Dawes-UCL SECReT PhD scholarships 2019

We currently have five Dawes-UCL SECReT PhD scholarships available (for September 2019 starters). Details of all scholarships are below.

The following studentships are available for a September 2019 start for our Route A programme (four-year MRes+PhD) OR Route B programme (three-year PhD, no MRes).

These studentships are available for **'pre-set' topics or for 'open topics'. Pre-set topics are** specific topics that have been suggested by supervisors here at UCL and which they will be happy to supervise. **Open topics are** topics proposed by the applicant. Further details are below.

PLEASE NOTE: You may apply for either Route A (4 years, i.e. MRes+PhD) or Route B (3 years PhD only) for these studentships. If you apply for Route B, depending on your background, in instances where we feel that you will benefit substantially from the extra year, we will recommend an offer for the Route A course and will only award a 4-year studentship to the successful applicant.

Eligibility: These awards are open to Home/EU fee paying students only.

What the awards cover: Each award covers full stipend of approx. £17,280 per annum, full Home/EU fees, plus conference funds of £1000 per annum.

Deadline for application: 15th July 2019 (However, we advise that you apply early, as we will be awarding the studentships as soon as we identify excellent candidates).

How to apply: All applications are made through the usual SECReT application procedure. Please visit the relevant section on our website for information on the application process. (N.B. on the UCL applications portal, the MRes+PhD option is listed under taught graduate degrees rather than research graduate degrees.)

Open topics

If you have a topic that you would like to explore that is not covered by the pre-set topics, you may apply for an 'open topic' studentship. This means you may develop your own idea for a research topic, and then approach academics at UCL to find two potential supervisors, and then apply for one of the **FIVE Dawes-UCL SECReT PhD scholarships** mentioned on this page. In this case, please detail your proposed research topic in your application – note that your topic must fit with the future crimes vision and agenda of the Dawes Centre for Future Crime. If you would like to check the suitability of your proposed topic before submitting an application please email Professor Shane Johnson.

Note: To help you come up with an exciting research topic remember that although our focus is future crime, this does not mean that we will only award studentships to 'high tech'

research topic proposals. We are equally interested in the way that, for instance, changes in society/demographics/people movement might influence crime – and are happy to consider proposals that combine social sciences with engineering/mathematical/physical sciences. Possible research areas that we are happy to look at include (but are not restricted to):

Applications	Generic Technologies	Background changes
Drones	Hyper-connectivity	Climate change: • Temperature • Sea level/acidification • Water, food shortage
Autonomous vehicles	AI	Mass migration
Smart rail signalling systems	Robotics/Nanobots	Antimicrobial resistance
Non-GPS navigation	Quantum computing	Commodity scarcities
Blockchain	SCADA	Commodity substitution e.g. Mo for Pt catalysts
Brainwave reading/control	3D printing	Universal wage
Smart lighting	Mass customisation	New finance/banking models
Performance-enhancing prosthetics	Portable, renewable power	New working patterns
Instructional technology	Wearable ICT	New transport/movement patterns
	Smart materials	Any concentration or dispersal of value, anywhere in the value chain
	Stealth technologies	
	Sensors, sensor fusion	
	IOT	
	Pharma	
	Chemical synthesis	
	GM/CRISPR	
	Advanced optics	
	Hacking (both senses)	

Pre-set topics

Future crime and the Internet of Things (IoT)
The Internet of Things (IoT) refers to the network of objects containing embedded electronic systems that permit them to collect and process data and to communicate wirelessly with other objects in the network. The IoT includes household products and control systems (e.g. fridges, thermostats, and security systems), building management systems (e.g. heating,

ventilation, and access control), medical equipment (patient monitors, information), and retail equipment (point of sale terminals, security systems). The IoT makes our lives easier and systems more efficient but also generates potential opportunities for crime. The aim of this PhD is to understand and suggest approaches to combatting vulnerabilities of the IoT, giving special attention to the 'everyday' crimes experienced by the general population that are typically overlooked in cyber security research.
Possible supervisor(s) at UCL: Prof Steve Hailes.

