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University of  
**Kent**



# SCHOOL OF COMPUTING

Canterbury/Medway

/ Graduate  
study

**50**

1965-2015  
THE UK'S  
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UNIVERSITY

# CONTENTS

Introduction	4
Our courses at a glance	7
Career prospects	8
Industrial Placement	9
Finding a placement	10
Taught programmes	12
Student profile	17
Graduate profile	18
Kent IT Consultancy (KITC)	19
Taught modules	20
Applying for taught programmes	27
Makerspace – The Shed	29
Research degrees	31
Challenging students	36
Research profile: Keeping your data safe	38
Applying for a research degree	39
Academic staff interests	40
General information	44



# WELCOME

**The School of Computing at the University of Kent excels in both teaching and research, with award-winning staff and impressive research results.**

The School is an internationally recognised Centre of Excellence for programming education and has been certified as a university partner in the UK-wide Network of Teaching Excellence in Computer Science.

In the Research Excellence Framework (REF) 2014, the School performed very strongly. Our research impact was especially impressive, with 100% of our research rated world leading or internationally excellent. This indicates that the work in the School has considerable influence beyond academia. All our eligible academic

staff submitted research to the REF, showing that our research is significant in both breadth and depth.

We provide an extensive support framework for our taught and research students and have strong links with industry, which underpin both methods of study.



**Frank Wang**  
Head of School



# INTRODUCTION

**Kent is a leading UK university. In the Research Excellence Framework (REF) 2014, we were ranked joint 17th\* in the UK for research intensity, outperforming 11 of the 24 Russell Group universities. We are also in the top 20 in *The Guardian University Guide 2015*. Kent is dedicated to excellence in both teaching and research.**

## World-leading research

The School of Computing is home to world-leading researchers in key areas such as communications, computational intelligence, grid computing, security, and memory management, and interdisciplinary

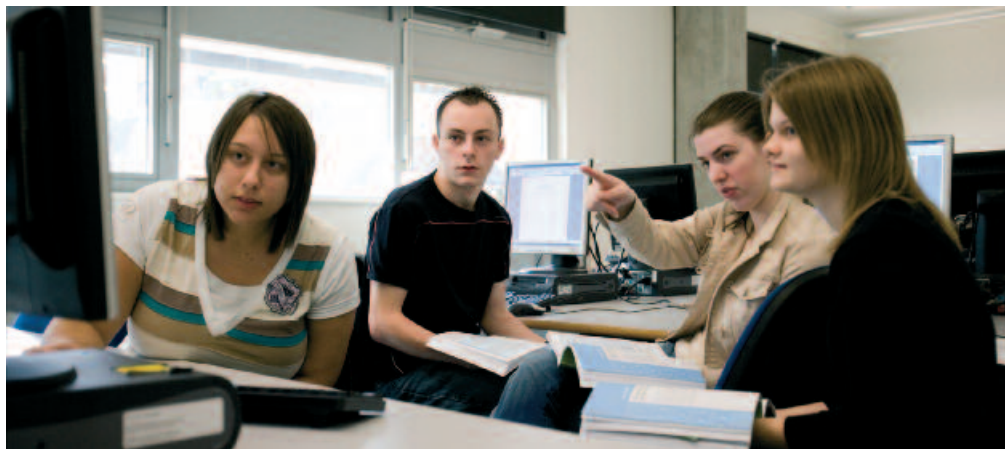
work with biosciences and psychology. Based on our results in the REF 2014, 'computer science and informatics' at Kent was ranked 12th in the UK for research intensity in the *Times Higher Education*. The REF also ranked the School 22 out of 89 for research power, with 100% of the School's research impact rated world leading or internationally excellent.

Staff publish regularly in journals, conference proceedings and books. They have recently contributed to: *Journal of Artificial Evolution and Applications*; *Computer Networks: The International Journal of Computer and Telecommunications Networking* and the *Journal in Computer Virology*. You will find details of academic staff interests on p40.

## Teaching excellence

An internationally recognised Centre of Excellence for programming education, the School of Computing is a leader in computer science teaching. Two academics have received the ACM SIGCSE award for their 'outstanding contribution to computer science education'. We are also home to two National Teaching Fellows, authors of widely used textbooks, and two award-winning teaching systems (Greenfoot and BlueJ) that are used in over 1000 institutions worldwide.

\* of 122 universities, not including specialist institutions



## Research environment

We offer an extensive support framework to all our research students and support you to become an effective researcher through a series of weekly workshops in your first year.

These cover research-specific subjects including how to access journals and review research publications, how to write and publish academic articles and how to present your work at seminars and conferences. You may also attend workshops on communication, time management and teamwork, key transferable skills that are highly valued by employers.

You join one or more of our active research groups where you test and discuss your ideas and place your research in a broader context.

We host a seminar series for visiting speakers and hold regular seminars within our research groups in which research students are encouraged to participate. We also host an annual postgraduate conference.

Many of our research students earn money by teaching on our undergraduate programmes. We provide teaching development courses in your first year to give you the skills to teach effectively.

## Master's student environment

Our Master's students can gain valuable work experience through our industrial placement scheme or with the Kent IT Consultancy (KITC), which provides a project-based consultancy service to local businesses.

We have strong links with industry including HP, IBM, Microsoft and Oracle.

Our taught postgraduate students enjoy a high level of access to academic staff and have their own dedicated study room providing a range of amenities including dedicated PCs and a social area. Students on courses that include an industrial placement are supported by a dedicated team who help them to gain a suitable position and provide support throughout the placement. For more information, see p10.

All students benefit from a well-stocked library and a high bandwidth internet gateway.



*“My MSc gave me loads of knowledge of how to be an entrepreneur. It also gave me good business skills... but, mainly, it gave me more experience and knowledge in how to deal with real IT consultancy projects, work within a team and improve leadership, thanks to the Kent IT Consultancy. It definitely improved my career prospects.”*

**Andrea Reyes Romo**  
MSc IT Consultancy



# OUR PROGRAMMES AT A GLANCE

## Undergraduate degree subject + other prior knowledge and skills

	A good honours degree in any subject, no prior knowledge of computing or IT	A good honours degree in any subject plus good practical knowledge of IT	A good honours degree with some coverage of computing	A good honours degree in computing or a closely related subject	A good honours degree in computing or a related subject plus strong programming skills	A good ordinary degree in any subject, no prior knowledge of computing	A good ordinary degree in computing or a related subject
<b>Conversion MSc</b>							
Computer Science	✓	✓	✓				
<b>IT and Business MSc</b>							
Computing and Entrepreneurship		✓	✓	✓	✓		
IT Consultancy		✓	✓	✓	✓		
<b>Advanced MSc</b>							
Advanced Comp Sci			Depends on modules	✓	✓		
Advanced Comp Sci (Computational Intel)				✓	✓		
Advanced Software Development					✓		
Computer Security			Depends on modules	✓	✓		
Networks and Security				✓	✓		
<b>Pre-Master's and International Master's</b>							
Computer Science GDip							✓
Computing GDip						✓	
International Master's						✓	✓

# CAREER PROSPECTS

**A postgraduate qualification from Kent opens up a wealth of career opportunities by providing an impressive portfolio of skills and specialist knowledge.**

As well as providing a first-rate academic experience, we want you to be in a good position to face the demands of a tough economic environment. Employers recognise that a postgraduate qualification demonstrates a wide range of skills. You acquire a high level of academic knowledge and specialist practical skills at Kent and we help you to develop key transferable skills that are essential within the competitive world of postgraduate employment. These include the ability to adapt to challenges, analyse complex real-world problems and develop original ideas that can be applied to all aspects of future work.

## Transferable skills training

All postgraduate students have the benefit of skills training offered by the University, relevant to their particular needs.

## Links with industry

Strong links with industry underpin all our work, notably with Microsoft, Oracle, IBM, Agilent Technologies, Erlang Training and Consulting, HP Labs, Ericsson and Nexor.



## Industrial placement

Our industrial placement programme can greatly enhance your studies and has a dramatic impact on your choices after graduation. Dedicated placement officers guide you through the process and support you during your placement. The industrial placement programme is available to all taught Master's students in the School of Computing.

## Work overseas

Our students regularly work in the US, Asia and continental Europe. UK and European Union (EU) students who secure placements within the EU are eligible for a grant through the Erasmus scheme. The School has a placement exchange programme with the

City University of Hong Kong. Each year students work in Hong Kong for a major company, such as HSBC. Since 2011, we have had regular placements at Cisco in California.

## Careers and Employability Service

Our award-winning Careers and Employability Service can help you to plan for your future by offering one-to-one advice at any stage in your postgraduate studies. It also provides online advice on employability skills, career choices, applications and interview skills.

## Further information

For more information on the careers help we provide at Kent, visit our Employability web page at [www.kent.ac.uk/employability](http://www.kent.ac.uk/employability)



# INDUSTRIAL PLACEMENT

**The industrial placement engages you in real work and pays a salary. It is an ideal way to get a clearer picture of graduate careers in computing and IT.**

## Master's placements

All full-time taught Master's programmes in the School of Computing can be combined with a work placement of between eight and 50 weeks. Students usually start their placements as soon as their dissertations have been submitted in September. Placements provide an opportunity to work in real-world, technical and business roles, putting into practice knowledge gained from our MSc programmes and developing new skills. They are also an ideal way to

get a clearer picture of current graduate careers in computing and IT. The experience gained gives you an extra edge when applying for jobs in the future.

The School of Computing's dedicated Placement Team has industrial links with hundreds of companies from numerous industries, both in the UK and overseas. Our industrial partners include: HSBC, Morgan Stanley, J P Morgan, Lilly, GSK, Warner Bros, The Walt Disney Company, IBM, Microsoft, Cisco, Dstl, Thales Group, BAE Systems, Accenture, Logica and Kinetic Solutions Ltd.

The average placement salary outside London is £16,500. Salaries in London range from £17,000 to £22,000 while some, depending on the employer, are over £30,000.

*"Kinetic has worked with the School of Computing's placement officers for six years, and during that time we have had many students come to work with us. They listen to how our business works and what types of role and people we require. They stay in touch throughout the placement and have built connections through our business that genuinely help placement students as they first enter the workplace... it feels like a personal, friendly service with a true desire to achieve the best possible outcome."*

**Chris Wildsmith**  
Managing Director  
Kinetic Solutions Ltd



## IMPRESSIVE CAREER PROSPECTS

Kent has an excellent record for postgraduate employment: over 94% of our postgraduate students who graduated in 2013 found a job or further study opportunity within six months.

# FINDING A PLACEMENT

**Katie Van Sanden and Sian Robson, the School's dedicated industrial placement co-ordinators, have experience in graduate recruitment, careers guidance and the banking industry. Here, they explain why an industrial placement is so important.**

Since joining the School, Katie and Sian have seen industrial placements grow from 46 in 2010 to 118 in 2014. Competition can be fierce; Vauxhall Motors recently received 3,500 applications for just 80 jobs. It is no longer enough to send out hopeful applications, students must do their homework to secure a placement that can open doors to a future career. But it has to meet students' career aspirations as well as the learning outcomes of the module. 'Students write a report about their placement, which counts towards their degree,' says Katie. 'There's more demand among employers,' adds Sian. 'A lot



of companies are waking up to the benefits to *them* of an industrial placement and are using it, effectively, as a year-long interview.'

