2025 EECMS Summer Internship Application Form

Main Supervisor	Dr Yifei Ren
Other supervisors (if applicable)	Dr Siavash Khaksar, Dr Lakmal Rupasinghe, Dr Nasim Ferdosian
Project Title	Secured Real-Time Machine Communication Protocol
Student location(s) for the project	ICP / 314
Duration of project	Eight weeks
Project Description	This research aims to design a new industrial communication protocol based on real-time communication, asymmetric & symmetric encryption, and port hopping. Inspired by wireless communication techniques, the protocol will establish a control channel to negotiate secure channels in advance, allowing clients to subscribe to data sources across multiple IP sockets dynamically with a double layer of encryption. **Technical Contributions:** The student intern will play a crucial role in the development and implementation of this protocol. Specifically, the intern will: 1. **Example Implementation:** Develop an example implementation of the protocol using the Go programming language. This will involve coding the server and client components, integrating asymmetric and symmetric encryption mechanisms, and implementing the port hopping functionality. 2. **Performance Testing:** Conduct comprehensive testing to evaluate the performance of the new protocol against existing industrial communication protocols. This will include setting up test environments, running benchmark tests, analysing the results, and identifying areas for optimization. **Academic Contributions:** The student intern will also contribute significantly to the academic aspects of the project by: 1. **Result Section of the Journal Paper:** Assisting in the writing and preparation of the results section of the journal paper, which will be submitted to MDPI. This will involve documenting the performance testing results, discussing the implications of the findings, and helping to draft clear and concise conclusions. 2. **Literature Review and Related Work:** Participating in the review of relevant literature and the discussion

	of related work to ensure the paper provides a comprehensive overview of the field and highlights the novelty of the proposed protocol. **Internship Benefits:** This internship will provide the student with valuable experience as an academic researcher, including: 1. **Research Experience:** Gaining hands-on experience in conducting high-impact research, from the initial design and implementation stages to the final performance evaluation and publication. 2. **Technical Skills:** Developing advanced programming skills in Go, as well as expertise in encryption techniques and real-time communication protocols. 3. **Academic Writing:** Enhancing academic writing skills through active participation in the preparation and publication of a peer-reviewed journal paper. **Conclusion:** The support of a student intern will be instrumental in advancing this research project and achieving our goal of developing a robust and secure industrial communication protocol. The internship will not only contribute to the technical and academic success of the project but also provide the student with invaluable experience and skills that will benefit their future career in academia or industry.