	https://telemanas.mohfw.gov.in/#/home Time series forecasting of Project Key Result Areas (KRAs) such as expected no of calls, Estimated patient arrivals. The time series problem will be formulated as a Large Language Model (LLM) zero shot problem.
Mandatory skills (what skills and competencies should they already have)	Time series forecasting, LLMs and ML
Learning opportunities	Ability to perform time series forecasting models using LLMs which is a paradigm shift from the conventional statistical/ ML models.

Project-Code	SRIP2024-25
Project Mentor	Prof. Srikanth/ Ramesh Kestur
Funding source	MINRO
Project title	Computational Neuro pathology lab at EHRC
Brief project description	State-of-the-art (SOTA) computer vision systems in digital pathology are trained to learn expert annotated regions of interest. This is cost prohibitive and restricts the generalizability and usability of the models. Learning directly from raw text about images is a promising alternative which leverages a much broader source of supervision. Contrastive Language Image Pretraining (CLIP) is an interesting approach for LLM-NLP based supervised learning on images. CLIP would be used to classify brain tumors by analysis of Whole Slide Images (WSI) for classifying malignant and non malignant gliomas (a type of brain tumor)
Mandatory skills (what skills and competencies should they already have)	Machine Learning, Math for Machine Learning and Advanced Visual Recognition courses.
Learning opportunities	Ability to apply build LLM based multi modal models to solve real problems.

Project-Code	SRIP2024-26
Project Mentor	Prof. Madhav Rao/ Ramesh Kestur
Funding source	CIET
Project title	AutoGrow/CIET lab
Brief project description	Intelligent Electronic Conductivity(EC) and Total Dissolved Salts(TDS) Estimation using In-House Systems • To develop an in-house sensor module to measure the total dissolved salts (TDS) and electronic conductivity (EC) in non-standard liquid solution. • Sensors currently available use the electrical resistance between 2 electrodes and estimating TDS and EC, similar has to be developed from scratch. • TDS unit: parts per million (PPM) • EC unit: micro-siemens per centimeter (us/cm) • The solution requires design and development of the electrodes, their weather resistant housing, weather resistant cabling to the interface board(a microcontroller), the microcontroller software and if possible, a production prototype of the solution. ◦ Electrodes material to be chosen considering the primary environment: acidic and ionic solutions. ◦ Weather resistance includes dust, wind, rain, natural fauna, etc. ◦ Any microcontroller can be chosen, low power solution is preferable. ◦ The software for the microcontroller primarily require the algorithm for TDS and EC estimation, serial communication exposed for interface with others. ◦ Algorithm to estimate TDS and EC can be mathematically modeled set of equations or can employ any machine learning paradigm, constrained by the microcontroller chosen. ◦ Serial communication requires at least one of UART,1-wire, SPI 3/4 wire or I2C ports exposed for use with other devices. Multiple is appreciable. ◦ Documentation of software interface required. ◦ Optional status LEDs for visual status helps. ◦ A toggle switch to power off the electrodes helps.
Mandatory skills (what skills and competencies should they already have)	Micro controllers and system design

Learning opportunities	Hands on system design skills to solve real and relatable problems.

Project-Code	SRIP2024-27
Project Mentor	Prof. Madhav Rao/ Ramesh Kestur
Funding source	CIET
Project title	Autogrow/CIET
Brief project description	Virtual AutoGrow Simulator • To develop a virtual simulation environment for AutoGrow's biological subsystem. • The simulation system should include an individual plant and a tray which houses multiple plants. • Inputs and outputs to plant and tray entities are fixed and are to be interlinked accordingly. • Control and status variables are to be exposed through software function calls appropriately. • The simulator will be used for further research purposes, primarily for applying Reinforcement Learning Mechanisms. • Hence, the interface should be friendly to the RL paradigm. • Tray Design Constraints: ◦ The tray entity contains soil medium for plants. ◦ The tray accepts nutrient mixed solution, via a wick, from a source containing said solution. ◦ Soil humidity and nutrient concentration of the soil should be simulated. • Plant Design Constraints: ◦ The plant entity can be inserted into a tray. There can be multiple plants in a single tray. ◦ The plant accepts w
Mandatory skills (what skills and competencies should they already have)	Machine Learning(ML), Monte carlo simulation,
Learning opportunities	This provides a very insightful learning to build a simulated environment for reinforcement learning and further build RL models.

Project-Code	SRIP2024-28
Project Mentor	Amit Chattopadhyay
Funding source	Institute
Project title	Persistent Homology based Matching of Large Point Clouds
Brief project description	Persistent Homology based Matching of Large Point Clouds for Applications in Robotics
Mandatory skills (what skills and competencies should they already have)	Basic Computational Topology
Learning opportunities	Understanding Persistence Diagram and its Application

Project-Code	SRIP2024-29
Project Mentor	Viswanath Gopalakrishnan
Funding source	Gridraster Inc. Sponsored Project
Project title	6D Object Pose Estimation / Few Shot Part Segmentation
Brief project description	Object 6D Pose Estimation - The objective is to improve the 6D pose estimation accuracy in BOP benchmark datasets Few Shot Part Segmentation - The objective to improve part segmentation accuracy in Imagenet Part dataset with minimal supervision. website : https://sites.google.com/view/viswanathiiitb/home
Mandatory skills (what skills and competencies should they already have)	Python, Experience with Pytorch/Tensorflow
Learning opportunities	Deeper understanding of latest approaches in Object 6D pose /Few Shot segmentation ; A potential publication

