Summer Internships Topics 2025

This year, INESC TEC is offering you **77 internship topics**! The topics are organized into the following scientific domains:

- **AI - Artificial Intelligence**
- **BIO - Bioengineering**
- **COM - Communications**
- **CSE - Computer Science and Engineering**
- **PES - Power and Energy Systems**
- **ROB - Robotics**
- **SEM – Systems Engineering and Management**

Choose **up to 3 topics that most interest you** and fill in [**here**] the application form indicating your order of preference. On the form, you should also **indicate the keywords that best characterize your research preferences**. If none of the topics you have chosen are available, you may be offered a topic within the same scientific area and aligned with your interests.

Each topic is identified by a reference, for example, **S25-AI01.** Use these references to fill in the application form.

If you want to develop a different theme or if you don't particularly identify with any of the proposed topics, **in the motivation text available on the form you** should **describe the research themes you are most interested in pursuing.** In this case, you should put the generic reference of the scientific field you wish to apply for in the “options” section, for example, **S25-ROB00.**

Described in the section below, in addition to the title of the topic and a brief description of what is required, you will find the names of the supervisors, the research centre where you will be working, the location of the internship and whether the internship will be hybrid or in-person.

This year, **some internships will give you the chance to work on real challenges proposed by INESC TEC's partner institutions**. You'll have the chance to join researchers as well as professionals in the field and, in some cases, even spend some time in the organisations themselves. A unique way to understand how science and technology solve everyday problems. **These internships are identified in the following list.**

Artificial Intelligence

S25-AI01 Conditional Anatomically-Accurate 3D Synthetic Mask Generation

S25-AI02 Enhancing automatic reading and analysis of sleep PDF reports

S25-AI03 Large Language Models and eXplainable AI for Clinical Decision Support Systems

S25-AI04 VeritasDepressionSense - Responsible AI-Driven Digital Phenotyping for Predicting Depression

S25-AI05 Bias on the Variety: Do LLMs talk European Portuguese?

S25-AI06 Virtual Worlds for Safer Factories

S25-AI07 Development of a reinforcement learning algorithm for decision making

S25-AI08 Creative Diffusion: Exploring Logo Design with Diffusion Models

S25-AI09 Mitigating confirmation bias in Large Language Models

S25-AI10 Exploring Generative AI for Visual Content

S25-AI11 Unsupervised Active Learning: Which Frames are Most Important?

S25-AI12 Emergent Recommendation Systems: Combining Agent-Based Models with LLM-Powered Agents

S25-AI13 Multi-Sensor Fusion for Blind Spot Monitoring in Motorcycles Using Vision and Radar

S25-AI14 Towards Interpretable/Explainable Deep Learning Models for Face Biometrics

S25-AI15 Hamiltonian Monte Carlo for the generation of adversarial examples

S25-AI16 AI System for Classifying Structural Pile Conditions

S25-AI00 Generic Topic – Artificial Intelligence

Bioengineering

S25-BIO01 Intelligent Photonics Point-of-Care for Human and Veterinary medicine

S25-BIO02 Genome-Scale Digital Twins for Precision Agriculture

S25-BIO03 Intelligent Photonics Point-of-Care for Human and Veterinary medicine

S25-BIO04 Precision Fertilization Systems

S25-BIO05 Plant Wearables and Systems Biology for Precision agriculture

S25-BIO00 Generic Topic – Bioengineering

Communications

S25-COM01 Rate Adaptation in a Predictive Flying Network Environment

S25-COM02 Experimental Evaluation of Drone Energy Consumption in Flying Networks

S25-COM03 Building and Testing a Reconfigurable Antenna with 3D-Printed Sustainable Materials

S25-COM04 Human Pose Estimation from WiFi Signals with Video Ground Truth

S25-COM05 Edge AI Acceleration: Simulating Neuromorphic Circuits for Energy-Efficient Sensing

S25-COM06 Exploring Wireless Communication and Sensing for UAVs and Aerial Systems

S25-COM07 Designing CubeSat Subsystems: Communications and Sensing Payload

S25-COM08 Visual Simulation of Radio Signal Propagation with Reconfigurable Intelligent Surfaces (RIS)

S25-COM09 Simulating Satellite Communication Links with Ground Stations

S25-COM00 Generic Topic – Communications

Computer Science and Engineering

S25-CSE01 Robotair Backend Development Summer Internship

S25-CSE02 Robotair Frontend Development Summer Internship

S25-CSE03 Robotair Linux and Containerization Internship

S25-CSE04 Robotair MCP Server Development for LLM interfacing Internship

S25-CSE05 Development of a Relational Database for Robot Component Management

S25-CSE06 Interactive Audio Story-Telling

S25-CSE07 Customization and Simulation of a RISC-V Based System-on-Chip

S25-CSE08 AI Acceleration in a High-Level Synthesizable RISC-V SoC

S25-CSE09 Designing a Cache Subsystem for a High-Level Synthesizable RISC-V SoC

S25-CSE10 Extending ONNX-to-DFG Conversion Tool for AI Acceleration

S25-CSE11 CMOS OPAMP Reference Designs

S25-CSE12 Physical Design of Electronic Circuits: From Schematic to Silicon

S25-CSE13 Design of Integrated-Circuit Voltage References

S25-CSE14 Design of Standard Cells for Microelectronics

S25-CSE15 AI-Enabled UAV Swarm Management for Joint Radar-Communication in Crisis and Natural Emergency Scenarios

S25-CSE16 Use of the European Digital Identity Wallet (EUDI Wallet) for Secure Access to Confidential Information **[Devise Futures]**

S25-CSE17 How can behavioral cybersecurity changes within the organization be detected? **[INCM]**

S25-CSE18 How to define an effective process for using offensive (cybersecurity) Red Team tactics in an organization? **[INCM]**

S25-CSE19 WalkingPAD: Certification of an app for supervised home-based exercise therapy

S25-CSE20 AI in Mental Health - Algorithms' Optimization for Depression Screening in Human-Computer Interactions

S25-CSE21 Enhancing TypeScript Code Generation for Java APIs

S25-CSE22 Building a Modern Web Demo for a C/C++ Source-to-Source Compiler

S25-CSE23 Presence and Immersion Experiments in VR and 360 videos

S25-CSE24 Blue energy XR Immersive dashboard visualization tool

S25-CSE25 Virtual Mirror – Therapeutic Dialogues with the “Other Self”

S25-CSE26 Augmented Insights: Developing a Mobile AR Solution for Offshore Wind Farm Monitoring

S25-CSE27 Augmented Reality Application for Monitoring Offshore Wind Farms with Apple Vision Pro

S25-CSE28 Dynamic Dashboard Generation Platform - backend

S25-CSE29 Dynamic Dashboard Generation Platform - frontend

S25-CSE30 Inven!RA learning activities provider frontend

S25-CSE31 ARNavAI – Intelligent Indoor Navigation System with Augmented Reality

S25-CSE32 DataVerseXR: Ambiente Colaborativo de Realidade Aumentada para Visualização e Exploração de Dados

S25-CSE33 Immersive Training Platform using XR

S25-CSE34 Game With A Purpose (GWAP) implementation to explore the most motivating game elements for each player type according to Bartle's Taxonomy

S25-CSE35 State of the Ark: software for animal adoption

S25-CSE36 Florensics: an intelligent forest fire prevention system

S25-CSE37 Artificial Intelligence for Depression Screening

S25-CSE00 Generic Topic – Computer Science and Engineering

Power and Energy Systems

S25-PES01 Smart Control, Protection, and Automation of Hybrid AC/DC Microgrids

S25-PES02 SynEPort: A synthetic data generator for highly electrified ports

S25-PES00 Generic Topics – Power and Energy Systems

Robotics

S25-ROB01 Innovative Aircraft Design and Advanced UI for Multi-Aircraft Monitoring

S25-ROB02 UAV power converter for tethered energy transfer

S25-ROB03 Underwater Structural Damage Measurement: Integration of Optical and Sonar Data

S25-ROB04 Robotair Python Client Application Internship

S25-ROB05 Spatio-Temporal Modelling and Mapping of Biophysical Crop Attributes Based on Earth Observation Satellite Data from a Precision Agriculture Perspective

S25-ROB06 Controlled winch for tethered UAV

S25-ROB00 Generic Topic – Robotics

Systems Engineering and Management

S25-SEM01 Last-Mile Parcel Delivery: Identifying Inefficiencies to Promote Sustainability

S25-SEM02 NIS2 Compliance for Small and Medium-Sized Enterprises (SMEs) **[Devise Futures]**

S25-SEM00 Generic Topic – Systems Engineering and Management

Artificial Intelligence

S25-AI01

Conditional Anatomically-Accurate 3D Synthetic Mask Generation

As medical imaging advances, so does the need for realistic, case-specific synthetic data to address dataset imbalances and train AI models, particularly in lung cancer research. Generative AI (GenAI) models can now produce 3D MRI and CT scans conditioned on tumor characteristics, improving data relevance. Models using segmentation masks perform best, as they ensure anatomical accuracy. However, generating tailored masks remains a challenge. This work proposes an anatomically accurate generative framework to create 3D segmentation masks from user inputs, which will enhance a benchmarked mask-based GenAI model, improving realism and giving specialists more control over synthetic data generation.