Katie says: 'Students tell us they've sent off 50 applications but haven't heard back from anyone. We get them to research companies and tailor their approach, spending a lot of time on just one application; it's about being a sniper not a machine-gunner – it's quality, not volume.'

'We help students get a job on their own merits,' says Sian. 'Every employer has a different recruitment process, and, because we've been to visit the company over several years, we know whether it's appropriate to wear a suit for an interview or if it's OK to turn up in casual clothes. We help with feedback, and motivate and encourage students when they feel down.'

Sian and Katie meet students individually and help them produce CVs, draft cover letters, fill out application forms and prepare for interviews. They organise employer presentations and invite businesses to meet students. 'We know what employers are looking for,' says Sian, 'so some of our work is a bit like a dating agency. We sometimes match the character of the student with what's available but many students don't know what they're looking for, so we encourage them to consider a job they may not have contemplated. We encourage them to widen their search. Technology isn't just about working for the big IT companies, it's every sector including pharmaceutical, retail and engineering.'

Students are on placements with more than 70 companies, including IBM, Intel, HP, Cisco, Boeing, GSK and Sky and smaller firms, including a fostering agency and a hospice.

## EXAMPLE OF BEST PRACTICE

The School of Computing's dedicated placement office has been recognised as an example of best practice in a national report on placements in computer science published by the National Centre for Universities and Business.

At the time of writing, students are in California, Hong Kong and Antwerp, and previously in Geneva (CERN), Barcelona and Amsterdam.

Some students lack confidence and a placement can give them a much-needed boost, but sometimes it can take persistence to find the right job. Sian recalls: 'We work closely with the University's Student Support Team and a student with Asperger's Syndrome, who was almost blind, struggled to find a placement. He needed a lot of help and encouragement but eventually got a software engineering job with Kent Police. He had a great year and is now doing a Master's degree. For some, it's an opportunity to prove they can hold down a job, learn to work as part of a team, or work commercially rather than academically.'

As dedicated placement officers, says Sian, 'we have the luxury of being able to adapt to each student's needs. Some feel they have nothing to offer, but we can show them they do have something to offer an employer.'

When students are on placements, Sian and Katie visit them twice during the year. The first two months, while they're finding their feet, is when students are likely to have a 'wobble'. 'It could be the reality of work is kicking in, there are clashes with supervisors, the work isn't stimulating or it's too difficult,' says Katie. 'Part of our role is to resolve issues for students on placement,' Sian adds.

'We don't just go in and sort it out for them,' says Katie. 'We give them the tools and techniques to resolve it themselves, so they learn what to do if it happens again.' Sian says: 'Sometimes a manager brings issues to us, perhaps timekeeping, and we discuss it with the student.'

A placement focuses the mind on what a student wants from a career. 'One student worked at a global consulting company. He had a fabulous year and was offered a job, but he realised that what he really wanted to do was teach,' Katie recalls, adding: 'Students have had a year of earning money, had an amazing experience, and return motivated for their final year. They seem to get a better classification in their degree because they have applied the technology that they have learnt on their courses in the real world and return better skilled and more driven.'

Helping students to find their feet in the workplace is rewarding for Katie and Sian. Katie explains: 'The transformation is amazing. It's a pivotal year that does so much for our students, it's very powerful. They come out of it more ambitious, more aware of their strengths with more of an idea of how and where they want to apply them, and they want a better career.'

Sian adds: 'We go to the students' graduation ceremonies and meet their families; we keep in touch with them and see some of them come back to Kent as recruiters after they've become managers themselves, which is great.'

### **Deepak Selvaraj graduated from Kent in 2014 with an MSc in Future Computing with an Industrial Placement. He now works at Arqiva WiFi.**

'The opportunity to do an industrial placement is what made me choose to study at Kent. My modules were future oriented and the programme was recognised among companies I attended for interviews. Katie and Sian were the best in motivating me and making me laugh at the silly mistakes I made during interviews. They helped me to learn from these failures, which resulted in offers from three major UK companies.'

'One example of how Kent helped me with interview technique was during an interview with two interviewers in the room and four others present via Skype. When I was asked about a project I had worked on, I remembered one of my professors said "use a whiteboard when you are trying to get more than one person to understand your concept". I took his advice and, with the panel's permission, used their whiteboard to explain my project and technical points. Towards the end of the interview, the head of department said they wanted me to join their company. In the end, though, I chose to work for Arqiva WiFi. I implemented all the skills I'd learnt at Kent: I treated each task as if it was a University assignment and always completed it on time. As a result, I was twice named best employee and was recently promoted to Senior Test Lead.'

# TAUGHT PROGRAMMES

## The School of Computing offers a variety of taught programmes, so you can choose the degree that reflects your interests.

Our taught MSc programmes have extensive flexibility in entry routes, content and format. Programmes are available for study on a full-time and part-time basis, with an optional industrial placement, or as 12-month intensive degrees or two-year International Master's degrees.

### Advanced Master's programmes

- Advanced Computer Science MSc\*
- Advanced Computer Science (Computational Intelligence) MSc\*
- Advanced Software Development MSc\*
- Computer Security MSc\*
- Networks and Security MSc\*

These programmes are for students who have studied computing at honours degree-level who wish to extend their knowledge. For details about these programmes, see p13.

### Conversion Master's programme

- Computer Science MSc\*

This programme is for students with a first degree in another subject area who wish to switch to a career in computing. For details about this programme, see p14.

### IT and Business Master's programmes

- Computing and Entrepreneurship MSc\*
- IT Consultancy MSc\*

These programmes are for students with a keen interest in information technology who wish to broaden their knowledge in technical and business areas. They are taught jointly with the University's Kent Business School.

### Pre-Master's programmes

- Computer Science GDip
- Computing GDip

The Graduate Diploma is suitable for (non-honours) graduates seeking to progress to one of our Master's programmes.

### International Master's programmes

International Master's programmes are equivalent to a Pre-Master's Graduate Diploma, followed by a one-year MSc programme with an optional industrial placement. They are for international students with undergraduate degrees from institutions that do not award the equivalent of UK honours degrees and who prefer (or whose financial sponsors require) enrolment on a single MSc programme.

Please note that progression from the Graduate Diploma to the Master's year is dependent on achieving a result equivalent to a good 2.2 honours level, or better.

### Master's with other schools

- Information Security and Biometrics MSc, taught jointly with the School of Engineering and Digital Arts.

This MSc is designed for practitioners, professionals and graduates with an interest in information security, access control technologies, and application domains using biometric identification and verification systems. For details see [www.eda.kent.ac.uk/postgraduate](http://www.eda.kent.ac.uk/postgraduate)

\*All taught Master's programmes in the School of Computing are available with an optional industrial placement of between eight and 50 weeks. They may be combined with a Pre-Master's course to form an International Master's Programme – for more details see left.

## KENT GRADUATE SCHOOL

The Graduate School delivers the Global Skills Award programme for students following taught programmes of study.

## Advanced Master's programmes

### Advanced Computer Science MSc

**Location:** Canterbury.

**Entry requirements:** A first, 2.1 or good 2.2 honours degree (or equivalent) in computing or a closely related subject, plus strong programming skills.

This flexible programme offers a largely free choice of modules from those offered on our range of Advanced Master's programmes. It is likely to appeal to computing graduates whose interests span more than one specialism and/or those seeking the freedom to explore a variety of advanced topics. Depending on the programme and the options chosen, this programme can serve as a springboard for employment or research.

### Course content

- Either Advanced Java for Programmers or Object-Oriented Programming, plus Advanced Object-Oriented Programming
- Project Research
- Project and Dissertation
- Five or six modules from a wide variety drawn from the Advanced Master's programmes in computational intelligence, advanced software development, computer security and networks.

### Advanced Computer Science (Computational Intelligence) MSc

**Location:** Canterbury.

**Entry requirements:** As for Advanced Computer Science.

This flexible programme combines a wide choice of advanced topics in computer science with specialist modules relating to computational intelligence, including logic-based,

connectionist and evolutionary artificial intelligence, inspirations from the natural world, practical applications and the philosophy of machine reasoning.

The programme is aimed at graduates considering a career in research and development. It would also provide an excellent foundation for PhD study.

### Course content

At least two from:

- Cognitive Neural Networks; Data Mining and Knowledge Discovery; Logic and Logic Programming; Natural Computation.
- Either Advanced Java for Programmers or Object-Oriented Programming, plus Advanced Object-Oriented Programming
- Project Research
- Project and Dissertation
- Up to four optional modules from the MSc in Advanced Computer Science.

### Advanced Software Development MSc

**Location:** Canterbury.

**Entry requirements:** A first, 2.1 or good 2.2 honours degree (or equivalent) in computing or a related subject with a substantial coverage of programming and software engineering.

This highly practical programme is for computing graduates seeking careers as professional software engineers and it equips them with the skills necessary to succeed.

CONTINUED OVERLEAF



# TAUGHT PROGRAMMES (CONT)

Employers often complain that computing graduates lack real-world practical skills. This programme addresses software development for new and emerging platforms such as wireless devices, multi-core processors and cloud computing. Modern development environments, languages and tools are also covered.

## Course content

- Advanced Java for Programmers
  - Cloud Computing
  - Concurrency and Parallelism
  - Development Frameworks
  - Mobile and Ubiquitous Computing
  - Project Research
  - Project and Dissertation
- Plus two optional modules from the MSc in Advanced Computer Science.

## Computer Security MSc

**Location:** Canterbury.

**Entry requirements:** As for Advanced Computer Science (p13).

Computer security remains a hot topic in the media and there is strong demand for graduates with technical skills in this area. This programme addresses computer and information security holistically because vulnerability in any one component can compromise an entire system. This includes computer architectures, operating systems, network technologies, data storage and software development processes. A wide range of threats and other security issues (for

example, denial-of-service attacks, hacking, viruses and worms) are covered along with defences and countermeasures.

The programme is aimed at computing graduates who are seeking careers as computer security professionals or who are interested in research.

## Course content

- Security and Trust
  - Networks and Network Security
  - System Security
  - Trust, Security and Privacy Management
- Either Advanced Java for Programmers or Introduction to Object-Oriented Programming plus Advanced Object-Oriented Programming
  - Project Research
  - Project and Dissertation
- And up to two optional modules from our other Advanced Master's programmes and the MSc in Information Security and Biometrics

## Networks and Security MSc

**Location:** Canterbury.

**Entry requirements:** As for Advanced Computer Science, p13.

This programme provides a broad coverage of computer networks, computer security and wireless device technologies. It looks in depth at some of the security issues that fixed and wireless networks are subject to, and the current solutions employed to address these problems.