Project-Code	SRIP2024-30
Project Mentor	Madhav Rao
Funding source	CIET
Project title	IoT for Post Harvesting
Brief project description	An IOT device to find ripening of fruits and vegetables.
Mandatory skills (what skills and competencies should they already have)	Analog circuits and electronics lab
Learning opportunities	Possible publication

Project-Code	SRIP2024-31
Project Mentor	Madhav Rao
Funding source	CIET
Project title	IOT for water Body
Brief project description	Developing a IoT / Robotics system for water body
Mandatory skills (what skills and competencies should they already have)	2
Learning opportunities	Possible publication

Project-Code	SRIP2024-32
Project Mentor	Madhav Rao
Funding source	CIET
Project title	Hardware security accelerator designs
Brief project description	Design and development of polynomial multipliers for EdDSA and ECC security schemes
Mandatory skills (what skills and competencies should they already have)	VLSI Architecture Design
Learning opportunities	Possible publications and understanding of hardware security systems

Project-Code	SRIP2024-33
Project Mentor	Madhav Rao
Funding source	CIET
Project title	IOT for wearables
Brief project description	Signal processing for IOT -wearables.
Mandatory skills (what skills and competencies should they already have)	Analog Circuits and signal processing
Learning opportunities	Possible publications

Project-Code	SRIP2024-34
Project Mentor	Madhav Rao
Funding source	Nimhans collaborative project (EHRC)
Project title	Body balance device
Brief project description	A device to detect and report body sway for infants needs to be built using sensors interfaced with mobile. An app for reporting the same needa to be designed as well.
Mandatory skills (what skills and competencies should they already have)	Electronics circuits and Android app design expertise
Learning opportunities	Deaign and field level testing

Project-Code	SRIP2024-35
Project Mentor	Nanditha Rao
Funding source	Institute
Project title	Explore TinyTapeout for our Vector accelerator
Brief project description	https://tinytapeout.com/ Vector accelerators can significantly enhance throughput of convolution/matrix multiplications, which are key compute tasks for ML inference. FPGAs are best suited to accelerate such tasks due to their inherent parallel processing capabilities. We implement such designs using different 1D and 2D architectures. Vector processing unit involves multiple compute blocks and operates on multiple data elements simultaneously. We want to evaluate the throughput through an ASIC using the tinytapeout program.
Mandatory skills (what skills and competencies should they already have)	RTL coding (Verilog), Computer architecture, ASIC design basics (Synthesis, Implementation)
Learning opportunities	We will be able to tapeout an ASIC chip in a few chips, and evaluate it

Project-Code	SRIP2024-36
Project Mentor	Jaya Sreevalsan Nair
Funding source	MINRO
Project title	MINRO / EHRC / Graphics-Visualization-Computing Lab
Brief project description	This project involves developing a visualization dashboard for population survey responses. Unlike the dashboards that can be readily generated from off-the-shelf visualization tools and libraries, our proposed SurveyVis dashboard visually represents complex relationships between responses to related or "group-able" questions, spatiotemporal analysis, and correlation analysis. Related paper: https://rdcu.be/c56W3 Related tool: https://gvcl.shinyapps.io/NFHS4Vis/
Mandatory skills (what skills and competencies should they already have)	Visualization, responsive app development
Learning opportunities	Dashboard design, app development for public health stakeholders, visualization design and analysis

Project-Code	SRIP2024-37
Project Mentor	Madhav Rao
Funding source	Sony SISC
Project title	Hardware design for communication systems
Brief project description	Hardware design for demodulator blocks. Explore different tools for synthesizing high level program.
Mandatory skills (what skills and competencies should they already have)	Verilog programming, circuits design, python
Learning opportunities	Possible publications

Project-Code	SRIP2024-38
Project Mentor	Jyotsna Bapat and Madhav Rao
Funding source	Compost Management Project and CIET
Project title	IoT based Waste Management System
Brief project description	Design and development of Wastes screening using IoT device.
Mandatory skills (what skills and competencies should they already have)	Communications, Electronics Circuits and Systems
Learning opportunities	Possible Publications

Project-Code	SRIP2024-39
Project Mentor	Madhav Rao
Funding source	EHRC (MINRO)
Project title	Wearables aid Parkinson Disease Patients
Brief project description	Wearables to aid PD patients for walking, eating, and holding activities.
Mandatory skills (what skills and competencies should they already have)	Electronics Circuits
Learning opportunities	Prototype Design, Clincal Testing, and Possible Publications

Project-Code	SRIP2024-40
Project Mentor	Sujit Kumar Chakrabarti
Funding source	CTRI-DG
Project title	Automated Validation of RESTful systems
Brief project description	In this project, we will explore the automated testing of RESTful applications, exemplified by a no-code/low-code development platform among others, using modern test execution tools and test generation methodologies.
Mandatory skills (what skills and competencies should they already have)	Programming, OOP, Data structures and algorithms, Discrete math basics
Learning opportunities	Automated testing, web programming, formal methods

Project-Code	SRIP2024-41
Project Mentor	Madhav Rao
Funding source	CIET
Project title	Hardware Architecture Design
Brief project description	Hardware Architecture for Secured AI-ML accelerator design
Mandatory skills (what skills and competencies should they already have)	VLSI Architecture Design
Learning opportunities	Characterised Accelerator designs