Research Centre: CTM - Telecommunications and Multimedia
Internship Location: Porto
Type of Internship: Hybrid
Supervisors: Pedro Fernandes Sousa and Hélder Oliveira

S25-AI02

Enhancing automatic reading and analysis of sleep PDF reports

This internship aims to validate and enhance a pipeline to extract and analyze information from sleep PDF reports efficiently and accurately, as sleep reports contain valuable data regarding sleep patterns, duration, and potential sleep disorders. By automating the process of extracting and analyzing, we intend to eliminate this time-consuming and prone to errors in the daily routine of healthcare professionals.
The student will focus on information extraction, natural language processing, layout analysis, and application design.

Research Centre: CTM - Telecommunications and Multimedia
Internship Location: Porto
Type of Internship: Hybrid
Supervisors: Daniela Ferreira-Santos and Nuno Ricardo Guimarães

S25-AI03

Large Language Models and eXplainable AI for Clinical Decision Support Systems

Large Language Models (LLMs), including BERT and GPT, are being integrated into Clinical Decision Support Systems (CDSSs) at an increasing rate, thereby presenting novel opportunities for the enhancement of healthcare. However, there is a paucity of practical exploration of Explainable Artificial Intelligence (XAI) methods in this domain. This proposal invites interns to develop and prototype techniques that integrate LLMs with XAI to enhance interpretability, clinical trust, and responsible use in CDSSs. The internship will centre on the development of proof-of-concept tools utilizing authentic or synthetic clinical data to illustrate how LLM outputs can be rendered transparent and aligned with medical standards. The goal is to foster the development of safe, effective, and equitable AI applications for real-world clinical environments.

Research Centre: HumanISE - Human-Centred Computing and Information Science
Internship Location: Porto ou Vila Real

Type of Internship: Hybrid
Supervisors: Dennis Paulino, André Netto and Hugo Paredes

S25-AI04

VeritasDepressionSense - Responsible AI-Driven Digital Phenotyping for Predicting Depression

In the realm of artificial intelligence, particularly in the context of mental health such as depression, significant opportunities arise for the passive and continuous capture of human behavior, such as digital phenotyping. Empirical evaluations of these approaches have demonstrated their effectiveness in assisting healthcare professionals in decision-making and improving data quality. However, these opportunities are accompanied by significant challenges, particularly in the context of mental illness diagnoses, where the difficulty of explaining diagnoses is significant. The objective of the VeritasDepressionSense project is to propose a digital phenotyping solution combined with responsible artificial intelligence, to ensure that the signaling of potential cases of depression is more transparent, validated and ethically compatible.

Research Centre: HumanISE - Human-Centred Computing and Information Science
Internship Location: Porto or Vila Real
Type of Internship: Hybrid
Supervisors: Dennis Paulino, André Netto and Hugo Paredes

S25-AI05

Bias on the Variety: Do LLMs talk European Portuguese?

Large Language Models (LLMs) have reshaped social perceptions of Artificial Intelligence, with their capabilities increasingly driving automation across sectors. However, Portuguese is frequently treated as a single entity, overlooking distinctions between its varieties. This reinforces biases toward dominant forms, such as Brazilian Portuguese. Thus, this project aims to assess the ability of open-source LLMs to generate text in European Portuguese. Leveraging previous research by our NLP group, we will translate datasets into European Portuguese and analyse the generated outputs using a Portuguese Variety Identifier.

Research Centre: LIAAD - Artificial Intelligence and Decision Support
Internship Location: Porto
Type of Internship: Hybrid
Supervisors: Nuno Ricardo Guimarães

S25-AI06

Virtual Worlds for Safer Factories

Imagine factories where intelligent systems can monitor operations and instantly spot potential problems, preventing accidents and costly shutdowns before they happen. We are exploring how new AI models, capable of understanding both language and visuals (like video) can be leveraged to monitor complex machinery.
This project dives into the intersection of simulation and artificial intelligence. Get hands-on experience creating realistic virtual industrial environments and using them to generate the crucial video data needed to test and ultimately train these systems. Your work will be a vital first step in building systems that make industries smarter, safer, and more efficient.
Workplan:
Design: Brainstorm and blueprint simple, realistic industrial tasks (think robot arms, assembly lines) to recreate in a virtual simulation environment.

Build: Use simulation software to construct your virtual factory floor and bring your designed tasks to life.
Capture and Test: Test VLM on capturing data and performing preliminary analysis.
Organise and document: Organize data created and document your setup and results, providing the essential building blocks.

Research Centre: CTM - Telecommunications and Multimedia
Internship Location: Porto
Type of Internship: To be defined
Supervisors: Nuno Pereira and Paula Viana

S25-AI07

Development of a reinforcement learning algorithm for decision making

Reinforcement Learning algorithms are capable of learning to make optimal decisions in complex scenarios through interaction with the environment, adjusting their actions to maximize rewards over time.
This proposal arises from the growing relevance of Artificial Intelligence (AI) in various areas, where algorithms capable of learning and making decisions autonomously have broad potential in applications such as robotics, games, recommendation systems and process optimization.
The project is justified by the need to explore and improve Reinforcement Learning algorithms in order to create more efficient and adaptable solutions to sequential decision-making problems.
The relevance of this work lies in its contribution to advancing research in Software Engineering and AI, promoting technological innovation and deepening knowledge of modern Machine Learning techniques. In addition, the project will provide students with the opportunity to apply theoretical concepts in practice, developing essential skills for working in areas of high demand in the world of work.

Research Centre: HumanISE - Human-Centred Computing and Information Science
Internship Location: Porto or Vila Real
Type of Internship: Hybrid
Supervisors: Dennis Paulino, André Netto and Hugo Paredes

S25-AI08

Creative Diffusion: Exploring Logo Design with Diffusion Models

Diffusion models have gained increasing popularity in creative image generation as dynamic tools that blend artistic ingenuity with computational precision. These types of generative models learn by progressively adding noise to a dataset and then learning to reverse this process, creating a diffusion process that obtains images that follow a target distribution from random noise. Whether applied to image generation, logo design, or other visual mediums, diffusion models offer a novel approach that encourages experimentation in the creative process. In order to leverage existing pre-trained implementations of diffusion models, we can employ prompt engineering, a technique that involves augmenting a large pre-trained model with task-specific hints, known as prompts, to adapt the model to new tasks.

Research Centre: CTM - Telecommunications and Multimedia
Internship Location: Porto
Type of Internship: Hybrid
Supervisors: Ana Filipa Sequeira

S25-AI09

Mitigating confirmation bias in Large Language Models

Large Language Models (LLMs) have revolutionized human-computer interaction (HCI) and are widely used in content generation, virtual assistants and recommendation systems. However, there is evidence that LLMs exhibit confirmation bias, responding in a way that reinforces beliefs or assumptions embedded in the users' own questions. With the increasing integration of LLMs in software engineering and decision-making, mitigating confirmation bias in their responses is necessary to ensure the neutrality and reliability of these models. Investigating the mitigation of confirmation bias in LLMs contributes to the development of more ethical and unbiased systems, positively impacting areas such as health, politics and economics, among others.

Research Centre: HumanISE - Human-Centred Computing and Information Science
Internship Location: Porto or Vila Real
Type of Internship: Hybrid
Supervisors: Rafael Ris-Ala, Gonçalo Gonçaves, Artur Rocha and Hugo Paredes

S25-AI10

Exploring Generative AI for Visual Content

Generative AI models are rapidly evolving and are increasingly being used for creative, educational, and media applications. This internship focuses on exploring existing models for image and video generation, identifying suitable tools, and experimenting with various generation tasks. The goal is to gain familiarity with how these models operate, understand the types of input and control mechanisms they support to produce content that is richer and more aligned with the user's intent.

Research Centre: CTM - Telecommunications and Multimedia
Internship Location: Porto
Type of Internship: Hybrid
Supervisors: Christina Mastralexi and Pedro Carvalho

S25-AI11

Unsupervised Active Learning: Which Frames are Most Important?

Collecting video data is often easy, but annotating data is much harder. Active learning consists of strategies to decide what data to annotate, but it assumes we already start with some annotated data. In this internship, we assume we have videos where no frame is yet annotated and we want to choose which frames to ask for annotation. We already have some conceptual algorithms and implementations (based on distance metrics and clustering between frames) that we want to apply to a couple of datasets. One of the datasets is on pig activity recognition in collaboration with Coimbra Polytechnic. This internship has the possibility to produce a paper.

Research Centre: CTM - Telecommunications and Multimedia
Internship Location: Porto
Type of Internship: Hybrid
Supervisors: Ricardo Cruz

S25-AI12

Emergent Recommendation Systems: Combining Agent-Based Models with LLM-Powered Agents

This internship proposes a novel approach to product recommendation by combining agent-based modelling (ABM) with large language models (LLMs). Consumer agents interact in a simulated market, making purchase decisions influenced by preferences, social networks, and LLM-powered reasoning. Using tools like Autogen (An event-driven programming framework for building scalable multi-agent AI systems), agents can exchange recommendations, adapt based on trends, and engage in conversational behaviour. The system models emergent phenomena such as brand popularity, influence cascades, and market shifts. The project will develop a hybrid simulation framework, integrate LLMs for preference generation and dialogue, and evaluate the impact on recommendation diversity, satisfaction, and visibility. This research bridges symbolic agent modelling and generative AI to explore next-generation recommender systems.

