

## 1. High speed Networks - a Performance Evaluation of Different Novel Architectures

Traffic modelling in general is to provide network designers with relative simple means to characterize traffic load within a network. This characterization can be used for a variety of purpose, including network design, network management, evaluation of novel services and protocols. Unfortunately, modern network traffic is extremely dynamic and the huge values of data traversing the network often result to heavy data loss because it cannot be stored and use the immense amount of information on all end –to-end traffic streams between all resources and destinations.

This research aims to investigate novel architectures with speed and QoS in mind. A testbed built on the cyber security centre firewalls, routers and switches will be implemented.

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. Highly resilient Networks-Reroute in Layer 3 VPNs (MPLS)

The aim of this research project is to create a testbed using the networks devices of the cyber security centre or a simulation model that replicates that. In a recent MPLS implementation we saw that Fast reroute performance can really be very variable. Different topologies and architectures will be created and we aim to extend current knowledge by creating a novel architecture that fast reroute is highly dependable.

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

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

## 3. Modelling Internet Network Congestions

In the last several years, our modern society has seen an enormous growth in our reliance on the Internet, computer networks serving an ever increasing amount of media, from television and movies to news and messages to users around the world. As the Internet grows and encompasses more components of everyday life, it becomes increasingly important to understand the dynamics of network traffic across the Internet, both to optimize the traffic and ensure it does not surpass critical levels.

There is a need for communication networks capable of providing an ever increasing spectrum of services calls for efficient traffic modelling techniques that are tractable. Moreover, internet usage is

growing exponentially and the traffic pattern is continuously changing. In this situation, network design must be on a platform of manageable set of traffic parameters, so that efficient utilization of the network resources can be achieved. Networks, whether voice or data, are designed around many different variables. Two of the most important variables in network design are service and cost. Our proposed research will:

- Assess and correct coarse and multiple time scale behaviour of the internet traffic network and develop a traffic carrier models for packet switched network.
- Develop a single traffic model which can account for the dynamic statistical characteristics of packets, flows and sessions.

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](mailto: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).**