

Strategic Applications and Research in Positioning, Navigation, and Timing (STAR-PNT) Summer Internship

An Initiative from IIT Tirupati Navavishkar I-Hub Foundation (IITNiF)

We are delighted to introduce the STARPNT Summer Internship Program at IIT Tirupati's Technology Innovation Hub. This prestigious program, entitled Strategic Applications and Research in Positioning, Navigation, and Timing, is meticulously designed to propel forward-thinking students into the forefront of geospatial technology and engineering.

The STARPNT Program invites undergraduates and postgraduates to immerse themselves in a rigorous research environment where they will explore and innovate within the fields of positioning, navigation, and timing. Our program aims to harness the sharp minds of ambitious students to pioneer solutions that address real-world challenges in navigation technology and geospatial science.

Throughout the summer, interns will have the opportunity to work alongside renowned experts and utilize cutting-edge technology to conduct strategic research and development projects. This hands-on experience not only enhances their technical skills but also prepares them for high-impact careers in academia, industry, and beyond.

Join us at IIT Tirupati for the STARPNT Program, where you will contribute to groundbreaking research while building a robust professional network and opening doors to future opportunities in technology innovation.

About STAR-PNT Summer Internship Program

Program Duration	May 15 - July 30
Eligibility Criteria	Candidates must have completed: 6 semesters of BE/Btech; 4 semesters of BSc; 2 semesters of MTech/MSc in relevant fields
Stipend	Rs 5,000 per month
Accommodation	Boarding, food, and lodging to be borne by the students; hostel subject to availability and must be requested in advance
Travel	Expenses to be borne by the students
Team Size	Maximum of 2 members
Application Requirements	Adherence to campus rules; unsatisfactory progress for two consecutive weeks may lead to termination of the internship

Note: Each student may participate in only one project.

Additional Details:

Internship Structure: Teams will engage in projects ranging from GIS mapping to advanced navigational tech. These projects aim to enhance technical skills and encourage real-world application and prototyping.

Future Opportunities: Post-internship, there is potential for continuation of projects as capstone assignments with startups and industry, which are paid positions. This enhances resumes and professional networks.

Benefits of Specializing in PNT: Specializing in Positioning and Precision Technologies opens up opportunities in diverse fields such as aerospace, automotive industries, and defense. Skills in GIS, remote sensing, and GNSS/IRNSS are highly valued.

Join Us:

This summer, IIT Tirupati invites you to a journey of innovation and exploration in the world of technology. Embark on projects that challenge your understanding and contribute to technological advancements. Apply today and be part of a summer that could define your future!

[Application LINK](#)

Domain Interest

Attribute	Details
Project 1: Indoor Navigation System	
Scope	Develop a prototype for indoor navigation using IRNSS.
Objectives	Provide accurate indoor positioning where GNSS is unavailable.
Methodology	Combine IRNSS, Wi-Fi, Bluetooth, and sensor data.
Technologies & Tools	IRNSS, Wi-Fi, Bluetooth, sensors, app development platforms.
Timeline	11 weeks
Outcomes	Indoor navigation app demonstrating effective positioning within buildings.
Project 2: Augmented Reality for Urban Planning	
Scope	Create an AR application using GIS for urban planning.
Objectives	Develop an interactive tool for visualizing urban planning data.
Methodology	Use ARKit/ARCore with GIS data.
Technologies & Tools	ARKit/ARCore, GIS, Unity or Unreal, C#/JavaScript.
Timeline	11 weeks
Outcomes	Functional AR prototype for urban planning visualization.
Project 3: GIS Dashboard for Disaster Management	
Scope	Develop a GIS dashboard for disaster-related data.
Objectives	Aid quick decision-making in disaster response.
Methodology	Design an interactive dashboard displaying various data types.
Technologies & Tools	JavaScript, Python, HTML/CSS, GIS software.
Timeline	11 weeks
Outcomes	GIS dashboard for effective disaster management.
Project 4: Radar Tracking System Prototype	
Scope	Develop a prototype for a radar tracking system.
Objectives	Create a reliable tracking system for monitoring objects.