Research Centre: LIAAD - Artificial Intelligence and Decision Support
Internship Location: Porto
Type of Internship: Hybrid
Supervisors: Pedro Campos and Bruno Veloso

S25-AI13

Multi-Sensor Fusion for Blind Spot Monitoring in Motorcycles Using Vision and Radar

Motorcycles are particularly vulnerable in traffic due to their reduced size and higher exposure to risk, making blind spot monitoring a critical safety feature. This internship aims to develop a blind spot monitoring system for motorcycles by leveraging the complementary characteristics of radar and vision sensors. While radar offers robust distance and velocity estimation under all weather and lighting conditions, vision systems provide rich contextual and semantic understanding of the environment. By fusing these modalities, the project will explore methods for achieving more accurate, reliable, and real-time detection of surrounding vehicles, even in challenging urban and highway settings. Key tasks include sensor calibration, multi-modal data alignment, and the design of fusion algorithms capable of exploiting the temporal and spatial synergies of radar and camera data. The final goal is a prototype system that enhances rider awareness and contributes to safer motorcycle navigation.

Research Centre: CTM - Telecommunications and Multimedia
Internship Location: Porto
Type of Internship: Hybrid
Supervisors: Francisco Manuel Ribeiro

S25-AI14

Towards Interpretable/Explainable Deep Learning Models for Face Biometrics

The information learnt by face recognition systems that rely on deep learning models is not transparent to humans. These highly complex systems learn correlations from non-causal events and infer potential causal relations. Hence, some of these systems, despite having extraordinary performance, are weak against adversarial attacks or unseen samples. For instance, these systems can be biased against gender or biases. Thus, the main goal of the student will be to introduce domain and semantic information in the model's learning

process. For instance, eye colour and face symmetry are usually useful, but not necessarily leveraged by current models.
For this task, the student will learn how to work with PyTorch and other machine learning frameworks, be acquainted with the literature on explainable artificial intelligence and face recognition. And also learn how to properly conduct scientific research.

Research Centre: CTM - Telecommunications and Multimedia
Internship Location: Porto
Type of Internship: Hybrid
Supervisors: Ana Filipa Sequeira

S25-AI15

Hamiltonian Monte Carlo for the generation of adversarial examples

One common problem in the field of Adversarial Machine Learning is the creation of adversarial examples, which are carefully crafted perturbations to input data that cause a model to make incorrect predictions while appearing benign to a human observer. White-box Techniques such as Fast Gradient Sign Method (FGSM), Projected Gradient Descent (PGD), and Carlini & Wagner (C&W) attacks generate adversarial examples by solving an optimization problem to maximize the model's loss function while adhering to a perturbation constraint. Their efficient exploration of the search space relies heavily on the information obtained by the gradients of the model with respect to the input.
In contrast to purely optimization-based approaches, Hamiltonian Monte Carlo (HMC) extends this paradigm into a sampling problem, combining ideas from physics and Bayesian statistics to explore complex, high-dimensional spaces more effectively. By simulating Hamiltonian dynamics, HMC allows for the generation of samples from regions of high posterior probability in a more structured and informed manner compared to standard random sampling or even gradient descent.

Research Centre: CTM - Telecommunications and Multimedia
Internship Location: Porto
Type of Internship: Hybrid
Supervisors: Ana Filipa Sequeira

S25-AI16

AI System for Classifying Structural Pile Conditions

Remotely operated vehicles (ROV) are increasingly used in underwater tasks, particularly to inspect submerged structures such as port infrastructures. These systems contribute to safety and sustainability maintenance activities. Early detection of structural damage is, therefore, crucial. Among the most vulnerable elements are the piles, which face several challenges, such as corrosion and biofouling. Thus, the goal is to enable the automatic detection of the condition level of a pile (through Artificial Intelligence), allowing classification into three categories: standard, requiring intervention, and damaged. This will be achieved using AI tools in combination with an ROV for image acquisition in real-world underwater scenarios.

Research Centre: CRAS - Robotics and Autonomous Systems
Internship Location: Porto
Type of Internship: In-person
Supervisors: Alexandra Nunes, Ana Rita Gaspar and Aníbal Matos

S25-AI00
Generic Topic – Artificial Intelligence
With a significant impact on many industries, including healthcare, transportation and manufacturing, Artificial Intelligence is also playing an increasingly important role in our everyday lives, from virtual assistants to online recommendation systems.

About Artificial Intelligence at INESC TEC: more information here

Bioengineering

S25-BIO01
Intelligent Photonics Point-of-Care for Human and Veterinary medicine
Development of new materials, optics, and biochip sensors based on the new concept of 'information specificity,' breaking with the traditional approach of 'bio/chemical specificity'. New materials can separate or concentrate molecules without the need for reactions, allowing us to design optical systems that once coupled with our information processing and AI, can identify and quantify molecules at low concentrations. We want to establish partnerships with the best research groups in Europe, allowing us to be at the forefront of reagentless point-of-care research and development in both human and veterinary medicine. We have identified key researchers from these leading institutions.

Research Centre: CRIIS - Centre for Robotics in Industry and Intelligent Systems
Internship Location: Porto
Type of Internship: Hybrid
Supervisors: Rui Martins, Nelson Machado and Filipe Silva

S25-BIO02
Genome-Scale Digital Twins for Precision Agriculture
Genome-scale Digital Twins lie at the heart of the latest in vivo molecular diagnosis in precision agriculture developed at INESC TEC, as a consequence of the projects MetBots, OmicBots, and Phenobots. It aims to make an inferential diagnosis given the metabolic quantification from robot platform spectroscopy sensors that measure the composition of soil, fertilizer, fruits, and leaves, which are integrated with climate and water to serve as input in the genome-scale metabolism of plants, simulating in detail the physiological response of each plant organ (e.g., roots, stem, leaves, and fruits) using the Finite Element Method and Computational Fluid Dynamics.

Research Centre: CRIIS - Centre for Robotics in Industry and Intelligent Systems
Internship Location: Porto
Type of Internship: Hybrid
Supervisors: Rui Martins

S25-BIO03
Intelligent Photonics Point-of-Care for Human and Veterinary medicine
Development of new materials, optics, and biochip sensors based on the new concept of 'information specificity,' breaking with the traditional approach of 'bio/chemical specificity'. New materials can separate or concentrate molecules without the need for reactions,

allowing us to design optical systems that once coupled with our information processing and AI, can identify and quantify molecules at low concentrations.

Research Centre: CRIIS - Centre for Robotics in Industry and Intelligent Systems
Internship Location: Porto
Type of Internship: Hybrid
Supervisors: Rui Martins

S25-BIO04

Precision Fertilization Systems

Measurement of nutrients in agriculture is a critical aspect of proper crop production. In hydroponic systems, it plays an even more important role, as plants are entirely dependent on the nutrient feed provided, and their growth will reflect the degree of control of the system. In this internship, the intern will be able to participate in one of the biggest humanity challenges: precision fertilization technology. Such means, designing sophisticated sensor systems to measure nutrient uptake and fertilizer composition 'in-vivo', adjusting the fertilizer composition and dosage to the plant's need in real-time. Over-fertilization is the main cause of loss of soil and water pollution. The intern will also interact with the fertilizer complex chemical network, collect fertigation samples from an ongoing hydroponic setup, and analyze them using various laboratory techniques to assess the NPK concentration.

Research Centre: CRIIS - Centre for Robotics in Industry and Intelligent Systems
Internship Location: Porto
Type of Internship: Hybrid
Supervisors: Rui Martins

S25-BIO05

Plant Wearables and Systems Biology for Precision agriculture

Plant Wearables are our latest innovation for real-time photosynthesis and central metabolism monitoring of the plant's vital signs. Metabolic fluxes obtained by wearables are used in Genome Scale Systems Biology models do re-construct and diagnose the plant's metabolic state, and control mechanisms and to diagnose plant physiology in both field and controlled environment agriculture.
During this internship, the intern will work on developing a systems Biology model for a metabolic network within a hydroponic system using our existing C3 plant model. This involves creating a high-resolution, holistic view of the hydroponic biochemical networks, constrained-based modelling, and managing control network mechanisms that are established under different scenarios of abiotic stress, such as light, temperature, water deficit, and nutrient imbalances.

Research Centre: CRIIS - Centre for Robotics in Industry and Intelligent Systems
Internship Location: Porto
Type of Internship: Hybrid
Supervisors: Rui Martins, Nelson Machado and Filipe Silva

S25-BIO00

Generic Topic – Bioengineering

Bioengineering is a rapidly growing and evolving field at the intersection of engineering and the life sciences, to provide solutions in medicine, biology and the environment, among others.

About Bioengineering at INESC TEC: more information here

Communications

S25-COM01

Rate Adaptation in a Predictive Flying Network Environment

The concept of ubiquitous connectivity is becoming increasingly realistic. However, in scenarios such as disaster management and maritime operations, communication coverage can be limited or even non-existent. Flying Networks, consisting of unmanned aerial vehicles (UAVs), are emerging as a viable solution to provide on-demand connectivity in these contexts.

The IEEE 802.11 Standard (Wi-Fi) has recently been updated with amendments that introduce new parameters aimed at improving network performance for both the PHY and MAC layers. When channel quality is highly dynamic, a robust rate adaptation algorithm becomes crucial to ensure the quality of service and reliability of the flying network.

The primary objective of this work is to develop, implement, and evaluate a rate adaptation algorithm that leverages the future trajectories of flying nodes to determine the transmission rate in a controlled flying network scenario. This work begins with a preliminary study to understand the functioning of existing rate adaptation algorithms in Linux systems. Following this initial phase, several experimental scenarios will be conducted to evaluate the limitations of current algorithms and to assess the performance of the proposed algorithm using conventional metrics such as throughput and frame success ratio.