This programme appeals to graduates seeking careers in the network or network security industries, or those who wish to carry on with this topic as an area of research.

## Course content

- Advanced Network Security
- Security and Trust
- Either Advanced Java for Programmers or Introduction to Object-Oriented Programming, plus Advanced Object-Oriented Programming
- Mobile and Ubiquitous Computing
- Networks and Network Security
- Project and Dissertation
- Project Research
- Up to two optional modules from our other Advanced Master's programmes and the MSc in Information Security and Biometrics.

## Conversion Master's programme

### Computer Science MSc

**Location:** Canterbury.

**Entry requirements:** A first, 2.1 or good 2.2 honours degree (or equivalent) in any subject.

This conversion programme prepares graduates from any discipline for a career in computing, or a career involving the application of computing within their original professional field. Our students come from a wide variety of backgrounds including natural sciences, engineering, arts, humanities and social sciences.

No prior knowledge of computer science is required.

### Course content

- Introduction to Object-Oriented Programming
- Advanced Object-Oriented Programming
- Logic and Logic Programming
- Project Research
- Project and Dissertation
- Software Engineering
- Systems Architecture
- Web-based Information System Development

One from:

- Computer Graphics and Animation
- Computing Law, Contracts and Professional Responsibility
- Data Mining and Knowledge Discovery
- Introduction to Intelligent Systems
- Mobile and Ubiquitous Computing.

## IT and Business Master's programmes

These programmes are taught jointly with the University's Kent Business School.

### Computing and Entrepreneurship MSc

**Location:** Canterbury.

**Entry requirements:** A first, 2.1 or good 2.2 honours degree (or the equivalent) in any subject. Applicants must have a keen interest in, and sufficient prior knowledge of, information technology (not necessarily gained via formal academic study).

This programme offers a flexible mix of technical, business and entrepreneurship modules delivered by the School of Computing and Kent Business School. It helps you to fill the growing demand from employers for graduates who possess both technical and business skills. Such people play vital leadership roles and function as a bridge between management and technical development and support teams. In addition, many new graduates are in a position, with guidance, to set up an enterprise of their own.

### Course content

- Computing Law, Contracts and Professional Responsibility
- Either Introduction to Object-Oriented Programming or Advanced Java for Programmers
- New Enterprise Development (project)
- Project Research
- Project and Dissertation

Three from:

- Advanced Object-Oriented Programming
- Security and Trust
- Digital Marketing
- Financial and Management Accounting
- IT Consultancy Practice
- Management of Operations
- Mobile and Ubiquitous Computing
- Networks and Network Security
- Software Engineering
- Strategy
- Structure and Organisation of the E-Commerce Enterprise
- Web-based Information Systems Development.

## IT Consultancy MSc

**Location:** Canterbury.

**Entry requirements:** Please see [www.cs.kent.ac.uk/pg](http://www.cs.kent.ac.uk/pg)

This unique programme prepares graduates for a career in IT consultancy, particularly in relation to small and medium enterprise (SME) clients. It includes practical work experience in a real consultancy business, the Kent IT Consultancy (KITC). The programme may appeal to graduates seeking a career in consultancy, or to practising consultants wishing to round out their skills and achieve formal academic recognition.

### Course content

- Extended IT Consultancy Project (practical work experience in a real consultancy business)
- Either Introduction to Object-Oriented Programming or Advanced Java for Programmers
- Management of Operations
- New Enterprise Development (project)

Three from:

- Advanced Object-Oriented Programming
- Security and Trust
- Contracts, Professional Responsibility and Computing Law
- Digital Marketing
- Financial and Management Accounting
- Mobile and Ubiquitous Computing
- Networks and Network Security
- Software Engineering

CONTINUED OVERLEAF

# TAUGHT PROGRAMMES (CONT)

- Strategy
- Structure and Organisation of the E-Commerce Enterprise
- Web-based Information Systems Development.

## Pre-Master's programmes

### Computer Science GDip

#### Computing GDip

The Pre-Master's programmes top up the equivalent of a UK ordinary degree to UK honours level. They are for international students with undergraduate degrees from institutions that do not award the equivalent of UK honours degrees.

A Graduate Diploma (GDip) can be used to gain admission to a relevant MSc programme at Kent or elsewhere in the UK (subject to satisfactory performance). Performance on the GDip equivalent to a good 2.2 honours level, or better, guarantees entry to appropriate MSc programmes at Kent.

### Computer Science GDip

**Location:** Canterbury.

**Attendance:** Nine months full-time.

**Entry requirements:** A good ordinary Bachelor's degree (or equivalent) in computing or a related subject.

The GDip in Computer Science is suitable for graduates of computer science or related subjects seeking to progress to one of our Advanced or IT and Business Master's programmes.

### Course content

- Advanced English for Academic Study (for non-native speakers, if required)
- Fundamentals of Programming and Logic (if not covered previously)
- Individual or group project
- Research and Study Skills.

You also choose up to five optional modules from our BSc honours degree programmes. Topics typically include: computer networks; security; web technology; mobile computing; graphics and animation; intelligent systems; data mining; neural networks; human-computer interaction; advanced programming techniques and computing law. The options may vary, subject to timetabling and other constraints.

### Assessment

Assessment is by examinations and coursework, the relative weights of which vary according to the nature of the module.

### Computing GDip

**Location:** Canterbury.

**Attendance:** Nine months full-time.

**Entry requirements:** As for Computer Science GDip.

The GDip in Computing is suitable for graduates of other disciplines seeking to progress to one of our Conversion or IT and Business Master's programmes.

### Course content

- Advanced English for Academic Study (for non-native speakers) if required)
- Introduction to Object-Oriented Programming
- Advanced Object-Oriented Programming
- Foundations of Computing (mathematics, if needed)
- Research and Study Skills
- Individual Project and Dissertation

Plus up to three optional modules from our BSc honours degree programmes in topics such as information systems, database systems, web applications and computing law. These options may vary from year to year, and are subject to timetabling constraints.

### Assessment

As for Computer Science GDip.

## International Master's programmes

Please see [www.cs.kent.ac.uk/international.html](http://www.cs.kent.ac.uk/international.html)

## Taught Master's with other Schools

### Information Security and Biometrics PDip, MSc

**Location:** Canterbury.

**Entry requirements:** A 2.2 or higher honours degree (or equivalent) in a subject with a strong IT component. Applicants are assessed on an individual basis, with professional experience taken into consideration. For details see [www.eda.kent.ac.uk/postgraduate](http://www.eda.kent.ac.uk/postgraduate)



# STUDENT PROFILE

**Daniel Lawrence is studying for a taught MSc in Advanced Computer Science and is currently on an industrial placement at Cisco in California.**

## **Why did you choose to study at Kent?**

I reviewed every Computer Science MSc course offered in the UK and, as I was living in London at the time, Kent provided a more attractive option for a year out of work studying, both from an environmental and financial standpoint.

## **What made you want to go into this area of study?**

I originally graduated in Australia, with degrees in Law and Psychology, and used little from either as I moved to the UK to focus on one of my passions, music: a common factor in all my work was the enjoyment I got from solving problems with technology. I would stretch my job role in any way possible, to give me the opportunity to learn simple scripting, utilities, even Excel macros!

My last job, as a Digital Editor working daily with XML and related technologies, reminded me how much I enjoyed programming in high school, and I decided to 'do things properly' and return to study – specifically to focus on learning code for a year and to 'reset my CV' with an academic degree, which would steer me in this direction professionally.

## **How are you enjoying your industrial placement?**

I am spending a year working as a Software Engineering intern for Cisco in San Jose, California. I am six months in to the placement. I was told I would be using Python to create backends to communicate with Openstack. However, on my second day a large-scale, intense project fell into the department's lap and since then I have been focused on using Javascript and Angular to create the front end for it. I had more practical experience in coding in two months of this than in a year of my Master's degree, so this internship has been important in converting the theoretical computer science background I learnt during the programme into practical, business-ready coding skills.

Interns are working on a variety of projects, from the Internet of Things (designing Bluetooth-based location tools or markers to communicate with friends) to new video compression technology and delivery formats, hardcore queuing theory in computing, network administration and SEO and network administration.

We recently had an intern mid-year showcase, in which groups of interns set up trade show-style booths for the day to demonstrate their projects and value to other staff and managers in the company. Because of the high-value, client-facing nature of our project, it was one of the few booths to be visited by Cisco's Head of Engineering, who reports directly to John

Chambers, the CEO. We had to give a short presentation explaining the project conceptually and technically, and he seemed pleased with our work.

The Bay Area is amazing for the quality of tech talent, startups etc. It really is another world. Getting on to Meetup means you can go to an interesting talk given by a start-up through to eBay, Facebook or Google (owing to our close proximity to their headquarters in Mountain View) every week. So it is a fantastic opportunity to learn more about your subjects of interest from the best in the business... and to network. And there's always free pizza!

San Francisco is an amazing city, I'd say like London but with sun. Initially, I brought my bicycle – I thought I could get around easily, but the sheer size of California meant that I soon wanted to buy a car. I try to get out most weekends and enjoy the incredible nature close to where I live. I've just got back from a snowboarding trip to Lake Tahoe, it's only 200 miles away. It's amazing that in a few hours you can go from a hot winter to being able to snowboard.

## **How did Kent help you with your career plans?**

I'm part of the CIIP (Cisco International Internship Program) started by Kent about six years ago, so the University has already been hugely proactive in my future career plans by helping me to get real experience during such an amazing industrial placement.

# GRADUATE PROFILE

**Matthew Gould graduated from Kent in 2012, with an MSc in Computer Science. He works as a software engineer for Influential Software Services Ltd.**

## Why did you choose Kent?

The University of Kent has great links with local companies, which I (correctly) believed would assist me in my placement search. Kent was one of the few universities that offered an industrial placement, which would give me practical work experience as part of the degree programme. The campus was a big part of why I chose to study at Kent – it had a strong, vibrant community feel.

## How did you find the programme?

It was demanding and stretched me in many areas, which helped me to realise my potential. It was so broad it enabled me to find the area of computing I enjoyed the most and the final project allowed me to hone the skills I wanted, as I could choose a project that interested me.

## Did the programme live up to your expectations?

It met my expectations, as there were plenty of coding challenges in multiple languages. Other disciplines, such as software engineering, enabled me to thrive in a technical atmosphere once I left university. I expected my Master's to prepare me for a technical working environment and I was not disappointed.

## Which part of the course most interested you?

I found the coding challenges the most interesting; I really enjoyed the sense of accomplishment once a problem was solved. The one-week project for the Software Engineering module and my final project stood out because they allowed me to work on larger-scale projects for a prolonged period.

## What about your lecturers?

The lecturers are clearly knowledgeable and enjoy their areas of research. The amount of material each lecturer had to cover was clearly challenging, given the contact hours and they did well to cover the necessary material in a methodical fashion.

## What was the level of support like in your studies?

Although teaching staff were clearly busy, they made time for me outside of the regular contact hours. The placement team was also helpful; they proofread CVs and covering letters, and recommended the most suitable placements to apply for.

