Research Institute in Trustworthy Inter-connected Cyber-physical Systems (RITICS)

Fellowship Call

Closing date: Wednesday 15th March / 5pm BST

The Research Institute in Trustworthy Inter-connected Cyber-physical Systems (RITICS) is inviting proposals from researchers for part-time fellowships.

Topic Areas

The topic areas for the 2023 RITICS fellowships are:

- **Fragility & Resilience** - Within the area of fragility, the concept is that there can be single points of failure within a system or organisation. This fragility can be in the form of specific technology or technical expertise. Quite often, this fragility or lack of resilience is not identified until an incident highlights the issue, it is not enough to just identify the single points of failure, but there needs to be a clear and identifiable way to rectify any fragility issues, or where that isn't possible, create an effective risk management strategy. One example of this is the reliance of parts of the critical infrastructure on accurate timing signals, typically provided by a GNSS service. Topics considered under this theme might include anti-fragility and novel techniques for engineering out vulnerabilities.

- **Digital Twins and Modelling** – While concepts such as the development of models and digital twins for ICS is not new, identifying the requirements needed to get the most effective use of these approaches is still somewhat limited. The potential for these kinds of tools to provide a detailed security picture of a system or organisation is high providing the results can be trusted. Within this, the level of fidelity is a prime source of issue. To create a model to a highly detailed degree is time, resource, and financially expensive. In cutting back on the fidelity of the system, there is a concern that real risks, threats, or impacts might not be covered. Creating the balance of accuracy to resource efficiency needs to be right such that organisations can know what it means to get useful information out of the system. As such understanding the limitations of fidelity will give a pathway to the scalability of these tools for wider CNI adoption. Security aspects of digital twins are often over-looked and novel ways of understanding and communicating risk would be of interest under this theme.

- **Economics of CNI Security** - With any business, there is a challenge in ensuring that there is value for money in all forms. This means that security is also subject to the same drivers. Wider than just the cryptographic cost issues highlighted, the economies of the whole space of protecting CNI has similar technical and financial pressures. Identifying where the financial and resource barriers are within CNI will be a first step towards removing some barriers for security uptake across different sectors. Considerations from air-gapping systems to downtime for upgrades or patching can have significant costs. There is no single issue that creates an issue with the economics of security, but there are common threads such as perceived value for money or return on investment that is often cited as a barrier for engagement in effective security measures.

Responsibilities

The RITICS Fellowship roles are leadership roles. Supported by RITICS and the NCSC, you will provide thought leadership in your topic across the RITICS Community and beyond. Specifically, you will:

- Explore the problem space to determine the research questions that need to be addressed and the benefits and means of growing the research topic beyond the initial period of a year.
- Engage with existing, established communities or establish a new community around the topic.
- Identify and engage with relevant research projects that fall under your scope and identify new opportunities to develop and grow the area.
- Consider the pipeline for and sustainability of the topic, providing development opportunities, establishes pathways to develop a new research angle, or connect relevant communities that are currently disparate.

Deliverables

The period of the Fellowship (17th April 2023 – 16th April 2024) is intended to be exploratory and stimulate your own innovation and creativity. Therefore, the exact nature and format of the deliverables to satisfy the responsibilities outlined above will naturally vary. The specifics of the exact programme of work to achieve the following can be discussed with the NCSC Technical Lead and the RITICS Director. The initial set of desired outcomes are:

- Demonstrate how you have built the community.
- Present outcomes of your problem definition activities.
- Articulate existing and recurrent research questions.
- Articulate the strategy for the topic going forward.

Assessment

Assessment of proposals will be undertaken by a panel who will be looking at the relevant strengths of the candidates and the proposed method for delivering in the topic areas.

Key Dates

Activity	Date
Call for Fellows Published by	16th February 2023
Proposals due to be submitted	15th March 2023
Announcement of Results	27th March 2023
Fellowships Starts	17th April 2023
Fellowship Completed	16th April 2024

Funding

Funding is available for up to 2 part-time fellows. The total pool of funding available is £180K and would be looking to support the engagement and activities of the fellows in these topic areas.

Application

A **2 page CV** and a **1 page plan of work which clearly indicates the topic area being addressed** should be provided describing the plan to deliver the desired outputs of the chosen topic. Breakdowns of any known costs should be included – costings should be calculated using the FEC model.

Applications should be sent to Furrah Hussain, RITICS Programme Manager (ritics@imperial.ac.uk). We must receive your application by **1700 on Wednesday 15th March.**