Research Centre: CTM - Telecommunications and Multimedia
Internship Location: Porto
Type of Internship: Hybrid
Supervisors: Rúben Queirós, Helder Fontes and Rui Campos

S25-COM02

Experimental Evaluation of Drone Energy Consumption in Flying Networks

Emerging 6G and Wi-Fi networks will leverage drones as communications nodes in Flying Networks, offering flexible and rapid deployment in scenarios such as disaster response and crowded events. However, battery limitations hinder continuous coverage, making energy efficiency essential. While current drone positioning algorithms account for energy consumption, they rely on theoretical models. This internship aims to measure and analyze real-world drone energy consumption. Results will support the validation of existing models and algorithms, contributing to more energy-efficient Flying Networks.

Research Centre: CTM - Telecommunications and Multimedia
Internship Location: Porto
Type of Internship: Hybrid
Supervisors: Pedro Ribeiro, Tomás Barros and André Coelho

S25-COM03

Building and Testing a Reconfigurable Antenna with 3D-Printed Sustainable Materials

This project explores the design, fabrication, and testing of simple antennas made with sustainable and 3D-printed materials. Students will learn the basics of antenna theory and

apply this knowledge in hands-on prototyping, using recycled or biodegradable materials. The work includes modelling, printing, and measurement of the antenna's performance using lab equipment. The aim is to combine sustainability with antenna engineering in a hands-on setting.

Research Centre: CTM - Telecommunications and Multimedia
Internship Location: Porto
Type of Internship: In-person
Supervisors: Luís Pessoa and Sofia Inácio

S25-COM04

Human Pose Estimation from WiFi Signals with Video Ground Truth

In this project, students will explore how WiFi signals can be used to estimate human movement and posture. They will use a multimodal setup combining radio and video data to validate pose estimation algorithms. Tasks include collecting data, analyzing radio signal features, and testing basic machine learning pipelines. The project offers a hands-on introduction to RF sensing, signal processing, and AI-based human sensing.

Research Centre: CTM - Telecommunications and Multimedia
Internship Location: Porto
Type of Internship: In-person
Supervisors: Francisco Ribeiro and Luis Pessoa

S25-COM05

Edge AI Acceleration: Simulating Neuromorphic Circuits for Energy-Efficient Sensing

This project focuses on simulating energy-efficient neuromorphic circuits inspired by the brain, for use in edge computing applications. Students will explore the basics of neuromorphic architectures and simulate small analog/digital circuits using tools like LTspice. The aim is to understand how such circuits can enable low-power sensing and computing close to the sensor, and how this approach can support sustainable and intelligent systems.

Research Centre: CTM - Telecommunications and Multimedia
Internship Location: Porto
Type of Internship: In-person
Supervisors: Vítor Tavares

S25-COM06

Exploring Wireless Communication and Sensing for UAVs and Aerial Systems

This project introduces students to the challenges of wireless communication and sensing in aerial systems such as drones. It covers basic concepts like link budgets, antenna orientation, and line-of-sight constraints. Students will simulate scenarios involving UAV communication and sensing tasks, and explore how to optimize system design for mobility, energy efficiency, and data throughput in dynamic environments.

Research Centre: CTM - Telecommunications and Multimedia
Internship Location: Porto
Type of Internship: In-person
Supervisors: Luís Pessoa and André Coelho

S25-COM07

Designing CubeSat Subsystems: Communications and Sensing Payload

This project introduces students to the building blocks of CubeSat systems, with a focus on two subsystems: a basic RF communication module and an environmental sensing payload. Students will define requirements, explore hardware options, and design a simple block diagram or simulation of these subsystems. The project offers a systems-engineering perspective and encourages creativity in resource-constrained environments.

Research Centre: CTM - Telecommunications and Multimedia
Internship Location: Porto
Type of Internship: In-person
Supervisors: Luís Pessoa

S25-COM08

Visual Simulation of Radio Signal Propagation with Reconfigurable Intelligent Surfaces (RIS)

This project focuses on developing a Python tool that simulates radio signal propagation between an access point (AP) and a user equipment (UE) in an indoor environment, with optional support for one or more Reconfigurable Intelligent Surfaces (RIS). The tool should allow configuration of room geometry, AP/UE positions, RIS placement, and basic propagation models (e.g., free-space, NLOS reflection, attenuation). Students will implement a basic visual interface to plot paths, power distribution, and RIS effects, offering an intuitive way to study how signal strength and coverage are influenced by RIS deployment.

Research Centre: CTM - Telecommunications and Multimedia
Internship Location: Porto
Type of Internship: In-person
Supervisors: Nuno Paulino and Luís Pessoa

S25-COM09

Simulating Satellite Communication Links with Ground Stations

Students will simulate a satellite-ground communication link, exploring how parameters such as orbital altitude, antenna gain, frequency, and transmission power affect performance. Using simplified models or tools like MATLAB or Python, they will analyze link budgets and visibility windows for satellites in different orbits (e.g., LEO). This project introduces core concepts in satellite comms and systems-level trade-offs.

Research Centre: CTM - Telecommunications and Multimedia
Internship Location: Porto
Type of Internship: In-person
Supervisors: Luís Pessoa

S25-COM00

Generic Topic – Communications

Digital network communications underpin the Internet and the myriad of services we increasingly depend on, indispensable for the widespread digital transformation.

About Communications at INESC TEC: more information here

Computer Science and Engineering

S25-CSE01
Robotair Backend Development Summer Internship

Join the Robotair project at INESC TEC and dive into the world of robotics and cloud technology! As a Backend Development Intern, you'll contribute to the development of our web application's backend component using Python. Hosted on AWS, our microservice architecture leverages Lambda functions and API Gateway, providing you with hands-on experience in modern backend development. You'll learn about deploying robotic software, enhancing operational efficiency, and ensuring seamless updates across fleets. This internship is perfect for BSc or MSc students eager to expand their skills in Python and cloud technologies while making a real impact in the robotics field. Apply now to be part of our innovative team!

Research Centre: CRIIS - Centre for Robotics in Industry and Intelligent Systems
Internship Location: Porto
Type of Internship: Hybrid
Supervisors: Rafael Arrais, Pedro Melo

S25-CSE02
Robotair Frontend Development Summer Internship

Join the Robotair project at INESC TEC as a Frontend Development Intern and immerse yourself in cutting-edge web technologies! You'll work with our React-based frontend application, gaining hands-on experience in developing new components and collaborating with an experienced team to identify and fix bugs. This internship offers a unique opportunity to enhance your skills in CSS and explore UI/UX design principles, ensuring a seamless user experience. Ideal for BSc or MSc students passionate about frontend development, this role will allow you to contribute to an innovative platform that revolutionizes robotic software deployment. Apply now to kickstart your career in tech!

Research Centre: CRIIS - Centre for Robotics in Industry and Intelligent Systems
Internship Location: Porto
Type of Internship: Hybrid
Supervisors: Rafael Arrais, Pedro Melo

S25-CSE03
Robotair Linux and Containerization Internship

Join the Robotair project at INESC TEC as a Linux and Containerization Intern and contribute to Rigel, our open-source tool designed to simplify the containerization of robotic software! In this role, you'll integrate newly developed components into Rigel and test these integrations across various robotic systems, both in simulation and on real robots. Robotic software enables robots to perform tasks and interact with their environment, making this internship ideal for BSc or MSc students passionate about Linux, Docker, and Kubernetes. Gain hands-on experience in cutting-edge technologies while making a meaningful impact in the robotics community. Apply now to join our innovative team!

Research Centre: CRIIS - Centre for Robotics in Industry and Intelligent Systems
Internship Location: Porto
Type of Internship: Hybrid
Supervisors: Rafael Arrais, Pedro Melo

S25-CSE04

Robotair MCP Server Development for LLM interfacing Internship

Join the Robotair project at INESC TEC and be part of developing the core of our secure API communication! As an Model Context Protocol (MCP) Server Development Intern, you'll work on building a server that securely connects to Robotair's API endpoints on behalf of users, ensuring fine-grained access control. You'll design how AI agents request access, display exactly which resources will be available upon user consent, and manage secure API interactions. This is a perfect opportunity for BSc or MSc students passionate about backend development, AI, and cloud to gain hands-on experience in authentication workflows, scalable service design, and Large Language Models (LLMs).

Research Centre: CRIIS - Centre for Robotics in Industry and Intelligent Systems
Internship Location: Porto
Type of Internship: Hybrid
Supervisors: Rafael Arrais, Pedro Melo

S25-CSE05

Development of a Relational Database for Robot Component Management

This internship proposal aims to develop and optimize a relational SQL database to organize and manage the components used in different robots. The goal is to create an efficient structure that enables detailed storage of parts, configurations, relationships between modules, and robot versions, facilitating control, maintenance, and the evolution of projects. The work will include requirements analysis, data modelling, implementation, and testing, contributing to more effectively managing the robotic systems.

Research Centre: CRIIS - Centre for Robotics in Industry and Intelligent Systems
Internship Location: Porto
Type of Internship: Hybrid
Supervisors: André Rodrigues Baltazar

S25-CSE06

Interactive Audio Story-Telling

Many interactive stories are available online, called game books or interactive fiction. A popular repository is ifdb.org containing many gamebooks in z8 format. The goal of the internship is to produce an Android app that allows the user to interact with the story, using a speech2text model such as Whisper and the text2speech feature that is built into Android.