## How did you enjoy your industrial placement?

The industrial placement was a highlight of the course. Working on real projects allowed me to apply the theory I had learnt during the first year to actual projects that would impact on businesses. The placement also endorsed the fact that I enjoyed working in a technical environment and wanted to continue a career in software engineering.

## How did Kent help with your career plans?

The industrial placement gave me practical, real-world experience that I could not have gained through lectures alone. Kent made it possible for me to get my foot on the career ladder with my first job as a software engineer.

## How do you see your career progressing?

I would like to continue in software development. I hope to eventually gain sufficient experience to become a senior developer. I enjoy working for a software consultancy, because it gives me exposure to many different projects, which enables me to gain a broad range of experience.

## What would you say to someone thinking of studying at Kent?

I would say 'go for it'. If you're prepared to put in the work and are aware of what the course involves, then there is no reason not to study at Kent. It has good facilities and teaching, and is a great place to live.

# KENT IT CONSULTANCY (KITC)

**Master's students looking to gain consultancy experience can do so by working in the Kent IT Consultancy (KITC) as part of their degree programme.**

## What is KITC?

KITC was founded in October 2004, and is part of the University of Kent's School of Computing. It is run by IT consultants who are students at the University, who provide a project-based consultancy service to small businesses. The relationships between the KITC consultants and their clients are managed by full-time IT professionals and the students are closely mentored by School of Computing staff members. Student consultants gain academic credit for the work they do, which counts towards their degree.

## What is KITC's mission?

KITC's mission is to solve business problems with technology and make our student consultants more employable. For our student consultants, the work that they do for our clients gives them the opportunity to apply their academic studies and experience in a real-world setting. This is backed up by the provision of specific, industry-focused training and support from both academics and professional IT consultants.



## How can KITC help me?

It can significantly improve your employment prospects. It gives real work experience, which is invaluable to future employers, and it gives you the edge over other graduates when applying for jobs. KITC is a great route for students who were undergraduates of any discipline who want to use their existing analytical and problem-solving skills in an IT setting.

*"I have achieved my goal of switching careers from working in banking to IT and I am now a consultant. I believe the course helped me to stand out among other recent graduates at the same level as myself, because of the work experience I gained while working in Kent IT Consultancy."*

**Oyinua Fumudoh**  
MSc IT Consultancy

# TAUGHT MODULES

**Below is a list of modules currently offered by the School of Computing. Please note that some modules may not be available in a particular year. For this reason, minor adjustments to programme structure may also sometimes be necessary.**

## Advanced Java for Programmers

**Module code:** CO871

This module is for well-qualified computer science students entering the MSc programme from a range of backgrounds. You will already have strong programming skills but will not necessarily have used Java or another object-oriented language extensively. This module develops you as a reflective programmer and seeks to ensure that you have the Java and object-oriented design skills necessary for the rest of your programme.

## Advanced Network Security

**Module code:** CO892

This module is about email security. Spam: why it exists, targeted spam and filtering systems. Phishing attacks, how to block fake sites and install browser-based defences; email-based malware and the defences against this. The topic includes intrusion detection, prevention systems, honey pots and denial of service, methods to detect complex denial of service attacks and defences against them. Eavesdropping and security in



wireless networks, and the use of router-based firewalls as a method to protect intranets is also covered.

## Advanced Object-Oriented Programming

**Module code:** CO882

This builds on CO881 and covers the design and implementation of high-quality software using object-oriented techniques. Systems are modelled as configurations of objects communicating with one another. Techniques are introduced which allow objects to play different roles within a system. These concepts are key to the support for adaptation and reuse that object-oriented programming provides. Emphasis is placed on gaining a deep understanding of these concepts and applying them in practice by developing programs in Java. You also explore software component frameworks that support the structuring and manipulation of data (structures and algorithms).

## Cloud Computing

**Module code:** CO846

Cloud computing describes a new supplement, consumption, and delivery model for IT services based on the internet. It typically involves over-the-internet provision of dynamically scalable and often virtualised resources. It is a byproduct and consequence of the ease-of-access to remote computing sites provided by the internet. This frequently takes the form of web-based tools or applications that users can access and use through a web browser as if it was a program installed locally on their own computer.

## Cognitive Neural Networks

**Module code:** CO836

Neural networks are placed in a historical perspective related to symbolic approaches and in the context of the artificial intelligence hypothesis. The idea of the components of a neuron as

a 'detector' are developed. Neural networks are explained in terms of the biology of the brain at a cellular electro-transmission level. A general framework is provided for neural network architectures at an abstract level and in terms of networks in the cortex. A simple Hebbian model of learning is outlined, and other models of unsupervised learning are introduced. Error-driven task learning is outlined, and the delta rule and back propagation presented. The generalised recirculation algorithm is introduced and its mathematical formulation and properties discussed.

### Computer Graphics and Animation

**Module code:** CO641

Computer graphics and animation are important for a variety of technical and artistic applications including web design, human-computer interaction (HCI) and graphical user interface (GUI) development, games and simulations, digital photography and cinema, medical and scientific visualisation and so on. This module introduces the subject from the perspective of computing. You learn about technologies and techniques for modelling, manipulating, capturing, displaying and storing 2D and 3D scenes, digital images, animations and video. You also gain practical experience of 3D modelling and animation tools, and of implementing digital imaging techniques in Java.

### Concurrency and Parallelism

**Module code:** CO890

Concurrent design and programming skills are of growing importance as multicore processor technology advances. A sound understanding of fundamental concurrency concepts and obstacles is essential. This module introduces fundamental theories of concurrency. It discusses how designs can be made parallel and identifies the common faults in concurrent programs and how to avoid them. It introduces a range of widely used programming paradigms and techniques for writing concurrent programs.

### Contracts, Professional Responsibility and Computing Law

**Module code:** CO841

You look at professional issues and professional organisations, data privacy legislation, and other UK laws relating to the professional use of computer systems. Criminal law relating to networked computer use, including new anti-terrorism legislation, and its application.

*"Without my degree and the placement year, I would not have the great job I have now. The help from the placement team is invaluable as they teach you how to deal with future employers and get the best deal for you."*

**Christian Baverstock**  
MSc Computer Science with an  
Industrial Placement

You learn about intellectual property rights, including copyright, patent and explicit intellectual property rights legislation. Contract law is covered, with a specific focus on vendor-client contracts and related issues. You look at examples of real-life contracts that have exposed a vendor or supplier to unacceptable commercial risks. However, this is a rapidly evolving field so specific topics will change from year to year.

### Data Mining and Knowledge Discovery

**Module code:** CO832

This module explores a range of data mining and knowledge discovery techniques and algorithms. You learn about the strengths and weaknesses of different techniques and how to choose the most appropriate for any particular task. You use a state-of-the-art data-mining tool, and learn to evaluate the quality of discovered knowledge. There is also the opportunity to extend data mining concepts and principles to text and web mining.

### Development Frameworks

**Module code:** CO894

This module examines the state-of-the-art in software development environments and the facilities they provide. The module outlines the development of simple applications in these environments, software libraries and frameworks, and their use in developing and testing software systems. You use development frameworks' facilities for project and source-code management, automated testing,

# TAUGHT MODULES (CONT)

refactoring and profiling and learn how to deploy applications across multiple platforms using installers and build-systems; continuous integration and deployment.

## Extended IT Consultancy Project

**Module code:** CO843

Students taking this module undertake three or (typically) more assignments for Kent IT Consultancy (KITC), which involves working with an external client. Every student is expected to take the lead in at least one project of this type. For each assignment, you may work individually or as part of a group. You are involved in the formulation and development within KITC of a product or service to be offered for future sale and you are expected to participate in a 'buddy' (mutual mentoring) relationship with another KITC student. In certain cases, you may be asked to undertake supervisory duties for which training is provided. Each assignment is carried out under the supervision of KITC's management. You are given a portfolio of assignments that explore a wide variety of stages in the software lifecycle.

## Foundations of Computing

**Module code:** CO322

Mathematical reasoning underpins many aspects of computer science. This module provides the skills needed for other modules on the degree programme. Topics include algebra, reasoning and proof set theory, functions and statistics.

## Fundamentals of Programming and Logic

**Module code:** CO523

This module covers object-oriented programming: fundamentals of classes and objects. Testing. Inheritance and polymorphism. Graphical-user interfaces (GUIs), exceptions and input-output. Functional programming: expressions, values and types (sessions and scripts). Numbers, Booleans and characters. Function definitions. Approaches to testing programs. Polymorphic types. Lists and common list processing functions. Tuples. Pattern matching, recursive function definitions. Algebraic data types. Propositional Logic. Data and information representation using XML.

## Introduction to Intelligent Systems

**Module code:** CO528

This module covers the basic principles of machine learning and the kinds of problems that can be solved by such techniques. You learn about the philosophy of AI, how knowledge is represented and algorithms are used to search state spaces. It is also an introduction to both machine learning and biologically inspired computation.

## Object-Oriented Programming

**Module code:** CO881

This introduces you to object-oriented programming using the popular Java language. It is designed for beginners who have not studied computer programming before. By the end you will be able

to develop simple programmes using Java.

(Note: students with substantial prior experience of programming take module CO871 Advanced Java for Programmers instead.)

## IT Consultancy Practice

**Module code:** CO645

Students taking this module undertake one or typically more assignments for Kent IT Consultancy (KITC). You learn to formulate and evaluate technical alternatives to meet IT requirements of small businesses including issues of integration with existing technologies and procedures, maintenance and expansion. Working under supervision, you estimate proposed solutions to small scale IT-based problems in small business situations in respect of time and cost. Assessment is 100% project-based.

## Logic and Logic Programming

**Module code:** CO884

There are four main components to this module, several of which are at the forefront of the academic discipline and are informed by research. These are:

- propositional and predicate logic, and resolution – this looks at the formal languages of propositional logic and predicate logic and the role of resolution in theorem proving and logic programming
- prolog programming – this is an introduction to the programming language and the concept of declarative coding

- search techniques – this uses generic search algorithms that are widely applied in solving computationally hard problems
- constraint logic programming – this shows how constraint satisfaction is useful in search and how this emerging paradigm fits with logic programming.

### Mobile and Ubiquitous Computing

**Module code:** CO831

You discuss the characteristics and limitations of hardware devices, communication and software infrastructures and environments used on small devices and in mobile and ubiquitous computing contexts. You look at the current practice in mobile and ubiquitous computing contexts, and deal with a range of professional and ethical issues, particularly those relating to security and privacy in mobile and ubiquitous computing.

### Natural Computation

**Module code:** CO837

This looks at the increasing use of nature-inspired computational techniques in computer science. These include the use of biology as a source of inspiration for solving computational problems, the application of artificial intelligence techniques to various problems, and the use of physical, chemical and biological systems to construct computers.

### Networks and Network Security

**Module code:** CO874

You review network techniques, switching and multiple access and look at high-speed local area networks and network protocols, including data link, transport and application layers. You look at real-time data transmission and quality of service; naming and addressing, including material on

the domain name system, dynamic IP address allocation and address translation systems. Firewalls, layer 3 network security and recent developments are also discussed. The nature of the topic changes from year to year and is addressed principally by research seminars and student-centred research.

