

# CDT Newsletter

Information  
Security  
Group

EPSRC Centre for Doctoral Training in Cyber Security  
April 2015

## CDT Director update

Welcome to the newsletter of Royal Holloway's CDT in Cyber Security, edition spring 2015. The CDT has just entered the third year since its launch in April 2013, and despite its early age, we are delighted with its progress and to have so much exciting news to report.

The CDT has currently 19 students, divided into two cohorts. We have recruited students with a wide range of backgrounds and interests, making the cohorts particularly suitable to the multidisciplinary nature of the CDT. We are now recruiting for the third cohort, to start in October 2015. We expect that 12 new students will be joining the CDT later this year and we look forward to their arrival.

Students from the first cohort are now well into their second year of studies, and moving full steam ahead with their PhD research. They are producing interesting research output, with some already resulting in academic publications. They are also looking forward to starting their industrial placements some time later this year.

The second cohort has just concluded their first six months of training, and students are now busy organising their summer projects. You can read in this newsletter some of their experiences – reported by the students themselves – and some of the research highlights.

We are also delighted to report that two CDT students (one from each cohort) have recently been awarded prizes at the national level. This is a great recognition of their work, and a reflection of the excellent quality of the CDT student body.



Royal Holloway – and the Information Security Group in particular – has always placed strong emphasis on external engagement throughout its education and research programmes. Our external links have only strengthened with the launch of the CDT two years ago. In our original bid, we received the support and commitment from over 30 organisations from across the cyber security sector, to be involved in the CDT training and research programme; several new ones have since joined the list. CDT students are able to get a strong ‘background’ exposure to industry through various CDT activities – we report some of these in the

newsletter. The growth in our industrial links – both in numbers and quality – is certainly a highlight from these first two years, one that brings many benefits not only to the CDT, but also to the ISG as a whole.

We are happy to celebrate the success of Royal Holloway's CDT in Cyber Security in the annual CDT showcase event. It is a great opportunity for networking and learning more about the research being done in the CDT. I hope you enjoy the event, and this newsletter.

**Professor Carlos Cid**



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# Inside the cohort

After a great first year of exploring a variety of topics within the area of cyber security, the second-year CDT cohort have now decided on their individual topics of interest and have started to carry out research into these full-time. Examples of research topics include access control, applied cryptography, malicious software and cyber warfare. Students are now busy working on articles to submit to journals or conferences (with some having papers accepted in the past year). We have also been able to attend academic events to both present our own work, and to also keep up-to-date with new research in the field. As summer draws closer, several members of the second-year cohort will soon be commencing summer internships in various companies, such as HP Labs and Mozilla Foundation, whilst others will be looking to start similar internships in the near future.

Although we have started to specialise in our own areas in cyber security, we have been fortunate enough to still be able to participate in the external engagement sessions with the first year CDT cohort, such as a recent visit to Intel Security, as well as workshops held at the university. A recent industrial session run by L-3 TRL Technology, for example, enabled us to get hands-on with ECM equipment and learn more about the valuable research that the company does.

Despite the change in focus for second year CDT students, informal discussions and weekly PhD seminars allow both cohorts to learn about the research interests of individual students within each cohort and to keep up-to-date with research that is being carried out within the CDT. ■

**Naomi Farley**  
second-year CDT student

As first year CDT students, we have been exposed to a variety of topics that fall within the wider cyber security context. One of the most interesting things has been learning from individuals whose knowledge-space spans across many completely different fields, from the theoretical to the geopolitical aspects of information security. The new cohort continues the trend of taking students from a diverse range of backgrounds and so this year has also been a good opportunity to communicate with peers about their past experiences. Thus, helping us to understand the different routes and interests that are available to students within this area.

Equally, due to Royal Holloway's prestige in the field, we have also had numerous opportunities to speak to leading individuals from the cyber security industry. This has manifested itself in visits to companies like KPMG and Intel Security where we have gained a unique perspective into how information security is viewed in the wider world rather than just from an academic perspective. These have been vital in providing context to our learning and have been just as valuable as the lectures we have been attending. Especially in developing the skills required for a broader understanding of the current global cyber security situation. We now hope to use these experiences in undertaking our individual summer projects which will reflect how our interests have developed over the past academic year. ■

**Alex Davidson**  
first-year CDT student



# Out of the ivory tower: CDT external activities

External engagement is a key component of the CDT programme. As part of the first-year CDT training, we run a number of external engagement sessions in order to expose the CDT students to perspectives from different sectors of the cyber security industry.

In January 2015 we visited the Transport Research Laboratory to learn about the cyber security challenges being faced through increased automation in future road systems. These included issues concerning driverless cars and battery charging. In February we visited Intel Security (McAfee) to get a better understanding of how malware is developing and how alerts are managed. In March we visited KPMG to experience the life of a cyber security consultant. The CDT students were set a number of complex challenges and had to present their findings to the boardroom – glad to report that none of the students were fired!