Research Centre: CTM - Telecommunications and Multimedia
Internship Location: Porto
Type of Internship: Hybrid
Supervisors: Ricardo Cruz

S25-CSE07

Customization and Simulation of a RISC-V Based System-on-Chip

RISC-V is a royalty free instruction set specification which has gained great traction in the open hardware community. The customizability-oriented paradigm of RISC-V makes it suitable for designers to add custom instructions for specific tasks, like AI acceleration. This work will consider an existing RISC-V SoC simulation platform (x-heep) and study its native

XAIF (eXtendible Accelerator InterFace) to determine how to implement one or more custom instructions. The custom instructions to implement will be determined. They may tentatively first be a small set dedicated to AI operations. The outcome will demonstrate the potential for improved efficiency and adaptability in RISC-V-based systems.

Research Centre: CTM - Telecommunications and Multimedia
Internship Location: Porto
Type of Internship: Hybrid
Supervisors: Nuno Paulino

S25-CSE08

AI Acceleration in a High-Level Synthesizable RISC-V SoC

RISC-V is a royalty free instruction set specification which has gained great traction in the open hardware community. The customizability-oriented paradigm of RISC-V makes it suitable for designers to add custom instructions for specific tasks, like AI acceleration. This work will consider an existing implementation of a SoC based on an in-house RISC-V processor, written entirely in C/C++. The code of the core can be compiled as a simulator or used to generate hardware via High-Level-Synthesis and can currently be improved with more features. This work will address adding custom instructions to the RISC-V core, at C/C++ level, to execute small computations for AI workloads. The outcome will demonstrate the potential for improved efficiency and adaptability in RISC-V-based systems.

Research Centre: CTM - Telecommunications and Multimedia
Internship Location: Porto
Type of Internship: Hybrid
Supervisors: Nuno Paulino

S25-CSE09

Designing a Cache Subsystem for a High-Level Synthesizable RISC-V SoC

RISC-V is a royalty-free instruction set architecture that has become a cornerstone of the open hardware movement due to its simplicity and extensibility. To move RISC-V designs closer to real-world deployments, system-level features like instruction and data caches are essential. This work builds upon an existing System-on-Chip implementation based on an in-house RISC-V processor, fully written in C/C++ and suitable for High-Level Synthesis (HLS). The current SoC is bare-metal and lacks cache support, limiting its ability to run complex workloads and real-time operating systems. This internship will add a L1 cache into the RISC-V core, using either an HLS approach (C/C++) or HDL (Hardware Description Language) approach, and evaluate the improved performance.

Research Centre: CTM - Telecommunications and Multimedia
Internship Location: Porto
Type of Internship: Hybrid
Supervisors: Nuno Paulino

S25-CSE10

Extending ONNX-to-DFG Conversion Tool for AI Acceleration

ONNX is a file format that represents trained AI models (e.g., CNNs). It is widely used by frameworks like TensorFlow or PyTorch. The models then run on hardware like CPUs or GPUs, however, the tendency currently is to explore more specialized hardware for AI inference. This work will contribute to a in-house tool which converts ONNX graphs into an output graph

suitable for compilation onto custom hardware. The tool currently supports conversion of a limited set of ONNX nodes (matmul, and add) and lacks potentially useful optimizations (like loop splitting or fusion). The goal of this work is to add support for at least one new ONNX operation (e.g., Transpose), and optionally implement functionality to split the resulting output graph into modular subgraphs.

Research Centre: CTM - Telecommunications and Multimedia
Internship Location: Porto
Type of Internship: Hybrid
Supervisors: Nuno Paulino

S25-CSE11
CMOS OPAMP Reference Designs

Operational amplifiers (opamps) are among the most critical building blocks in integrated circuits (ICs, i.e. chips), serving essential roles in signal conditioning, filtering, data conversion, and control systems. Designing opamps requires a deep understanding of device-level behavior, analog design principles, and system-level trade-offs.
This internship provides students with hands-on experience in designing, optimizing, and validating key architectures, such as two-stage, folded cascode, and other IC configurations. Through structured simulations and design iterations, students will explore the impact of sizing, biasing, and topology choices in a wide range of performance metrics, ultimately producing robust reference IC designs.

Research Centre: CTM - Telecommunications and Multimedia
Internship Location: Porto
Type of Internship: In-person
Supervisors: Cândido Duarte

S25-CSE12
Physical Design of Electronic Circuits: From Schematic to Silicon

CMOS layout design for microelectronics (silicon chips) is a critical step in the physical realization of integrated circuits, where the abstract schematic is transformed into a manufacturable geometry. This internship focuses on layout techniques for analog and mixed-signal blocks, with an emphasis on design for performance, matching, and manufacturability. Students will learn how to interpret analog schematics, apply layout best practices, and use EDA tools to create and verify layout views that meet stringent design requirements. Emphasis is placed on understanding the physical limitations of CMOS processes and minimizing layout-induced degradations such as mismatch, parasitics, and noise coupling.

Research Centre: CTM - Telecommunications and Multimedia
Internship Location: Porto
Type of Internship: In-person
Supervisors: Cândido Duarte

S25-CSE13
Design of Integrated-Circuit Voltage References

This internship focuses on the design of voltage reference circuits, essential for stable operation of analog and mixed-signal ICs (chips). Students will explore bandgap and subthreshold-based reference architectures in CMOS technology, analyzing temperature and

supply independence. The internship includes schematic-level design, simulation across corners, and layout considerations. Key learning outcomes include understanding temperature compensation, startup circuitry, and noise performance. Participants will validate their designs through PVT and Monte Carlo analysis, gaining hands-on experience in creating robust, process-tolerant references for integration in modern ICs.

Research Centre: CTM - Telecommunications and Multimedia
Internship Location: Porto
Type of Internship: In-person
Supervisors: Cândido Duarte

S25-CSE14

Design of Standard Cells for Microelectronics

This internship addresses the design and characterization of standard cells: fundamental building blocks in digital integrated circuits. Participants will explore the complete flow from transistor-level schematics to layout implementation. The internship covers critical aspects such as cell sizing, logical effort, delay optimization, power and area trade-offs, and layout strategies for manufacturability and scalability. Students will create a small library of standard cells (e.g., inverters, NAND, NOR, flip-flops), validate their designs through simulation, and ensure compliance with DRC, LVS, and timing characterization.

Research Centre: CTM - Telecommunications and Multimedia
Internship Location: Porto
Type of Internship: In-person
Supervisors: Cândido Duarte

S25-CSE15

AI-Enabled UAV Swarm Management for Joint Radar-Communication in Crisis and Natural Emergency Scenarios

This project aims to develop an optimized multi-UAV framework to maximize detection accuracy in post-disaster scenarios. The proposed dynamic UAV assignment strategy will allocate drones to targets or zones of interest, ensuring a balanced trade-off between area coverage and detection accuracy. Our work plan includes the design of a multi-UAV system, in which UAVs are equipped with dual radar and communication capabilities. The focus will be on developing a dynamic assignment algorithm that optimally distributes UAVs across various locations while maintaining high detection performance and effective coverage. The system's effectiveness will be evaluated through simulations, assessing detection accuracy, coverage efficiency, and communication reliability in crisis response scenarios.

Research Centre: CTM - Telecommunications and Multimedia
Internship Location: Porto
Type of Internship: Hybrid
Supervisors: Alaa Awad Abdellatif

S25-CSE16

Use of the European Digital Identity Wallet (EUDI Wallet) for Secure Access to Confidential Information [Devise Futures]

The European Digital Identity Wallet (EUDI Wallet) enables user authentication with a high level of assurance (Level of Assurance High) — the highest level under the eIDAS Regulation framework — which is essential for ensuring security when accessing sensitive information.
This project aims to leverage this functionality to develop a web page and service that enable secure and controlled access to confidential information, ensuring that only users authenticated with valid credentials can access the documents to which they are entitled. This model significantly reduces the risk of unauthorized access, helping to mitigate threats such as data leaks, unauthorized disclosures, and social engineering.
Authentication through the EUDI Wallet ensures robust user identification, allowing access control policies to be enforced based on verifiable and up-to-date credentials. Once authenticated, the system provides access exclusively to authorized documents, safeguarding both the confidentiality and integrity of the information.
Additionally, in cases where a user has access to confidential documents from multiple entities, it is expected that only the relevant credential needs to be presented during the authentication process. This approach not only adheres to the principle of data minimization but also enhances security by avoiding unnecessary disclosure of institutional relationships, thereby reducing the attack surface in potential cyber threat scenarios.
This authentication model supports a strengthened cybersecurity posture, leveraging principles of digital trust, data protection, and resilience in accessing critical systems and information.

Research Centre: HASLAB - High-Assurance Software
Internship Location: Porto or Braga
Type of Internship: To be defined
Supervisors: José Miranda and José Pina Miranda (Devise Futures)

S25-CSE17

How can behavioral cybersecurity changes within the organization be detected? [INCM]

"This research project aims to understand how companies (INCM, in this case) can improve its ability to detect behavioral changes related to logical access to its infrastructure.
The objective is to identify, based on the literature, best practices in identity management and access control, including references to “Zero Trust” principles. It will be important to:
- Understand which rules should be implemented to detect behavioral changes in terms of logical access;
- Identify data sources that can provide the necessary information for this detection;
- Determine situations where access should be blocked and others where only an alert should be triggered;
- Understand how to communicate potential situations to various stakeholders within the organization that may be critical to its operations."