### New Enterprise Development

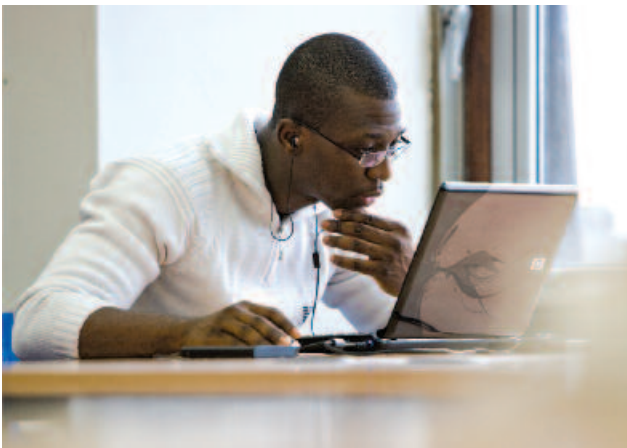
**Module code:** CO845

This module looks at all aspects of establishing a new business from evaluating a business idea to identifying potential markets and customers and writing a business plan. What skills are required for success? How do you identify relevant 'intellectual property' (IP) protection requirements. How do you commercialise and protect IP assets? Legal compliance and policies to ensure best practice in the governance of the business are covered as well as competitor analysis, marketing strategies and distribution networks. You also look at financial planning, cash flow, profit forecasts, break-even analysis and risk analysis. You learn negotiation skills to ensure best value from suppliers, for sales and customer contracts, and also for obtaining funding for the business.

### Project and Dissertation

**Module code:** CO880

Students choose their project near the beginning of their second term in co-ordination with the Project Research module (CO885). Projects are usually suggested by the School, a number of which may involve industrial collaboration.



**CONTINUED OVERLEAF**

## TAUGHT MODULES (CONT)

You may propose a project of your own if a suitable member of academic staff is available to supervise. The project must be appropriate for, and relevant to, your programme of study. Project work is normally undertaken individually. The project examines your ability to understand and expand on a specific technical problem, carry out investigations and practical work, including programming. You also have to be able to describe results, draw conclusions from them and write a coherent, well-organised dissertation.

### Project Research

**Module code:** CO885

The crowning piece of most Master's degrees is the project and dissertation in which you apply a wide range of skills learned in the taught modules to an interesting research problem or practical application of your choice. This module provides useful transferable skills for completing the project, and supports you in some preparatory tasks such as literature study and project planning.

*"By changing fields, I have a multidisciplinary skill base. The technical skills from my Computer Science MSc combined with problem-solving and analytical skills from my Physics BSc gave me a unique ability to sell myself to employers."*

**Robin Taylor**  
MSc Computer Science



### Security and Trust

**Module code:** CO876

You study cryptographic algorithms including symmetric and asymmetric techniques and the distinction between encryption and signatures and look at security mechanisms that are used with operating systems and the common criteria for evaluation. The module considers the problems of network security including wiretap, replay, masquerade and denial of service and the mechanisms to provide security such as firewalls and VPNs, and the problem of viruses and worms. You also look at digital rights management systems using digital watermarking techniques and the security of IEEE 802.11 networks, such as Wi-Fi.

### Software Engineering

**Module code:** CO886

This module takes a wider view of the software development process, with an emphasis on techniques and procedures for ensuring high product quality. A key topic is the use of the Unified Modelling Language (UML) for problem analysis and software design. Towards the end of the module students have an opportunity to put theory into practice by undertaking a group project, with another group as their customer.

### Systems Architecture

**Module code:** CO883

This provides an understanding of the basic principles of computer architecture. This includes the fundamental ideas of computer hardware such as Boolean algebra; binary and hexadecimal numbers



and data representation; bits, bytes and character codes; memory, and peripherals; registers, RAM and ROM. It also offers a practical introduction to the use of a UNIX-like operating system and you learn the principles and mechanisms of operating systems including memory management, swapping, virtual memory, file systems and local and remote file access.

### System Security

**Module code:** CO899

You look at federated identity management, privacy protection; viruses and worms and hacking. The module also covers secure architectures; formal verification methods and email security, such as SMTP-MIME and S/MIME. You study secure software development methods and tools, common criteria, code inspections, code coverage tools and code evaluation.

### Trust, Security and Privacy Management

**Module code:** CO834

This module investigates the process of security management. You take a holistic view of security management, starting with risk management and the formulation of security policies. Technical subjects include a description of the various security models, showing how authorisation policies can be automatically enforced. The legal and privacy issues associated with information management are also addressed, as are the usability issues of security technologies. The module concludes by investigating how security has been inbuilt into

some existing applications, and how security issues will effect the uptake of ubiquitous computing systems.

### Web-based Information Systems Development

**Module code:** CO887

Web-based information systems form the heart of e-commerce. They are also increasingly the way businesses handle all their information needs. Building such systems requires an understanding of up-to-date tools and technologies such as XML, UML, Java and databases; it also calls for an understanding of how to design systems that genuinely meet user and business needs. This module starts by examining the business context of web-based information systems. It introduces design methodologies and techniques, using UML in recording requirements. Systems implementation involves database management systems and these are studied in some depth. By the end of the module, you have developed a complete information system which uses XML and Java to link dynamic web pages to a database back-end.

**The following modules are taught by Kent Business School.**

### Digital Marketing

**Module code:** CB9067

This module looks at the digital marketing environment and related issues including: enabling technologies for digital marketing, website design, implementation and analysis, and the use of social

media as a marketing tool. You also consider the needs of customers in the internet age, customer loyalty, the customer relationship and how to reach and retain customers. Network effects and versioning, strategy and brands in the internet age are also covered, as well as data protection, privacy, legal issues, and digital marketing and globalisation.

### Financial and Management Accounting

**Module code:** CB937

The nature and purpose of accounting and the concepts underpinning accounting systems and financial statements are covered in this module. You look at the construction of primary financial statements and how to interpret and evaluate them, the regulatory framework of financial reporting and corporate governance. Topics covered include: budgeting, costing systems, including costing for overhead expenditure, accounting control and investment appraisal.

### Management of Operations

**Module code:** CB932

In this module you discover how operations can deliver a real competitive advantage. You gain the ability to review the overall operations management task, look at market issues and the development of business and operations strategies, and the management of people. You analyse operating problems, using the appropriate techniques to improve the operation's functions and develop your personal learning

## TAUGHT MODULES (CONT)

skills, group working skills, and the ability to critically analyse the techniques used within operations management taking account of the organisational context. Topics covered include: managing operations in the manufacturing and service sector; the operations manager's task and role; operations strategy, levels of strategy; linking the different levels of strategies through markets; designing and developing services, products and delivery systems to achieve strategic objectives; managing and controlling the operations system: Material Requirements Planning (MRP) Just in Time (JIT) Total Quality Management (TQM) SixSigma, inventory, and supply chain; improving operations, which includes measuring productivity and performance, and the tools and techniques for improvement.

### Strategy

**Module code:** CB934

This module provides an understanding of strategic analysis, strategic decision-making and strategic processes within and between organisations. It introduces key concepts, frameworks and approaches that are used in the formulation, implementation and evaluation of strategies, as well as contemporary issues that influence organisational strategic direction and decision-making. Case studies and exercises, used throughout the module, provide a vehicle for exploring the relationship between theory and practice in organisations.



### Structure and Organisation of the E-Commerce Enterprise

**Module code:** CB904

Internet technology, infrastructure, technology planning, management, acquisition and development of organisational capabilities are covered in this module. You look at e-commerce business models and competitive advantage; internet technologies and infrastructure; organisational IT (and IT infrastructure) management, especially in relation to information, networks and the internet, and the social, legal and ethical issues arising from use of the internet, such as security, privacy, identity and intellectual property. You are introduced to the notion of firm capabilities and discover how firms obtain, develop and retain these

capabilities as well as organisational structure and management, and how capabilities can be extended through virtual organisation.

*"I managed to get a job offer while I was doing my dissertation, which I don't think I would have got if I didn't decide to do the course. A lot of technical knowledge was required for the job interview that my course helped with; I think putting the course on my CV also helped me to stand out from the crowd."*

**Paul Ashton**  
MSc Networks and Security

# APPLYING FOR TAUGHT PROGRAMMES

**The entry qualifications vary according to which Master's programme you are applying for. Applicants whose qualifications fall short of the requirements but who have relevant work experience will also be considered and are encouraged to apply.**

## Advanced Master's programmes

A 2.2 or higher honours degree (or equivalent) in computing or a closely related subject.

## Conversion Master's (Computer Science MSc)

A 2.2 or higher honours degree (or equivalent) in any subject.

## IT and Business Master's programmes

A 2.2 or higher honours degree or equivalent in any subject.

Applicants must have a keen interest in, and sufficient prior knowledge of, information technology, which need not have been gained via formal academic study.

For the MSc IT Consultancy, entry is subject to a skills assessment and an interview (which may be conducted by phone or Skype).

## Pre-Master's programmes

### Computer Science GDip

A good ordinary Bachelor's degree (or equivalent) in computing or a related subject.

### Computing GDip

A good ordinary Bachelor's degree (or equivalent) in any subject.

## International Master's programmes

For details please see p12.

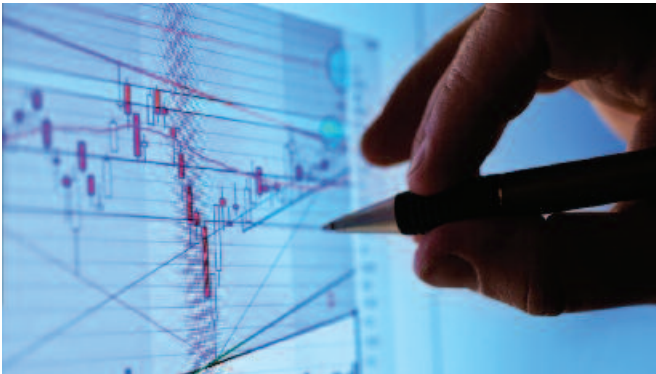
## How to apply

We only accept online applications. To apply, select the programme that you wish to study and click on 'apply'. See [www.kent.ac.uk/courses/postgrad/apply/](http://www.kent.ac.uk/courses/postgrad/apply/)

There is no fixed deadline, but we recommend that you apply no later than three months before your intended start date. Most taught postgraduate degrees begin in September although some may offer the opportunity to start in January.

If you have further questions about the application process, please read the application FAQs and if your query is not answered there, contact us on [www.cs.kent.ac.uk/about/contact-us.html](http://www.cs.kent.ac.uk/about/contact-us.html)

For details of the University's general entry requirements, see page 44.