Methodology	Design radar data processing algorithms and interface.
Technologies & Tools	Radar technology, signal processing, Python/MATLAB.
Timeline	11 weeks
Outcomes	Radar tracking system capable of detecting and monitoring objects accurately.
Project 5: VR Navigation System for Training	
Scope	Build a VR system for navigation training.
Objectives	Help users practice navigation skills in a virtual setting.
Methodology	Use VR to create realistic scenarios for navigation; develop intuitive controls.
Technologies & Tools	VR headsets, Unity or Unreal, C++/C#.
Timeline	11 weeks
Outcomes	VR-based training system providing realistic navigation experiences.
Project 6: Smart Parking System Using GIS	
Scope	Design a GIS-based system to monitor and manage parking.
Objectives	Reduce time searching for parking via real-time data.
Methodology	Integrate GIS with IoT sensors.
Technologies & Tools	IoT sensors, GIS software, mobile apps.
Timeline	11 weeks
Outcomes	App showing real-time parking spot availability.
Project 7: Wildlife Tracking System	
Scope	Create a system for tracking wildlife using GPS and GIS.
Objectives	Monitor wildlife movements and behaviors.
Methodology	Develop GPS collars and integrate data with GIS.
Technologies & Tools	GPS devices, GIS platforms, data analytics.
Timeline	11 weeks
Outcomes	System providing real-time data on wildlife locations and movements.

Project 8: Flood Risk Mapping Using Remote Sensing	
Scope	Develop a flood risk assessment tool using remote sensing.
Objectives	Enhance preparedness for floods with accurate risk maps.
Methodology	Analyze remote sensing data for flood-prone area identification.
Technologies & Tools	Remote sensing software, GIS tools.
Timeline	11 weeks
Outcomes	Map showing flood risks in selected regions.
Project 9: Wearable Health Monitoring System	
Scope	Develop a GNSS-based wearable for monitoring health.
Objectives	Provide a safety net for individuals via monitoring.
Methodology	Integrate GNSS with health sensors in a wearable device.
Technologies & Tools	GNSS modules, sensors, wearables, apps.
Timeline	11 weeks
Outcomes	Wearable device tracking location and vital signs, with emergency alerts.
Project 10: 3D City Modeling Using GIS and LiDAR	
Scope	Create 3D urban models using GIS and LiDAR.
Objectives	Aid urban planning with accurate 3D models.
Methodology	Process LiDAR data to construct 3D models integrated with GIS.
Technologies & Tools	LiDAR, GIS software, 3D modeling tools.
Timeline	11 weeks
Outcomes	Detailed 3D models of urban areas for planning purposes.
Project 11: Agricultural Yield Prediction Tool Using GIS	
Scope	Develop a tool that predicts agricultural yields using GIS data and machine learning.
Objectives	Improve crop management and forecasting.
Methodology	Analyze historical GIS data and crop yields with machine learning to predict future yields.

Technologies & Tools	GIS software, Python, machine learning frameworks.
Timeline	11 weeks
Outcomes	Predictive tool for farmers and agronomists to estimate future crop yields.
Project 12: Drone-Based GIS Data Collection System	
Scope	Design a system using drones to collect GIS data for mapping hard-to-reach areas.
Objectives	Enhance the accuracy and efficiency of GIS data collection.
Methodology	Use drones equipped with cameras and sensors to gather geographic data.
Technologies & Tools	Drones, camera and sensor technologies, GIS software.
Timeline	11 weeks
Outcomes	Drone system capable of collecting detailed geographic data.
Project 13: Real-Time Traffic Management System	
Scope	Develop a real-time traffic management system using GIS and live data feeds.
Objectives	Optimize traffic flow and reduce congestion in urban areas.
Methodology	Integrate live traffic data with a GIS system to manage and direct traffic flow dynamically.
Technologies & Tools	Traffic cameras and sensors, GIS platforms, data analytics software.
Timeline	11 weeks
Outcomes	System providing real-time traffic updates and suggestions for route optimizations.
Project 14: Heritage Site Monitoring Using Remote Sensing	
Scope	Utilize remote sensing to monitor and preserve cultural heritage sites.
Objectives	Detect and analyze changes in heritage sites for preservation efforts.
Methodology	Use satellite imagery and aerial photography to monitor heritage sites over time.
Technologies & Tools	Remote sensing tools, image processing software, GIS.
Timeline	11 weeks