Research Centre: HASLAB - High-Assurance Software
Internship Location: INESCTEC (Porto or Braga), INCM (Lisboa)
Type of Internship: To be defined
Supervisors: José Pina Miranda and Nelson Faria (INCM)

S25-CSE18

How to define an effective process for using offensive (cybersecurity) Red Team tactics in an organization? [INCM]

This research project aims to define the appropriate practices that an organization (like INCM) should apply to test its infrastructure against vulnerabilities or threats. In this context, Red Teaming is one of the approaches that provides security teams (Blue Teams) with insights into improvements they can implement to eliminate or mitigate these defense gaps.
With the organization's consent, a Red Team typically adopts the modus operandi of an adversary, mimicking methods commonly used for physical or digital intrusion against the organization.
The objective of this research is to address these questions, taking into consideration the following: How should a Red Team operate (in-house or outsourced, pros and cons, etc.)? Which resources or areas should be granted access or given special attention? Who should be called upon to support the Red Team? Should certain key stakeholders from top management be involved, including the IT Director?

Research Centre: HASLAB - High-Assurance Software
Internship Location: INESCTEC (Porto or Braga), INCM (Lisboa)
Type of Internship: To be defined
Supervisors: José Pina Miranda and Nelson Faria (INCM)

S25-CSE19

WalkingPAD: Certification of an app for supervised home-based exercise therapy

Cardiovascular disease constitutes a substantial economic encumbrance to society; consequently, the implementation of efficacious preventive measures is imperative. Behavioral interventions, such as motivational interviewing, have been shown to enhance compliance and self-efficacy. The WalkingPAD platform (walkingpad.inesctec.pt) has been developed for the purpose of facilitating supervised, home-based exercise therapy for claudicant patients. This platform utilizes ICT tools for self-monitoring, which is a critical component in promoting long-term behavioral change. The objective of this internship is to facilitate the integration of the WalkingPAD into the app certification pathways. The objective is to provide an accurate, efficient, economical, and readily accessible program to promote compliance and accountability among patients with peripheral vascular disease, with the aim of enhancing walking distances and preventing adverse outcomes such as rest pain or amputation.

Research Centre: HumanISE - Human-Centred Computing and Information Science
Internship Location: Porto ou Vila Real (To be defined)
Type of Internship: Hybrid
Supervisors: Dennis Paulino and Hugo Paredes

S25-CSE20

AI in Mental Health - Algorithms' Optimization for Depression Screening in Human-Computer Interactions

In the age of artificial intelligence, understanding which technological solution is most effective for solving specific problems is a valuable skill. In the context of mental health, different machine learning algorithms can be used to detect signs of depression based on human-computer interaction (HCI) data.
This project proposes a practical and comparative approach: test two or three widely used algorithms, choose the one best suited to the needs of the project and explore ways to improve performance, adjust parameters and evaluate the most relevant features, ensuring that the algorithm is tuned to the context of depression screening.

Research Centre: HumanISE - Human-Centred Computing and Information Science
Internship Location: Porto ou Vila Real (To be defined)
Type of Internship: Hybrid
Supervisors: André Netto, Dennis Paulino and Hugo Paredes

S25-CSE21

Enhancing TypeScript Code Generation for Java APIs

Join our lab for a hands-on internship where you'll improve our TypeScript code generator! We have a XML-based Language Specification that defines an API. From this, Java and matching TypeScript classes are generated. These must be compatible (i.e TS calls the Java code). However, support for complex types is lacking. You'll work in a team of two to rebuild and enhance this tool-flow, ensuring full support for Java types and generics. Gain experience in API design, code generation, and Java/TS interoperability while contributing to real-world tools!
Disclaimer: Not for the faint of heart. In the last two years, projects from our lab have taken 1st and 2nd place in the internship competition. If you're looking for a challenge you've just found it.

Research Centre: HumanISE - Human-Centred Computing and Information Science
Internship Location: Porto
Type of Internship: Hybrid
Supervisors: Luís Sousa and João Bispo

S25-CSE22

Building a Modern Web Demo for a C/C++ Source-to-Source Compiler

Join our lab to modernize the web demo for Clava, our powerful source-to-source compiler for C and C++. The current demo runs on an outdated setup—your mission will be to bring it up to date using modern web frameworks and tools. Flying solo or as a team of two, you'll integrate the latest version of Clava into a new interactive interface, gaining hands-on experience with compiler infrastructure, web technologies, and project integration. Perfect for students excited about full-stack development and compiler tech!
Disclaimer: Not for the faint of heart. In the last two years, projects from our lab have taken 1st and 2nd place in the internship competition. If you're looking for a challenge you've just found it.

Research Centre: HumanISE - Human-Centred Computing and Information Science
Internship Location: Porto
Type of Internship: Hybrid
Supervisors: Luís Sousa and João Bispo

S25-CSE23

Presence and Immersion Experiments in VR and 360 videos

Measuring presence and immersion in immersive environments such as VR or 360º videos is important to assess the effectiveness of such environments and the impact in the user experience.
In this internship we would like to explore different approaches in terms of content generation and/or sensor data collection to both ellicit and measure different impacts in the immersion and sense of presence.

Research Centre: HumanISE - Human-Centred Computing and Information Science

Internship Location: Porto
Type of Internship: Hybrid
Supervisors: Rui Rodrigues

S25-CSE24

Blue energy XR Immersive dashboard visualization tool

Blue renewable energy sources such as offshore (floating) wind, floating solar (FPV), waves, tides and currents have a high and still unused potential to be explored. The proposed Blue Energy Offshore Installation Accelerator (BLUE-X) European project will contribute to the Green Deal objectives and its related policies, in particular with regard to increasing the EU's climate ambition for 2030 and 2050. BLUE-X is an innovative Copernicus based solution for optimising and accelerating decision making for blue renewable energy projects in all phases, from planning to construction, operation and decommissioning.
Under the scope of this project we are developing an eXtendend Reality (XR) platform, using the Oculus Quest 3, from meta company, to create an immersive dashboard visualization tool, using virtual choreographies approach, to support the decision-making process as well as monitoring the production workflow.
Virtual choreographies are ""sets of behaviors, interactions, and associated events that occur in a given time and space, with well-defined objectives and rules"". This type of approach can be used to represent and analyse various phenomena, such as learning activities, office users' behaviors, and immersive authoring scenarios. Virtual choreographies can also be applied to different domains, such as education, energy and industry.

Research Centre: HumanISE - Human-Centred Computing and Information Science
Internship Location: Porto
Type of Internship: Hybrid
Supervisors: Fernando Cassola Marques

S25-CSE25

Virtual Mirror – Therapeutic Dialogues with the "Other Self"

This project proposes the development of a Virtual Reality (VR) application focused on emotional well-being, enabling users to engage in therapeutic-style dialogues with a virtual representation of their "critical inner voice" or symbolic figures from their past. Through AI-generated avatars, the system will simulate immersive conversations in safe, emotionally adaptive environments.
The application allows users to switch roles—speaking both as themselves and as the "other self"—promoting self-reflection and empathy. The platform will also feature AI-generated ""safe place"" environments to create emotionally supportive spaces for the user.
Combining cutting-edge technologies (VR, AI, biometrics) with concepts from narrative psychology, the project offers a novel interaction format to support therapeutic interventions or personal growth processes.

Research Centre: HumanISE - Human-Centred Computing and Information Science
Internship Location: Porto
Type of Internship: Hybrid
Supervisors: Fernando Cassola Marques and Demetrius Lacet

S25-CSE26

Augmented Insights: Developing a Mobile AR Solution for Offshore Wind Farm Monitoring

This project focuses on developing a mobile augmented reality (AR) application for monitoring data in offshore wind farms. The application will enable interactive visualization of spatial, oceanographic, and energy-related data by pointing a smartphone at a 3D model of a wind turbine. Objectives include integrating real-time data APIs, developing an intuitive interface, and validating with physical models. Activities involve requirements gathering, design, programming with AR frameworks (Unity, Vuforia, ARCore), API integration, testing, and documentation. The project fosters skills in AR, data visualization, and innovative mobile application development.

Research Centre: HumanISE - Human-Centred Computing and Information Science
Internship Location: Porto
Type of Internship: Hybrid
Supervisors: Fernando Cassola Marques

S25-CSE27

Augmented Reality Application for Monitoring Offshore Wind Farms with Apple Vision Pro

This project focuses on developing an augmented reality application for Apple Vision Pro to monitor data in offshore wind farms. The application will provide an immersive experience, combining oceanographic, energy, and temporal data with interactive 3D models of wind turbines. Objectives include developing real-time visualization features, integrating APIs, and designing intuitive interfaces using the visionOS framework. Activities involve requirement gathering, prototyping, programming, testing, and application validation, emphasizing immersive interaction and data exploration. This project fosters skills in cutting-edge technologies, such as visionOS and augmented reality.

Research Centre: HumanISE - Human-Centred Computing and Information Science
Internship Location: Porto
Type of Internship: Hybrid
Supervisors: Fernando Cassola Marques

S25-CSE28

Dynamic Dashboard Generation Platform - backend

This project aims to develop an innovative web platform for creating dynamic and configurable dashboards, adaptable to any type of data or domain, enabling non-technical users to create intuitive visualizations. The system will feature a robust backend for data management and scalable APIs. Key challenges include designing a flexible and scalable core, managing diverse data sources (JSON, SQL, NoSQL, external APIs), implementing authentication and authorization (OAuth2/JWT), creating models to store dashboard configurations, and ensuring performance for multiple users. Clear API documentation will be essential to facilitate usage and integration.