*"I liked the flexibility of my degree. The lecturers were really helpful and the subjects were structured in a way that the knowledge you receive and your progress is perceived as a whole, rather than just a collection of separate classes. It is interesting to see how what you've learnt in one subject can be applied in a seemingly different subject."*

**Elena Tishkova**  
MSc Advanced Computer Science



# MAKERSPACE – THE SHED

**The School of Computing has its own makerspace, The Shed, which supports new kinds of innovative teaching and learning. Students and staff can use it to build physical devices for taught modules and to develop their own interests and hobbies.**

Equipped with a wide variety of machinery and development equipment such as the Oculus Rift and Raspberry Pi, The Shed takes advantage of the increasing accessibility of electronics and engineering with a rapid prototyping capability.

Over the last decade there has been a transformation in the ease with which complex, interactive objects combining software and hardware can be made. These overlapping technologies and ways of working have made this happen. They include:

- the ready availability of cheap, computer-controlled hardware that can easily be attached to other hardware such as lights, speakers, motors and microphones
- new software environments, such as processing and wiring, which facilitate the rapid prototyping of interactive software
- novel interfaces, in particular those using gesture and open source interfaces to game controllers such as Wii and Kinect



- the interaction of technology and craft, such as 3D printing and laser cutting, that enable complex designs to be readily built and shared online for others to build on, and craft that incorporates technology, such as smart textiles
- open source software projects, so that software design can draw on a vast repertoire of already-written software components
- the availability of data formats that allow the creation and mash-up of data from different sources including web and sensors.

## What's in The Shed?

The Shed is a large open-plan workshop area, fitted at one end with large, fixed pieces of equipment including 3D printers, a laser cutter and metal fabrication

machinery. Moveable workbenches give added flexibility and there is an open area for exhibitions which opens out on to a terrace.

## How is the space being used?

Initially it is being used for informal learning and teaching. We plan to embed a number of final-year undergraduate and Master's projects in the space. It is being used by other University groups, primarily TinkerSoc (Kent's Maker Society) for its community activities. We hope to run events for the wider University community and collaborative events with outside organisations and for the public.



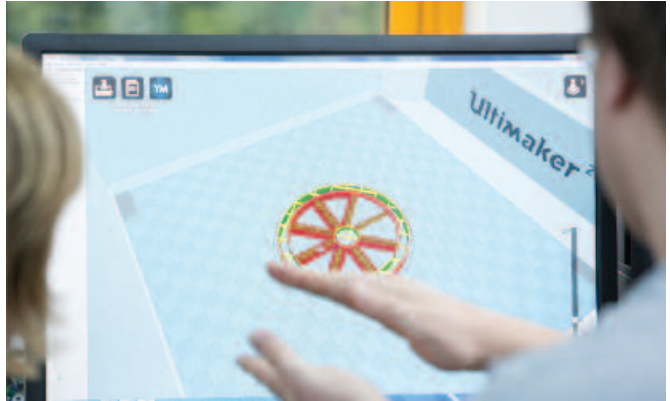
# RESEARCH DEGREES

**The School of Computing is recognised for its world-leading research. In the Research Excellence Framework (REF) 2014, computer science and informatics at Kent was ranked 12th in the UK for research intensity by the *Times Higher Education (THE)*.**

We have a vibrant postgraduate population and actively seek new PhD and MSc research students to join our research environment. We offer substantial financial support for students undertaking research degrees with studentships available by competition.

For a research degree in the School of Computing you undertake original individual study in a specified area of computing, under the guidance of an academic supervisor. A full-time PhD degree requires a minimum of three years' work; an MSc research degree can be completed in one year. All research students join a Research Group and are encouraged to work within the School and to engage with the wider national and international research communities.

In the most recent national Postgraduate Research Experience Survey, the School of Computing scored highly, with 90% of respondents expressing satisfaction with the quality of our supervision, and 90% stating that their overall experience either met or exceeded



their expectations. This underlines our commitment to creating an excellent environment for our research students.

## Funding and teaching opportunities

Each year the School of Computing offers several scholarships. These are open to UK, EU and overseas postgraduate research students who satisfy the entry requirements, who have made a formal application to the University, and who have been offered a PhD place.

All scholarships available are for home fees only. Overseas students need to demonstrate that they can fund the difference between the international and the home fee. Some studentships are for Graduate Teaching Assistantships (GTAs), and the School requires students in receipt of GTA funding to undertake no more than up to six hours of teaching and teaching-related

duties per week during term time. GTA applicants need to demonstrate that they are suitably skilled to carry out teaching.

These awards are typically for three years for PhD students, and dependent on satisfactory progression through each year of study. They are awarded on a competitive basis and interview performance is taken into account.

The Alumni Research Scholarship, for alumni of the University of Kent, is open to applicants from any subject. The successful candidate is selected on the basis of academic excellence, achievements to date in their chosen field, their communication skills and their contribution to the life of the University community.

For more details see [www.cs.kent.ac.uk](http://www.cs.kent.ac.uk)

**CONTINUED OVERLEAF**

## RESEARCH DEGREES (CONT)

For details on how to apply for funding, see [www.cs.kent.ac.uk/research/studyingforaphd/fundingopportunities.html](http://www.cs.kent.ac.uk/research/studyingforaphd/fundingopportunities.html)

For self-funded students, we may be able to offer the possibility of hourly paid teaching for small groups.

### Studying for a research degree

The PhD programme provides rigorous training for careers in professional computing or academia. At the end of this three-year period, you submit your PhD or enter an extension year. At the beginning of your registration, you and your supervisor produce a document outlining your plan for your degree. During the three years of your registration, you have

regular contact with your supervisor to report on progress, get advice and make plans.

### Skills training

As a postgraduate student at Kent, you have access to the support of the Graduate School, which is a focus for all graduate matters at Kent and provides specialist academic and personal advice and guidance.

The University's Graduate School co-ordinates the Researcher Development Programme for research students, providing access to a wide range of lectures and workshops on training, personal development planning and career development skills.

All first-year PhD students are required to complete a skills audit, which encourages you to consider your existing portfolio of skills, as well as the skills that you hope to acquire while doing your doctoral research. In addition, research students who are required to teach take part in an initial teacher training session and can enrol for the Associate Teacher Accreditation Programme.

### Research programmes Computer Science MSc, PhD

**Location:** Canterbury.

**Entry requirements:** A first or 2.1 degree or advanced/specialist taught MSc in computer science or a related discipline (such as mathematics, business studies





or electronics, as long as the degree has a strong computing component).

Your research should produce an original contribution in your chosen field of study. You work closely with your supervisor, a member of academic staff, who is your principal source of support. If you choose a research area that has interdisciplinary aspects, you may have more than one supervisor. In addition to regular supervision, you will be supported by a supervisory panel who provide further structured input and guidance.

## Research groups

### Computing Education Group

We focus on disciplinary-specific pedagogy, especially the teaching and learning of computer science and programming. Our research interests focus on understanding the aspects of learning that are specific to computing education, and which range from examining general theories of learning, through thematically focused investigations (such as gender), to tool construction. We examine education from multiple aspects, including supporting computing education research infrastructure, working with teachers, or focusing on student learning.

Areas of interest include:

- building an evidence base of research on early programming education
- tool support for learning and teaching of programming, including custom-made

development tools, such as educational programming languages, or development environments, which can adapt to changes in programming paradigms and technology and pedagogical advances

- analysis of data generated as a part of the learning process, which could be text-based, naturally occurring in the classroom (eg, assessments), generated as a reflective process on learning (eg, diaries), or generated from interaction with programming environments.

### Computational Intelligence Group

This Group brings together interdisciplinary researchers investigating the interface between computer science and the domains of bioscience and cognition. In terms of applying computation to other domains, we have experts in investigating the modelling of gene expression and human attention, emotions and reasoning. From the perspective of applying biological metaphors to computation, we research new computational methods such as genetic algorithms and swarm intelligence.

The Group also develops novel techniques for data mining, visualisation and simulation. These use the results of interdisciplinary research for finding solutions to computationally expensive problems.

The Group has strong links with other schools at the University of Kent, as well as with universities, hospitals and scientific research institutes throughout the country and internationally.

Areas of research activity within the Group include:

- bio-inspired computing including neural networks, evolutionary computing and swarm intelligence
- application of computational simulations in biology and medicine
- systems biology including gene expression modelling
- theory and application of diagrammatic visualisation methods
- data mining and knowledge discovery
- construction of computational models of the human cognitive and neural system.

### Future Computing Group

We target the next generation computing paradigms and their applications. The Group has been working on grid/cloud computing (internet II), green computing and virtual computing, etc, for many years. A developed grid/cloud computing platform conforms to the internet standard and can universally accelerate office/database/web/media applications by a factor of up to ten. This work won an Association for Computing Machinery/Institute of Electrical and Electronics Engineers' (IEEE) Supercomputing Finalist Award.

**CONTINUED OVERLEAF**

## RESEARCH DEGREES (CONT)

The Group's other important work is on environment-friendly green computing through utilising a revolutionary element – memristor. Most recently, the Group has discovered that memristor has a peculiar effect (they named it 'delayed switching' in an IEEE paper). It has demonstrated that power-saving memristors can be packed at least twice as densely as semiconductors, achieving a significant breakthrough in computer storage density.

The Computational Economics and Multi-Agent Systems (CEMAS) Lab is part of this Group and conducts research in the intersection between computer science and economics (including finance), and the crossroads between multi-agent systems and cloud computing.

Areas of interest include:

- grid/cloud computing
- green computing
- biologically-inspired computing
- computational economics and finance
- multi-agent systems and distributed artificial intelligence
- evolutionary computation and optimisation
- web-based information retrieval.

### Programming Languages and Systems Group

Our research involves all aspects of programming languages and systems, from fundamental theory to practical implementation. The Group has interests across a wide

range of programming paradigms: object-oriented, concurrent, functional and logic. We research the links between logic and programming languages, the verification of the correctness of programs, and develop tools for refactoring, tracing and testing. We are interested in incorporating safe concurrent programming practices into language design.

The Group is also interested in practical implementation of programming languages, from concurrent parallel processing to battery-operated mobile systems. Particular research topics include lightweight multi-threading kernels, memory managers and garbage collectors.

Research areas include:

- theoretical and architectural questions concerning designs for both hardware and software
- abstractions and implementations of concurrency in programming languages
- formal specification of systems and their architecture
- design patterns and tools for enabling the safe and scalable exploitation of concurrency
- compilers, memory managers and garbage collectors
- lightweight multi-threading kernels and highly concurrent operating systems
- refactoring of functional and concurrent languages
- applications of formal methods to provably correct, secure systems

- model checking and abstract interpretation, including applications to discovering security vulnerabilities
- program verification and theorem proving.

### Security Research Group

This Group is a key partner in the University's Interdisciplinary Cyber Security Research Centre, see [www.cybersecurity.kent.ac.uk](http://www.cybersecurity.kent.ac.uk)

The University has been recognised as an Academic Centre of Excellence in Cyber Security Research by the Engineering and Physical Sciences Research Council (EPSRC) and the Government Communications Headquarters (GCHQ). The centre of excellence recognition will run from July 2015 to June 2017.