Outcomes	Analysis system that can alert conservationists to potential damage or changes in heritage sites.
Project 15: Sea Level Rise Visualization Tool	
Scope	Develop a visualization tool that models potential sea level rise scenarios using GIS data.
Objectives	Aid coastal communities in planning for future sea level changes.
Methodology	Integrate climate models with GIS to visualize rising sea levels under various scenarios.
Technologies & Tools	GIS software, climate modeling tools, visualization software.
Timeline	11 weeks
Outcomes	Tool that visually represents how rising sea levels could impact specific coastal areas.
Project 16: Integrated Public Transport System Using GIS	
Scope	Create an integrated system for managing public transport using GIS data.
Objectives	Improve the efficiency and accessibility of public transportation.
Methodology	Develop a GIS-based platform that integrates data from various public transport modes.
Technologies & Tools	GIS platforms, database management systems, user interface design.
Timeline	11 weeks
Outcomes	Integrated platform that provides real-time information on public transport options and schedules.
Project 17: GIS-Based Water Quality Monitoring System	
Scope	Design a system to monitor water quality using GIS and IoT sensors.
Objectives	Provide real-time data on water quality to government and public agencies.
Methodology	Integrate water quality sensors with a GIS system to monitor and analyze water data.
Technologies & Tools	IoT sensors, GIS software, data analytics platforms.
Timeline	11 weeks

Outcomes	System that constantly monitors water quality and provides actionable insights.
Project 18: Urban Heat Island Effect Analysis Tool	
Scope	Develop a tool to analyze the urban heat island effect using remote sensing and GIS.
Objectives	Understand and mitigate the heat island effect in urban areas.
Methodology	Use remote sensing data to map temperature variations and integrate with GIS for analysis.
Technologies & Tools	Remote sensing software, GIS tools, environmental simulation software.
Timeline	11 weeks
Outcomes	Detailed analysis tool that helps urban planners understand and address heat concentration areas.
Project 19: Navigation System for Visually Impaired Using GNSS	
Scope	Develop a navigation aid for visually impaired individuals using GNSS and audio feedback.
Objectives	Assist visually impaired people in navigating urban environments independently.
Methodology	Integrate GNSS with a mobile application that provides audio directions and feedback.
Technologies & Tools	GNSS, mobile development platforms, audio processing.
Timeline	11 weeks
Outcomes	Mobile app that helps visually impaired users navigate with ease using audio cues.
Project 20: Automated GIS Data Cleansing Tool	
Scope	Develop a tool that automates the process of cleaning and preparing GIS data.
Objectives	Enhance the efficiency and accuracy of GIS data analysis.
Methodology	Design algorithms that automatically detect and correct errors in GIS datasets.

Technologies & Tools	Python, GIS software, data cleansing libraries.
Timeline	11 weeks
Outcomes	Software tool that streamlines the process of preparing GIS data for analysis.
Project 21: Disaster Response Drone System	
Scope	Create a drone system designed for rapid deployment in disaster zones to gather real-time data.
Objectives	Enhance disaster response efforts with immediate aerial data collection.
Methodology	Equip drones with cameras and sensors; develop software for real-time data transmission to rescue teams.
Technologies & Tools	Drones, real-time video processing software, GIS integration.
Timeline	11 weeks
Outcomes	Drone system capable of providing immediate visual and sensor data to facilitate rapid response in disaster scenarios.
Project 22: Smart City Lighting System Using GIS	
Scope	Implement a smart lighting system that uses GIS data to optimize street light usage based on traffic and pedestrian patterns.
Objectives	Reduce energy consumption and enhance safety in urban areas.
Methodology	Integrate traffic and pedestrian data with a GIS system to control lighting dynamically.
Technologies & Tools	IoT sensors, GIS platforms, smart lighting technology.
Timeline	11 weeks
Outcomes	Smart lighting system that adjusts based on real-time data, reducing energy costs and improving urban safety.
Project 23: GIS-Enhanced Agricultural Resource Management	
Scope	Design a system that uses GIS to manage agricultural resources more efficiently.
Objectives	Optimize resource allocation in farming to increase yield and reduce waste.

