

1. Cyber Security - Highly Secure Novel Architectures

In this research project, various testbeds with different highly secure architectures will be implemented and compared. This will create an extension to the current knowledge in terms of what are the most secure LAN architecture models and most likely produce novel architectures and models for highly secure networks. The network devices from the cyber Security centre will be used.

This project requires either a programming or a networks configuration background. Training will be provided.

Supervisor: Dr Athanasios Tsokanos (a.tsokanos@herts.ac.uk)

2. Cyber Security and Novel Firewall clustering techniques

In recent experiments we noticed that firewall clustering is more targeted to help the resiliency of a network and not the performance side of it.

In this research project we aim to develop a novel firewall clustering technique aiming on the performance of the network with possibly parallel processing without sacrificing the resiliency of the network. A testbed will be created either in hardware or in a simulation environment in order to implement novel firewall clustering techniques and compare them with existing ones.

This work can be implemented if you are familiar with Network devices configuration or programming. Training will be provided.

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3. Cyber Security in Software Defined Networks

With the increasing complexity and management of the networks due to typical networking devices are also tightly tied to line products and versions. In other words, each line of product may have its own particular configuration and management interfaces, implying long cycles for producing product updates (e.g., new firmware) or upgrades (e.g., new versions of the devices). All this has given rise to vendor lock-in problems for network infrastructure owners, as well as posing severe restrictions to change and innovation. Software-Defined Networking (SDN) created an opportunity for solving these long-standing problems.

In this research SDN and its security related problems will be studied for the improvement and reliability of these networks and its performance metrics. It will also be compared with existing security networks by conducting the empirical evaluation implementing the new features of the SDN

networks. The research will also investigate the SDN technology and its security issues considering the state-of-the-art research in this technology. However, the research in the security of this technology still not yet well embraced by the security researcher which is still an open problem that will mainly focus in this research.

Although SDN brings hope of resolving several security issues with its features, as discussed in the previous section, still there are certain security concerns with SDN architecture that needs to be addressed to secure the network completely.

To study these security issues and develop new security techniques in SDN, a platform for developing and testing security applications will be designed. This will be a security application development framework, which will provide a platform to researchers for building and developing modular security applications.

The physical network hardware testbed will also be used to address these issues while performing the empirical studies on the network hardware to test the network optimization and the performances. The network simulation will be used to generate real case scenario that will be tested on the state-of-the-art physical system to identify underlying security issues. The Network operators can dynamically configure, manage, and optimize network resources and adjust traffic flows to meet changing needs quickly via dynamic and automated SDN programs defined in this research work.

This project requires either a programming or a networks configuration background. Training will be provided.

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Entry Requirements

Applicants are expected to hold a very good first or upper-second class degree in a relevant discipline (or equivalent overseas qualification), and/or a good Master's degree (or equivalent experience/qualifications). Prior scientific publications are particularly desirable but not essential. Non UK/EU nationals without an academic degree from the UK or EU (taught in English) will normally be required to have IELTS of 6.5 or above (or equivalent) with at least 6.0 in each individual component. The position is open to home and overseas students.

How to Apply

Download the application form and find further details from:

<https://www.herts.ac.uk/study/schools-of-study/computer-science/our-research/the-phd-programme-in-computer-science>

Please note: You must download the application form to your computer before you complete it. If you complete the form in the browser window, the information you have entered may be lost when the form is saved. The application form should be returned to:

Mrs Emma Thorogood Research Student Administrator University of Hertfordshire College Lane Hatfield, Herts AL10 9AB tel: +44 (0)1707 286083 doctoralcollegeadmissions@herts.ac.uk

Applications should also include two references and transcripts of previous academic degrees as well as a cover letter and a CV. We also accept applications for self-funded places in various computer science related topics throughout the year.

For informal enquiries please contact Dr Athanasios Tsokanos (a.tsokanos@herts.ac.uk).