We have also hosted several sessions at Royal Holloway. The National Crime Agency presented their view of the cybercrime landscape and tasked the students with addressing several of the ongoing challenges that the NCA faces during a set of lively discussions. Adeptica explained the complex cryptography behind smart metering during an engaging workshop which required students to apply their cryptography knowledge in a real world setting. A team from L-3 TRL ran a very interesting hands-on workshop in March, when students got some firsthand experience of key management in high graded cryptographic equipment. Finally, CDT students also spent two days with a former Radio 4 producer developing cyber security awareness podcasts. ■



## CDT News

Andreas Haggman, first-year PhD student with the Centre for Doctoral Training in Cyber Security, has been awarded 1st place in the International Institute for Strategic Studies 2015 Student Essay Competition on International Cyber Security with his entry 'The Dangerous Rhetoric of Cyber Deterrence'.

"I am delighted and honoured to be recognised in this way by such a prestigious institution," Andreas says. "This is a fantastic opportunity to not only get my work out in the public domain, potentially read by HM Government, but also to participate personally in the proliferating international cyber security debate."

The International Institute for Strategic Studies (IISS) is a world-leading authority on global security, political risk and military conflict. It was founded in the UK in 1958 with a focus on nuclear deterrence and arms control. Today, it is also renowned for its annual Military Balance assessments of countries' armed forces and for its high-powered security summits, including the Shari-La Dialogue.

For winning the essay competition, Andreas has received a cash prize and has been invited to join IISS's Academic Network in support of Her Majesty's Government on International cyber security policy.

Professor Klaus Dodds, Royal Holloway's research theme champion for security and sustainability, noted, "It is a tribute to Andreas and colleagues that such recognition has been secured, and is indicative of the kind of students being attracted to the CDT in Cyber Security in the first place."

Professor Keith Martin, Director of the Information Security Group, commented, "Andreas is one of three CDT students jointly supervised by the Department of Geography and the Information Security Group, and I am delighted that the resulting cross-disciplinary environment is fostering talented researchers who can make meaningful contributions to debates of contemporary significance." ■





## CDT student wins prize at ACE-CSR conference

Second year CDT student Dusan Repel won the 'best elevator pitch' competition at the Third Annual Conference for the Academic Centres of Excellence in Cyber Security Research. Dusan spoke about his work on malware analysis and saw off competition from students from each of the other ten UK Centres of Excellence. The conference itself brought together academic, industry and government representatives to discuss a number of themes, mainly based around exploitation of academic research and innovation. This is the second time in three years that a Royal Holloway student has won this prize. ■

The second year team of PhD students from the CDT in Cyber Security won second prize in this year's 'Universally Challenged' University Ciphers competition.

The Cyber Security Challenge UK saw teams from universities across the country pit their cyber skills against each other before a judging panel of industry experts from BSides London, CERT-UK and GCHQ who named Edinburgh Napier as the top team.

Teams were tasked to create as complicated a cipher as possible, which was then shared with all the other teams to test their skills against. They were then challenged to break as many of the other ciphers as possible before the competition ended.

'Alice in Cyberland', the team from Royal Holloway's success was officially announced at a ceremony in London in front of an audience of the UK's top cyber security experts. Professor Keith Martin said, "This is a prestigious competition open to every university in the UK so it's fantastic that the Royal Holloway CDT team has achieved such a strong performance. Cyber security and the ability to solve complex problems through teamwork are skills that are in heavy demand, and this challenge was a great opportunity to put the techniques our students have learnt to the test and showcase their talents."

Dusan Repel, from the Alice in Cyberland team said, "It was a really enjoyable and fulfilling task to design a challenging puzzle that interviewed program analysis and cryptography. It was an honour to have been part of the 'Alice in Cyberland' team at Royal Holloway's Centre for Doctoral Training in Cyber Security." ■

## CDT research newsbites

- **Naomi Farley** is a co-author of the paper *Cryptographic Enforcement of Information Flow Policies without Public Information*, which was accepted at the 13th International Conference on Applied Cryptography and Network Security (ACNS 2015). Naomi will be presenting the paper at the conference in June in New York.
- **Giovanni Cherubin** presented his paper (written with several Royal Holloway colleagues) *Conformal Clustering and Its Application to Botnet Traffic* at the Third International Symposium on Statistical Learning and Data Sciences (SLDS 2015). The event was held at Royal Holloway in April 2015.
- **Steve Hersee** presented his paper (co-authored with **Dusan Repel**) *The Ingredients of Cyber Weapons* at the 10th International Conference on Cyber Warfare and Security in March 2015 in South Africa.