Methodology	Develop a GIS-based decision support system that integrates data on soil quality, weather, crop health, and water availability.
Technologies & Tools	GIS software, remote sensing, data analytics platforms.
Timeline	11 weeks
Outcomes	Management system that helps farmers make informed decisions about resource use, improving productivity and sustainability.
Project 24: Urban Air Quality Monitoring Using GIS	
Scope	Build a system for monitoring and reporting urban air quality using GIS and real-time sensor data.
Objectives	Provide public access to real-time air quality information and assist in environmental management.
Methodology	Integrate air quality sensors with a GIS system to track and display pollution levels.
Technologies & Tools	Air quality sensors, GIS platforms, web development tools.
Timeline	11 weeks
Outcomes	Online GIS-based system that provides real-time air quality updates and health advisories.
Project 25: Interactive GIS-Based Tourist Information System	
Scope	Develop an interactive tourist guide that uses GIS data to provide information on attractions, routes, and services.
Objectives	Enhance the tourist experience with accessible and detailed geographic information.
Methodology	Create a mobile application that integrates GIS data with multimedia content about tourist spots.
Technologies & Tools	Mobile app development platforms, GIS software, content management systems.
Timeline	11 weeks
Outcomes	User-friendly mobile app that offers tourists real-time information, navigation, and services based on their location.

Project 26: Deforestation Monitoring Dashboard	
Scope	Develop a GEE dashboard for real-time deforestation watch.
Objectives	Enable quick response to illegal deforestation activities.
Methodology	Process satellite images to detect changes in forest cover using GEE.
Technologies & Tools	Google Earth Engine, JavaScript, satellite imagery.
Timeline	11 weeks
Outcomes	Dashboard providing alerts and visuals of deforestation areas.
Project 27: Urban Expansion and Land Use Change Dashboard	
Scope	Track urban growth and land use change via GEE dashboard.
Objectives	Understand urban expansion patterns for better planning.
Methodology	Analyze satellite imagery for urban area mapping and land use changes.
Technologies & Tools	Google Earth Engine, JavaScript, remote sensing data.
Timeline	11 weeks
Outcomes	Interactive dashboard showing urban growth and land use changes.
Project 28: Water Resources Management Dashboard	
Scope	Monitor water bodies using a GEE dashboard.
Objectives	Manage water resources effectively for government and NGOs.
Methodology	Analyze water quality indicators and levels using satellite and sensor data.
Technologies & Tools	Google Earth Engine, JavaScript, hydrological data.
Timeline	11 weeks
Outcomes	Dashboard offering updated information on water quality and availability.
Project 29: Climate Change Impact Visualization Dashboard	
Scope	Visualize the impacts of climate change, such as rising sea levels, using a GEE dashboard.
Objectives	Inform about climate change effects locally and globally.
Methodology	Integrate climate data in GEE to create interactive maps and graphs.

Technologies & Tools	Google Earth Engine, JavaScript, climate datasets.
Timeline	11 weeks
Outcomes	Dynamic dashboard showing climate change trends and projections.
Project 30: Agricultural Productivity and Soil Health Dashboard	
Scope	Assess agriculture and soil health via a GEE dashboard.
Objectives	Assist in decision-making for farming based on real-time data.
Methodology	Analyze crop vitality and soil conditions using satellite imagery and ground truth data.
Technologies & Tools	Google Earth Engine, JavaScript, agricultural and soil databases.
Timeline	11 weeks
Outcomes	Interactive dashboard with insights into crop conditions and soil health.