Research Centre: HumanISE - Human-Centred Computing and Information Science
Internship Location: Porto
Type of Internship: Hybrid
Supervisors: Fernando Cassola Marques

S25-CSE29

Dynamic Dashboard Generation Platform - frontend

This project aims to develop an innovative web platform for creating dynamic and configurable dashboards, allowing non-technical users to intuitively customize data visualizations. The challenge is to build an interactive and responsive interface with drag-and-drop tools for real-time configuration. Key features include: designing user-friendly interfaces with customizable graphs, tables, and maps; ensuring seamless communication with the backend via API; optimizing performance and compliance with accessibility standards (WCAG); and providing clear documentation for end-users and the development team.

Research Centre: HumanISE - Human-Centred Computing and Information Science
Internship Location: Porto
Type of Internship: Hybrid
Supervisors: Fernando Cassola Marques

S25-CSE30
Inven!RA learning activities provider frontend

The Inven!RA architecture aims to enable online tracking and orchestration of distributed learning activities provided by multiple third parties. It follows a broker pattern (Stal, 1995) inspired by the approach of the BEACONING project framework (Bourazeri et al., 2017) and has been developed as a collaboration between the INESC TEC Associated Laboratory in Portugal and the UNISINOS project CAPES/PRINT ""Digital Transformation and Humanities"" in Brazil. It allows the design and tracking of distributed learning activity plans, called Inventive Activity Plans (IAPs), based on external third-party modules that provide each activity and record learning analytics about it. The Inven!RA architecture maps the learning analytics of the activities in an IAP to its learning objectives, and enables integration with learning management systems such as Moodle by providing teachers with customised URLs for each learning activity.
The Inventive Activities Plans in the Inven!RA architecture consist of a graph of parameterizable learning activities that are linked to specific learning objectives through a weighted combination of analytics. It is a distributed and agnostic architecture: the activities that make up an IAP are conceptually external to the Inven!RA back-end and front-end.

Research Centre: HumanISE - Human-Centred Computing and Information Science
Internship Location: Porto
Type of Internship: Hybrid
Supervisors: Fernando Cassola Marques

S25-CSE31
ARNavAI – Intelligent Indoor Navigation System with Augmented Reality

"This project proposes the development of an innovative indoor navigation platform based on augmented reality (AR), offering intelligent multimodal assistance. The mobile application will enable users to navigate complex indoor environments – such as hospitals, university campuses, or cultural centres – using:
- Visual AR guidance (e.g., arrows or paths overlaid on the real world),
- Personalized audio instructions powered by artificial intelligence,
- Interactive virtual avatars acting as smart guides.
The system will be highly configurable, allowing seamless adaptation to any building through a user-friendly mapping and setup process. Furthermore, it will include a user behaviour analysis module, capable of identifying navigation patterns, frequently visited areas, and signage needs through machine learning techniques.

By combining accessibility, personalization, and spatial intelligence, the proposed solution opens new avenues for assisted mobility, cultural tourism, crowd flow management in public spaces, and digital inclusion.

Research Centre: HumanISE - Human-Centred Computing and Information Science
Internship Location: Porto
Type of Internship: Hybrid
Supervisors: Fernando Cassola Marques

S25-CSE32

DataVerseXR: Ambiente Colaborativo de Realidade Aumentada para Visualização e Exploração de Dados

This project aims to develop an interactive platform based on Augmented Reality (AR), enabling the collaborative visualization, manipulation, and analysis of data within immersive and three-dimensional environments. Using devices such as smartphones or AR headsets (Meta Quest 3, Apple Vision Pro, Magic Leap, etc.), users will be able to organize and explore multiple data elements (tables, charts, spreadsheets, APIs) in a 360º space.
Key Features:
- Simultaneous visualization of multiple data sources in an AR environment;
- Spatial manipulation and positioning of charts, tables, and other data elements;
- Real-time multiuser collaboration;
- Creation of multimodal annotations (text, audio, video);
- AI assistant with integrated avatar for contextual data queries;
- Intelligent pattern recognition and correlation detection;
- Customization of data sources, visual themes, and interaction language.

Expected Outcomes: A working prototype that explores new forms of interaction with data in collaborative, immersive environments, with potential application in education, data science, business analytics, and virtual meetings.

Research Centre: HumanISE - Human-Centred Computing and Information Science
Internship Location: Porto
Type of Internship: Hybrid
Supervisors: Fernando Cassola Marques

S25-CSE33

Immersive Training Platform using XR

This project aims to develop an immersive and customizable VR/AR training platform compatible with devices like Meta Quest 3 and Apple Vision Pro. The platform will allow the creation of adaptable training environments (e.g., industrial settings, sports arenas), collaborative multi-user sessions, and intelligent behavior analysis using AI techniques.
Key Technologies: Unity/Unreal Engine/Cyango (XR); VR/AR devices (Quest 3, Vision Pro); Machine Learning for behavioral pattern analysis; Real-time collaborative computing; Natural interfaces and 3D environment customization.
We're looking for students who: Are passionate about immersive technologies (VR/AR/XR); Have programming skills (C#, Python, etc.); Are eager to engage in applied research; (Bonus) Have experience with Unity or Unreal Engine
What we offer: Hands-on experience in a cutting-edge research project; Application of your skills to real-world domains (industry, sports, healthcare); Opportunity to co-author scientific publications and integrate with R&D teams; Access to state-of-the-art equipment (VR/AR headsets, motion capture, etc.).

Research Centre: HumanISE - Human-Centred Computing and Information Science
Internship Location: Porto
Type of Internship: Hybrid
Supervisors: Fernando Cassola Marques

S25-CSE34

Game With A Purpose (GWAP) implementation to explore the most motivating game elements for each player type according to Bartle's Taxonomy

This project builds upon an already developed GWAP (Game With A Purpose) to enhance its motivational impact by refining game elements tailored to different player types, as defined by Bartle's Taxonomy. This proposal intends to explore how competitive and cooperative game elements influence player engagement, aiming to optimize the gaming experience for diverse player profiles.

Research Centre: HumanISE - Human-Centred Computing and Information Science
Internship Location: Vila Real
Type of Internship: Hybrid
Supervisors: Diogo Guimarães, Dennis Paulino and Hugo Paredes

S25-CSE35

State of the Ark: software for animal adoption

At State of The Ark, we're building tech that transforms animal rescue. We have developed a prototype for The Ark Manager that allows shelters to streamline administrative tasks and manage volunteers, donations, adoptions, and crucial animal data all in one place. This internship focuses on developing a prototype for The Ark Connection that aggregates data from multiple The Ark Manager instances into a unified adoption portal. The selected interns will help design and implement APIs, develop the data synchronization layer, and build a user-friendly interface to search and view adoptable animals. Working with real-world data and partner associations is a chance to create a meaningful impact while contributing to a platform for animal welfare.

Research Centre: HumanISE - Human-Centred Computing and Information Science
Internship Location: Porto
Type of Internship: Hybrid
Supervisors: José Pedro Ferreira

S25-CSE36

Florensics: an intelligent forest fire prevention system

The Florensics project proposes an intelligent forest fire prevention system based on the Internet of Things (IoT), mesh networks and artificial intelligence. This internship aims to evolve the current prototype into a functional version in the field. The selected interns will contribute to the development and integration of sensor nodes, optimisation of mesh network communication and improvement of the central system. They will also take part in validating the system. This is a great opportunity for anyone interested in experimenting with real-world applications of IoT and mesh networks that can have a good impact on society.

Research Centre: HumanISE - Human-Centred Computing and Information Science
Internship Location: Porto
Type of Internship: Hybrid
Supervisors: José Pedro Ferreira

S25-CSE37

Artificial Intelligence for Depression Screening

Technology is changing the way we deal with complex problems, including mental health. Human-computer interaction (HCI) is playing an increasingly important role in collecting data that can help identify signs of conditions including depression.
This project aims to create a machine learning model that can analyse this data and identify patterns linked to depression. The goal is to combine theory and practice in an objective way to develop a functional solution that can be applied to web platforms and mobile devices.

Research Centre: HumanISE - Human-Centred Computing and Information Science
Internship Location: Vila Real
Type of Internship: Hybrid
Supervisors: André Netto, Dennis Paulino and Hugo Paredes

S25-CSE00

Generic Topic – Computer Science and Engineering

Computer science and engineering are the linchpins to the unstoppable evolution of computing and enable its application to an ever-growing plethora of computer-based solutions.

About Computer Science and Engineering at INESC TEC: more information here

Power and Energy Systems

S25-PES01

Smart Control, Protection, and Automation of Hybrid AC/DC Microgrids

This internship will focus on the modeling, control, and protection of hybrid AC/DC microgrids—future-ready architectures designed to integrate distributed renewable energy sources and energy storage. The student will develop a microgrid model using MATLAB/Simulink, incorporating both AC and DC segments connected through an interlinking converter. They will implement control algorithms (e.g., droop/grid-forming control) and simulate fault scenarios to test protection schemes. The project draws from EU-funded HYNET and NGS projects at INESC TEC, aligning with ongoing research in resilience and reliability of inverter-based power networks. Through scenario testing, the student will analyze system behaviour during grid-connected and islanded modes. The internship offers a hands-on experience in cutting-edge R&D in power systems, strengthening technical proficiency in simulation tools and real-world energy transition strategies.
Main tasks and goals to be achieved: Review hybrid microgrid architectures and control/protection strategies, Build an AC/DC microgrid model in MATLAB/Simulink, Implement converter control (droop/grid-forming strategies), Design basic protection for AC and DC segments, Simulate operational/fault scenarios, Analyse system response (stability, fault handling), Document methodology and findings in a technical report.