Security of computer systems and the information held on them is becoming even more important as a consequence of society's increased reliance on electronic devices – with most of these holding valuable information or performing critical operations, and connected through networks of some kind.

The Security Research Group covers a wide range of security topics, including identity management and authorisation, privacy, cloud computing, intrusion detection, intrusion tolerance, network overlays, cryptography, formal methods and reverse engineering for vulnerability



analysis. It has a strong involvement with postgraduate teaching in the MSc programmes in Computer Security, Information Security and Biometrics, and Networks and Security.

A main subgroup is the Information Systems Security Group led by the authors of PERMIS, a fully functional open source authorisation (or privilege management) infrastructure written in Java.

Research in the Security group contributes to the Research Councils' UK Global Uncertainties Programme.

Research areas include:

- public key and privilege management infrastructures
- trust management and metrics and reputation systems
- intrusion detection
- tools for vulnerability analysis
- formal methods for cryptography
- policy-based security
- security and risk management
- privacy and security
- autonomic security
- user-friendly security
- continuous auditing
- cloud security.

*“I have studied from undergraduate through to PhD here at Kent, and chose to because I enjoy it here so much! The campus is beautiful and always buzzing with a friendly atmosphere. I have been able to grow as a researcher in an environment where I feel confident and supported.”*

**Jenny Cooke**  
PhD Computer Science

# CHALLENGING STUDENTS

**Sally Fincher, Professor of Computing Education and Director of Graduate Studies – Research, supervises Daniel Knox, who is studying for a PhD in Computer Science. Here, they discuss what studying at PhD level is like and how the supervisory process works.**

**Daniel, why did you choose to study for a PhD at Kent?**

I originally did an undergraduate degree at Kent and really enjoyed the degree and campus, so staying at Kent was a big motivation for me. It is also one of the few computer science departments with an education research group, which was also a big draw for me.

**What are you researching for your PhD?**

I am researching how a space can afford different kinds of practice when students are learning to program. I choose to research this because much of our current research investigates how students interact with the computer (when they are programming), and so, my research takes a step back from this and asks, 'where are they programming?', 'why did they choose to go there and not somewhere else?' and 'what are they doing in that space?'

**How have you found the supervision process?**

My supervisor goes above and beyond. She lets me know when I am going down the wrong path and is always around so that I can quickly chat to her about my work. She also points me in the right direction for new opportunities.

**Sally:** Dan is a good PhD student! He confronts issues and doesn't 'hide' when the research is not going well. Also, he realised very early in his doctoral studies that he was going to have to write papers (and a thesis) and that this was not a strength for him; he worked consistently at this, and has greatly developed his writing skill and facility.

**What are you most enjoying about your studies?**

Everyone has their specialism and they are happy to share their knowledge. This means there is always help for academic 'problems' and my own projects. For example, a lecturer in my School helped me to see some data [that I had collected] in a new light.

**How is study at postgraduate level different to undergraduate study?**

You are in control. I decide what to work on each day and make sure things get done. I can choose to work on research, teaching, my academic development or my own smaller projects each day. Many days I do them all; it involves long hours, but is very rewarding. There is also no right or wrong answer

anymore. This means that I have to defend my position, based upon my research and literature in the field.

**Sally:** Postgraduate study can be lonely. Students aren't part of a cohort, and they don't face the common hurdles of assessments and exams together. As student representative, Dan has done great work in bringing PhD students in the School together for group activities and social events.

**How have you funded your studies?**

I received a three-year scholarship from the Engineering & Physical Sciences Research Council (EPSRC) and supplemented it with some teaching. Currently I now work as a technician in the new makerspace that the school has built, which helps me fund my continuation year.

**How would you describe the relationship between a supervisor and a student?**

**Sally:** Part challenge (I'm challenging them, or they're challenging me) part adventure (you never know the end of the journey at the start). With luck it's the start of a long-term association: at best, you end up owing your students an intellectual debt.

**Daniel:** The relationship between a supervisor and student changes over time and it can be radically different for each student. Generally, your supervisor will be quite hands-on in the first year, suggesting literature and encouraging you to write. Hopefully, this is also the time

when you can experiment and learn the ropes about conducting research – you will make lots of mistakes, have cringe-making interviews, etc. Your supervisor will get you over this.

By year two, you get a lot more independence and your supervisor is likely to start suggesting different publishing routes and introducing you to others in your field. By year three, most of what a student does is their own independent research and you go to your supervisor for advice – a second pair of eyes on your work – and, most important, discussions about your thesis.

### What makes a good supervisor?

**Daniel:** One who lets you experiment, but also keeps track of time, so that they can pull you back when you are going the wrong way (there is only three years after all!).

**Sally:** PhD supervision is a tricky skill, because every student is different. Some need project-management from you, some need close intellectual guidance, some need wide-ranging discussion,

some need reassurance – they pretty much all need coffee! And just as students are different, so are supervisors, which means there are different types of good supervisor, and different ways of being a good supervisor. Perhaps the real skill is in the match, in knowing what kind of person you want to work with for three or four years.

### Is Daniel a good student to supervise, and why?

**Sally:** Dan is determined and dogged in tracking ideas down – and that's a great thing in a PhD student. Doctoral studies are more marathon than sprint, so being persistent gives you an advantage.

### Do you have any advice for someone thinking about taking a research degree at Kent?

**Sally:** Don't walk in cold off the street: talk to your potential supervisor – and to some of their

other students, if possible. Make sure you have a good intellectual and interpersonal fit.

**Daniel:** Think why you want to do research, it will be a long and hard three-plus years. At the same time, Kent is a brilliant place to work, with a lot of support that goes on behind the scenes (we get provided with all the computer resources and printing we need, office space and constant support from people throughout the School). The hardest bit is selecting your initial topic (it will likely substantially change), work out if you are willing to do the same thing for a long time (compared to earning money in industry) and pick a supervisor that you feel you can work well with during that time. After that, you're set.

*“My PhD allows me to explore my own personal interests in computer science and make my own discoveries. I am no longer studying other people's ideas, but creating my own.”*

**Edward Barrett**  
PhD Computer Science



# RESEARCH PROFILE: KEEPING YOUR DATA SAFE

The Security Research Group in the School of Computing has as one of its main themes the protection of data from malicious access. This is of great importance to individuals – people are beginning to feel their privacy slip away because of the activities of internet companies and intelligence services. With more and more cases of identity theft and compromised internet banking accounts, people are also getting more worried about the security of personal data.

The role of humans in security is critical, and this is reflected in the Security Research Group having many collaborations with other disciplines (such as Psychology and Law) in the Interdisciplinary Cyber Security Research Centre.

For many years, Professor David Chadwick and his research team have worked on the PERMIS authentication infrastructure. This allows the owners of data to express in a very sophisticated way, and to a high level of detail, who can have access to which data.

Part of the reason that Chelsea Manning and Edward Snowden were able to access so many 'highly secret' files is the lack of sophistication of the access control system usage by the intelligence services. PERMIS also covers issues such as sharing data between different collaborating organisations, allowing exceptional access in special circumstances, and delegating access rights to others where needed. In so far as

it can possibly be automated, the European data protection laws have been encoded in a policy for the PERMIS system as well, to ensure that access to personal data also satisfies the relevant legal obligations.

PERMIS is an open source project, which means that it can be freely used by organisations, which can also give back their own additions to the project. One example of this is the 'hardened' version of PERMIS that was constructed by the Swiss Ministry of Defence. The current development of PERMIS is to enable it to protect access to cloud-based systems.

Another way that Manning and Snowden might have been foiled is by detecting the unusually high number of files that they downloaded, especially in relation to their position within the organisations they worked for. Research is under way at Kent to detect these kinds of

'insider attacks' through observing anomalous behaviour, and how access control systems can be modified, while still in operation, to stop such attacks. Along with Chadwick, Dr Rogério de Lemos and Chris Bailey are exploring this.

A final and essential component is the protection of data while it is being transmitted across the open internet. It had been clear for a long time that information sent 'in the clear' across the network could in principle be 'sniffed' and collected by any of the computers traversed. Recent revelations have made it clear that this sort of data gathering, or 'mass surveillance', is actually happening in practice. As a consequence, encryption as a mechanism of guaranteeing confidentiality, and steganography as a way of hiding messages, are becoming more prominent and are being explored within the Security Research Group.



# APPLYING FOR A RESEARCH DEGREE

**The School of Computing welcomes applications to study for a research degree (PhD, MSc). Candidates must hold a good honours degree (first or 2:1) or a Master's degree at merit or distinction in a relevant subject or equivalent.**

Before you can apply for a research degree, you must have an idea for a project, or an area you wish to work in. If you have a specific research proposal (or area) in mind you can contact a member of staff and develop a research proposal directly with them. You can find out more information about the research interests of members of staff and look at some suggested research projects. Once a research proposal has been agreed, you can then fill in the University's online admission form.

If you have not previously contacted a member of staff, you can apply using the University's online admission form. We will then work to match your interests with a member of the academic staff.

## Applying for funding

Your application will be put forward for consideration for any of the available funding, including 50th Anniversary Scholarships. There are several funding opportunities; see p31 or visit [www.kent.ac.uk/pgfunding](http://www.kent.ac.uk/pgfunding) for more details.



## Application requirements

You must complete an online admission form and, for funding applications, a completed request for funding form. You must also supply the name and contact details of two referees; plus an original document providing confirmation of your degree. If the degree is not yet awarded send a transcript giving details of your marks to date. Non-native English speakers must supply a certificate of competence in English (IELTS or Pearson). The School of Computing requires IELTS at 6.5 with no element less than 6.0 (or equivalent) and Pearson 62 including 60 in all subtests. Applicants for the IT Consultancy MSc require 7.0 IELTS (including 7.0 speaking and all other elements at 6.0) or Pearson 68 (inc 62 in all four subtests).

## Deadlines

We have one starting date each year for our research degrees: September. We will consider applications up to 30 June for entry in September that year. Overseas students may wish to apply in advance of the deadline to ensure that they leave enough time to obtain their visas.

The School Scholarship Committee has much earlier deadlines for completed applications, and sits twice a year, in the early spring and in the summer. If you apply for external funding be aware that these often have their own deadlines.

## Further information

For details of how to apply, see p44.





# ACADEMIC STAFF INTERESTS

**The School of Computing is home to over 40 academic staff, including world-leading researchers in key areas such as security, communications, computational intelligence, grid computing, and memory management.**

For full details please see:  
www.cs.kent.ac.uk/people/

## **David Barnes Lecturer**

Tools for testing numerical and scientific software; computer simulation in biology; technological support for computer science learning and teaching. Recent publications include: *Objects First with Java* (co-author, 2012).

## **Dr Fred Barnes Senior Lecturer**

Concurrent programming languages, compilers and run-time systems for and based on the communicating processes model of concurrency (CSP and pi-calculus); low-level programming; operating-systems; memory management; run-time system implementation; distributed, parallel and GPU computing; languages, compilers and formal methods.