Smarter sensing: enhancing operational policing through contextual awareness
Over the last two decades, there has been a rapid global rollout of Wi-Fi and it is now a ubiquitous technology. In addition to its primary use of enabling access, Wi-Fi can be used to sense the environment it operates in. The UCL Security Technology group led by Dr Kevin Chetty (UCL Security & Crime Science) have developed a world-leading position in passive Wi-Fi sensing: The project team have recently developed methods to enable information about the micro-motions of targets to be obtained, opening-up the possibility for activity recognition and biometric identification using a technique termed micro-Doppler analysis. The biggest obstacle to achieving the above capabilities comes from the lack of Wi-Fi micro-Doppler signal data labelled with the human activities causing the pattern, with which to train the Machine Learning models – known as the cold start problem. To address this, the project will pioneer using video data of unscripted natural activity, and process the data using computer vision approaches.
The proposed project would be co-supervised by Dr Chetty and Dr Lewis Griffin (who leads the Computational Security Science (Compass) research group and is the Director of the UCL DeepMind doctoral training centre in A.I. based in UCL Computer Science).
Supervisor(s) at UCL: Dr Kevin Chetty and Dr Lewis Griffin.

Development of novel dry-tagging technologies
An exciting opportunity at UCL's Institute for Materials Discovery to create new approaches to molecular identification technologies to 'invisibly' tag items of value to be fingerprinted at a future date, without the use of classic liquid dispersions which may damage or compromise high value assets. This project will be carried out in close collaboration with Dawes Centre for Future Crime at UCL. This project will aim to develop a solvent-free route to deposit unique molecular signatures without leaving a visible imprint, which may be quickly and easily analysed. The PhD will cover identifying and establishing a tagging route compatible with the remit, synthesis of the tagging agent(s) and development of the deposition process (including construction and adaptation of existing equipment). The project will also explore the engineering of identification technologies for a robust, reliable, and ideally handheld identification unit. The project will consider both intrinsic scientific issues (to be written into academic papers) and potential commercial application, accounting for scalability, cost, and route to exploitation. This postgraduate research opportunity for a successful candidate with a minimum of an upper second-class degree (or equivalent) in Materials Sciences, Chemistry, Chemical Engineering, Physics, and/or a broad range of relevant backgrounds. The multidisciplinary nature of the project requires a candidate with a keen interest in new materials, fabrication technology and engineering, and experience in a laboratory setting. The successful candidate will conduct research in the state-of-the-art new Institute for Materials Discovery laboratory with well-funded equipment and consumables. This highly interdisciplinary research will involve many

national and international academic and industrial collaborations, so a desire to proactively interact with industrial partners is highly desirable.

Possible supervisor(s) at UCL: Prof Kwang-Leong Choy.

Financial fraud with cryptocurrencies

This project aims to examine criminal opportunities arising from cryptocurrencies using data science techniques. We are interested in understanding how the trading in and reliance on cryptocurrencies facilitates/changes financial fraud; how nefarious groups use social media to organise fraud schemes; how cryptocurrency fraud could be detected and mitigated. We are also interested in investigating wider crime problems arising from cryptocurrencies, such as money laundering, financing of organised crime groups, and general security problems related to cryptocurrency transactions.

Possible supervisors: Prof Shane Johnson and Dr Bennett Kleinberg.

Anticipating and governing new threats around autonomous vehicles

Self-driving cars have moved rapidly from being seen as impossible to inevitable. The suggested benefits for public safety and transport systems are substantial, but there are a number of important questions around the security of new systems, the possible inability of drivers to escape dangerous situations (e.g. where a crowd is surrounding a self-driving car), and unclear liability in the event of catastrophe. As transport systems become increasingly interconnected, the possibility for error or terror to have broad ramifications increases. This project, based in UCL Science and Technology Studies, and carried out in close collaboration with Dawes Centre for Future Crime at UCL, will seek to understand the possible opportunities and challenges surrounding self-driving cars or 'autonomous vehicles'. The research will be mainly qualitative, with the possibility for qualitative analysis of trends and other data. It will suit a candidate with interests and expertise in science and technology policy, law, sociology of science or criminology. The successful candidate likely have a strong first degree and an MA/MSc in a relevant discipline, with interests in combining perspectives from the social sciences, humanities and science and engineering. The student will work closely with the Driverless Futures project https://driverless-futures.com/, which has been funded by the Economic and Social Research Council (ESRC).

Possible supervisors : Dr Jack Stilgoe, Science and Technology Studies (j.stilgoe@ucl.ac.uk)

About the funders

The Dawes Centre for Future Crime at UCL was established in 2016 with a £3.7M grant from the Dawes Trust. It has the broad vision of completing cutting-edge, application-focused research designed to meet the challenges of the changing nature of crime. Research aims to both forecast the nature and spread of future crime opportunities, and to propose methods for tackling them effectively before they become established.

UCL SECReT is a £17m international centre for PhD training in security and crime science at University College London, the first centre of its kind in Europe. We offer the most comprehensive integrated PhD programme for students wishing to pursue multidisciplinary security or crime-related research degrees.