Research Centre: CPES - Power and Energy Systems
Internship Location: Porto
Type of Internship: Hybrid
Supervisors: Habib Habib

S25-PES02

SynEPort: A synthetic data generator for highly electrified ports

In the coming years, seaports will undergo a significant electrification process, moving away from fossil fuels. In this new reality, obtaining accurate electricity load forecasting is crucial for reducing costs, planning infrastructure improvements, and ensuring a stable energy supply. However, studies specifically addressing this need in ports are scarce, and the limited availability of electricity-related data hinders further development in these areas. To address the need for publicly available and realistic data, the aim of this internship is to develop a synthetic data generator (SDG) that can be used to develop energy management systems in highly electrified ports.

Research Centre: CPES - Power and Energy Systems
Internship Location: Porto
Type of Internship: Hybrid
Supervisors: Adrian Galvez and João Almeida

S25-PES00

Generic Topics – Power and Energy Systems

Research in Power and Energy Systems envisions to support the full and enduring decarbonisation of society, an overarching objective of the EU, anchored on the integration of renewable energy sources and energy efficiency.

About Power and Energy Systems at INESC TEC: more information here

Robotics

S25-ROB01

Innovative Aircraft Design and Advanced UI for Multi-Aircraft Monitoring

The aerospace industry is continuously evolving with developments in aircraft design and system integration. This proposal outlines a project focused on developing novel aircraft concepts by leveraging modern engineering techniques and human-machine interaction principles to create a next-generation aerospace solution.
Objectives:
1. Design and develop new aircraft concepts with improved aerodynamics, efficiency, and sustainability.
2. Integrate advanced avionics and systems to enhance aircraft performance and reliability.
3. Develop a user interface (UI) for real-time monitoring and control of multiple aircraft.
Development Description:
The project will be executed in key phases:
1. Conceptual Design & System Integration: Research and development of innovative aircraft configurations, aerodynamics, and propulsion systems. Advanced system integration will focus on avionics, automation, and connectivity.
2. UI/UX Development: Design and implement an interface for monitoring multiple aircraft, incorporating real-time data visualization, predictive analytics, and AI-driven decision support.
3. Prototyping & Testing: Fabrication of prototype models, software simulation, and field testing to validate performance, safety, and usability.
The outcomes of this project will contribute to the advancement of aerospace technology, improving operational efficiency and situational awareness for multi-aircraft management.

This project is expected to receive 3 interns, and it will have senior research monitoring the work progress at daily basis. The workload is expected to be divided by all members of the team.

Research Centre: CRAS - Robotics and Autonomous Systems
Internship Location: Porto
Type of Internship: Hybrid
Supervisors: Andry Maykol Pinto and Rafael Claro

S25-ROB02

UAV power converter for tethered energy transfer

This internship focusses on building and testing an energy converter to transfer power from batteries on the ground to a UAV (drone) through a tether (pair of cables). This project will design, build and test a electronic board to convert the 48V DC from the batteries to 100V DC, send this energy through a 10m cable and convert it to 12V DC.
This project will use the student's knowledge on power electronics, energy conversion and circuit assembly to understand and build the circuit board. After assembly, the test will involve knowledge on energy conversion efficiency, conversion ratio and energy transmission loss..

Research Centre: CRIIS - Centre for Robotics in Industry and Intelligent Systems
Internship Location: Porto
Type of Internship: To be defined
Supervisors: Miguel Nakajima Marques

S25-ROB03

Underwater Structural Damage Measurement: Integration of Optical and Sonar Data

Remotely operated vehicles (ROV) and optical perception are essential in underwater tasks, such as in short-range operations, namely port infrastructure inspections, and contribute to the safety and sustainability of their maintenance. Therefore, measuring structural damage is crucial, namely measuring its size. As this task is impossible using a single visual sensor, the main goal is to combine this data with sonar data to obtain a scale factor. It will allow measuring structural faults, such as joints between blocks or crack length, to assess the structure's hazard index. The data will be acquired from an ROV in real-world underwater scenarios.

Research Centre: CRAS - Robotics and Autonomous Systems
Internship Location: Porto
Type of Internship: In-person
Supervisors: Ana Rita Gaspar, Alexandra Nunes and Aníbal Matos

S25-ROB04

Robotair Python Client Application Internship

Join the Robotair project at INESC TEC as a Python Client Application Intern and play a vital role in connecting robots to our innovative cloud platform! You'll work on the Python application installed on robots, enabling seamless communication with the Robotair server for software deployment and real-time monitoring of statistics and logs. This internship offers hands-on experience with Docker containers, Linux, operating system-level services (via systemd), and MQTT protocols. Ideal for BSc or MSc students eager to deepen their Python

skills and explore the intricacies of robotic systems, this opportunity will empower you to contribute to the future of robotics. Apply now to be part of our dynamic team!

Research Centre: CRIIS - Centre for Robotics in Industry and Intelligent Systems
Internship Location: Porto
Type of Internship: Hybrid
Supervisors: Rafael Arrais and Pedro Melo

S25-ROB05

Spatio-Temporal Modelling and Mapping of Biophysical Crop Attributes Based on Earth Observation Satellite Data from a Precision Agriculture Perspective

This work aims to develop predictive models of crop biophysical variables based on plant optical spectral reflectance and to carry out their spatiotemporal mapping using Earth Observation Satellite (EOS) data.
The specific objectives are as follows:
i) to construct a dataset integrating relevant crop attributes and satellite imagery;
ii) to validate predictive models of these attributes using optimised vegetation indices and artificial intelligence techniques;
iii) to perform the spatio-temporal mapping of the modelled variables;
iv) to extract agronomic indicators to support decision-making in agricultural management processes within a farming company.
The work will be developed based on two case studies supported by time series of satellite data, with the following purposes:
i) monitoring the development of agronomic management indicators from a Precision Agriculture perspective;
ii) spatio-temporal mapping of crop development dynamics and estimating their phenological stages.
This work will be carried out in close collaboration with the business sector, promoting the transfer of knowledge and technology to agriculture, and is aligned with CRIIS-TRIBE's main goals.

Research Centre: CRIIS - Centre for Robotics in Industry and Intelligent Systems
Internship Location: Porto
Type of Internship: In-person
Supervisors: Mário Cunha

S25-ROB06

Controlled winch for tethered UAV

This internship focusses on the assembly, configuration and evaluation of a controlled winch used to provide a power cable to a UAV(drone). This project will assembly and configure the equipment necessary to control the length of the cable during the UAV's flight.
The student will use notions of motor control and torque transmission during assembly and evaluation of the equipment.

Research Centre: CRIIS - Centre for Robotics in Industry and Intelligent Systems
Internship Location: Porto
Type of Internship: To be defined
Supervisors: Miguel Nakajima Marques

S25-ROB00
Generic Topic – Robotics
Robotics provides new tools and paradigms to enable robots to operate in complex and dynamic environments, shared with humans.

About Robotics at INESC TEC: more information here

Systems Engineering and Management

S25-SEM01
Last-Mile Parcel Delivery: Identifying Inefficiencies to Promote Sustainability
"The popularization of e-commerce has introduced new transportation challenges that not only affect the economic viability of logistics companies but also contribute to environmental and social externalities, such as air pollution, noise, and urban congestion. Various alternative delivery methods, such as cargo bikes and parcel lockers, have been proposed to address these issues. However, understanding, comparing, and selecting the most suitable solution has proven difficult due to the multiple trade-offs involved, the complexity of urban contexts, and the diversity of stakeholders covered.
The main goals are: Describe the delivery last-mile process in the city of Porto; Identify inefficiencies in the last-mile service considering the European 2050 sustainability agenda; Use service design techniques to improve the sustainability in the last-mile delivery services.
The focus will be on reimagining delivery processes, optimizing resource use, and reducing carbon footprints, while ensuring the solutions are adaptable to different types of urban environments.

Research Centre: CESE - Centro de Engenharia de Sistemas Empresariais
Internship Location: Porto
Type of Internship: Hybrid
Supervisors: Tânia Fontes

S25-SEM02
NIS2 Compliance for Small and Medium-Sized Enterprises (SMEs) [Devise Futures]
The Directive on the Security of Network and Information Systems 2 (NIS2) broadens the scope of cybersecurity requirements, directly impacting SMEs by requiring the demonstration of robust cybersecurity practices - especially within the context of supply chains. In some cases, it may even be necessary to provide concrete evidence of the security measures implemented.
The objective is to clearly and accessibly identify the cybersecurity practices that SMEs should adopt and be able to demonstrate, in line with the requirements of NIS2. Based on this identification, a practical guide will be developed to help companies carry out a structured self-assessment of their maturity and level of compliance. This guide will include checklists, examples of evidence to be presented, levels of criticality, and suggestions for corrective actions, enabling SMEs to understand their current state of preparedness and what actions they need to take to achieve the required compliance. Additionally, the guide is intended to serve as a tool for awareness and capacity-building, fostering a stronger and more sustainable cybersecurity culture within the business ecosystem.

Research Centre: HASLAB - Laboratório de Software Confiável
Internship Location: Porto or Braga
Type of Internship: To be defined
Supervisors: José Miranda and José Pina Miranda (Devise Futures)

S25-SEM00

Generic Topic – Systems Engineering and Management

Systems Engineering and Management research seeks to improve systems for decision support, human-centred operations, intelligence, technology management, and innovation.

About Systems Engineering and Management at INESC TEC: more information here