## **Dr Mark Batty Lecturer**

Concurrency; software verification; systems; relaxed memory; programming language semantics; GPU concurrency.

## **Dr Laura Bocchi Lecturer**

Formal verification of distributed systems; service-oriented systems; concurrency; behavioural types with logical annotations and time; transactions and transaction protocols.

## **Dr Eerke Boiten Senior Lecturer**

Formal methods, refinement, cryptography and security.

## **Professor Howard Bowman Professor of Cognition and Logic**

Human attention, emotions, reasoning; connectionist modelling; symbolic modelling; EEG recording and analysis methods; formal methods and concurrency theory.

## **Professor David Chadwick Professor of Information Systems Security**

Public key infrastructures; privilege management infrastructures; trust management; identity management; privacy management; policy-based authorisation; cloud security; autonomic access controls and internet security research.

## **Dr Vincent Cheval Lecturer**

Member of the Security Research Group; formal and automatic verification of cryptographic protocols.

## **Dr Olaf Chitil Lecturer**

Semantics and theoretical foundations of programming languages; type theory; program

transformation; compiler construction; message-passing-based concurrency; programming tools; how to write programs.

## **Dr Dominique Chu**

### **Senior Lecturer**

Computational systems biology and simulation of biological systems. Recent publications include: *The Science Myth: God, society, the self and what we will never know* (2013).

## **Professor Theodosios Dimitrakos**

### **Professor of Computer Science**

Cloud computing security; cyber security; data confidentiality and data leak protection; trust management and reputation systems; identity and access management; uncertainty reasoning and formal logic.

## **Bob Eager**

### **Senior Lecturer**

System software, particularly operating systems; computer history; hardware-related topics; UNIX operating systems.

## **Professor Sally Fincher Professor of Computing Education**

The construction and boundaries of Computer Science education; the teacher perspective, especially teacher decision-making; patterns and pattern languages, their use in knowledge-transfer, and their application to CS pedagogy. Recent publications include: *A Commons Leader's Vade Mecum* (co-author, 2011).

CONTINUED OVERLEAF

## ACADEMIC STAFF INTERESTS (CONT)

### **Professor Alex Freitas** **Professor of Computational Intelligence**

Data mining; evolutionary algorithms; bioinformatics; the biology of ageing. Publications include: *Automating the Design of Data Mining Algorithms: an evolutionary computation approach* (co-author, 2009).

### **Dr Marek Grześ** **Lecturer**

Simulation-based dynamic optimisation; reinforcement learning; symbolic and decision-theoretic planning and developing intelligent, assistive systems for people with dementia.

### **Dr Julio Hernandez-Castro** **Lecturer**

Computer and network security; cryptography and cryptanalysis; steganography and steganalysis; data loss prevention; lightweight cryptography and RFID security.

### **Dr Colin Johnson** **Reader**

Bioinformatics; computer simulation in biology; bio-inspired computing including genetic algorithms, genetic programming and swarm intelligence methods.

### **Professor Richard Jones** **Professor of Computer Systems**

Implementation of programming languages; memory management; garbage collection, distributed garbage collection; object demographics; program analysis

for improved memory management; program visualisation. Recent publications include: *The Garbage Collection Handbook: The Art of Automatic Memory Management* (co-author, 2011).

### **Dr Anna Jordanous** **Lecturer in Computing**

Computational creativity; music informatics; information retrieval; knowledge modelling; natural language processing; machine learning; data mining; semantic web; linked data; ontologies; digital humanities. Contributed a chapter on 'Language and Music' to *The Routledge Handbook of Language and Creativity*, edited by Rodney H Jones (forthcoming, 2015).

### **Dr Stefan Kahrs** **Lecturer**

Expressiveness of programming languages, type systems, term rewriting, infinitary rewriting.

### **Dr Michael Kampouridis** **Lecturer**

Computational finance; application of computational intelligence (ci) techniques to business-related problems, such as economics and finance; use of evolutionary techniques (eg genetic algorithms), genetic programming), heuristic search optimisation and hyper-heuristics; financial forecasting; intelligent decision support systems for business.

### **Dr Peter Kenny** **Senior Lecturer; Director of Graduate Studies – Taught**

Computer graphics and animation, especially realistic human characters; simulations and games based on AI techniques; digital imaging and image processing.

### **Professor Andy King** **Professor in Program Analysis**

Abstract interpretation, logic programming and security.

### **Professor Michael Kölling** **Professor of Computer Science**

Object-oriented systems; computer science education; programming languages; visualisation; development environments and tools; user interfaces. Recent publications include: *Objects First with Java: A Practical Introduction Using BlueJ* (co-author, 2011).

### **Dr Rogério de Lemos** **Senior Lecturer**

Software engineering for self-adaptive systems: just dynamic generation of processes, abstractions for supporting self-adaptability and self-organisation, resilience evaluation; self-adaptive dependable and secure systems; architecting dependable systems: architectural abstractions for fault tolerance, and verification and validation of dependable software architectures; software development for safety-critical systems; dependability and bio-inspired computing.

**Dr Caroline Ling Li**  
**Lecturer**

Tools for controlling computer/robot using brain signal; body sensor data fusion for healthcare and sports; methods for diagnosing, classifying and monitoring states of brain health/ illness; signal processing and machine learning methods. Recent publications include: *Tax Reforms under Market Distortions in Product and Labour Markets* (with K Angelopoulos and J Malley), *European Economic Review*, 2013, 61(c), 28-42.

**Ian McLaughlin**  
**Head of School (Medway)**

Embedded systems; speech and audio; mobile and energy-aware computing; communications; machine hearing; smart buildings and homes.

**Dr Fernando Otero**  
**Lecturer**

Development of ant colony optimisation algorithms for data mining; economic applications of data mining; bioinformatics; evolutionary algorithms, mainly genetic programming.

**Dr Scott Owens**  
**Senior Lecturer**

Semantics of shared memory concurrency; design of programming languages; formal verification for software and interactive theorem proving.

**Dr Palaniappan Ramaswamy**  
**Reader**

Biological signal analysis; biometrics; brain-computer interface; genetic algorithms; neural networks. Recent publications include: *Biological Signal Analysis* (author, 2010); *Digital Systems Design* (author, 2011); *Introduction to Speech Signal Analysis Using MATLAB* (author, 2015).

**Dr Peter Rodgers**  
**Reader**

Information visualisation; graph drawing; Euler diagrams.

**Professor Simon Thompson**  
**Professor of Logic and Computation**

Functional programming in Haskell and Erlang; refactoring functional programs: tool building, theory and practice; dependently-typed functional programming; testing of complex and concurrent systems using properties; property extraction from test suites. Recent publications include: *Haskell: The Craft of Functional Programming* (2011).

**Gerald Tripp**  
**Lecturer**

Techniques for the analysis and control of high-speed packet networks, including system monitoring and network intrusion detection; use of special-purpose hardware and firmware designs to perform high-speed string and regular expression matching.

**Ian Utting**  
**Senior Lecturer**

Tool support for teaching and learning in CS, especially programming, and especially small and mobile devices; large scale data-driven studies of initial programming education, especially using Black Box.

**Professor Frank Wang**  
**Professor of Future Computing;**  
**Head of School**

Future computing; green computing; cloud computing; biologically-inspired computing; data storage and data communication.

**Dr Meng Wang**  
**Lecturer**

Functional programming; bidirectional transformation; software testing and debugging.

**RESEARCH  
EXCELLENCE**

The School of Computing was judged to have an environment conducive to supporting the development of internationally excellent research, according to the Research Excellence Framework (REF) 2014.



# SCHOLARSHIPS AND FUNDING

## Academic scholarships

### School of Computing scholarships

Scholarships are awarded on academic merit and are available to students of any nationality registering on our standard taught Master's programmes. Please note: a scholarship is guaranteed for all eligible overseas (non-EU) students with the equivalent of a UK first class honours degree.

### International Scholarship for Taught Master's Students

The University of Kent offers scholarships to overseas (non-EU) students registering on our taught postgraduate courses. These are awarded on the basis of academic merit. For details, and to apply online, see [www.kent.ac.uk/scholarships/postgraduate/international/taught\\_masters.html](http://www.kent.ac.uk/scholarships/postgraduate/international/taught_masters.html)

International scholarship applicants are also recommended to apply for a School of Computing Scholarship. Applying for both increases your chance of securing some funding. For more details, see [www.cs.kent.ac.uk/research/studyingforaphd/fundingopportunities.html](http://www.cs.kent.ac.uk/research/studyingforaphd/fundingopportunities.html)

### For Kent graduates

Kent students who graduate with an honours degree from the University who opt to go straight in to a Master's programme are eligible for a tuition discount. For details see [www.kent.ac.uk/scholarships/postgraduate/graduateschool.html](http://www.kent.ac.uk/scholarships/postgraduate/graduateschool.html)



### Deadlines

The deadlines for applying for School of Computing and University scholarships can vary, so please check the School and University websites for up-to-date information.

### School enquiries

T: +44 (0)1227 824180  
E: [computing@kent.ac.uk](mailto:computing@kent.ac.uk)

### Admission enquiries

T: +44 (0)1227 827272  
E: [admissions@kent.ac.uk](mailto:admissions@kent.ac.uk)

### Further information

For information about applying to Kent, or to order a copy of the *Graduate Prospectus*, please contact:  
Recruitment and Admissions Office,  
The Registry, University of Kent,  
Canterbury, Kent CT2 7NZ, UK  
T: +44 (0)1227 827272  
F: +44 (0)1227 827077

## COME AND VISIT US

We hold Open Days and postgraduate events throughout the year. For more details, see [www.kent.ac.uk/opendays](http://www.kent.ac.uk/opendays)

# GENERAL INFORMATION

## European connections

Kent is known as the UK's European university. Our two main UK campuses, Canterbury and Medway, are located in the south-east of England, close to London, and we also have study locations in Brussels, Paris, Athens and Rome. We have a diverse, cosmopolitan population with 149 nationalities represented. We also have strong links with universities in Europe. From Kent, you are two hours away from Paris and Brussels by train.

## World-leading research

In the Research Excellence Framework (REF) 2014, 97% of Kent's research is of international quality, up from 87% in 2008. The percentage of Kent's research deemed to be world-leading or internationally excellent is 73%. Kent's score for research power increased by 59%, the third largest increase of the top 50 research-intensive universities. Computer Science at Kent is ranked in the top 20 in the UK for research intensity.

## Strong academic community

Kent's postgraduate students are part of a thriving intellectual community. In addition to lectures, seminars and supervision, you benefit from a rich and stimulating research culture. We have also invested in Woolf College, a modern facility on the Canterbury campus dedicated to postgraduates, which combines accommodation with academic and social space.

## A global outlook

Kent has a great international reputation, attracting academic staff and students from around the world. Our academic schools are engaged in collaborative research with universities worldwide and we offer a range of opportunities to study abroad and an approach that is truly global.

## The Graduate School

As a postgraduate student, you also have the support of the Graduate School, which promotes your academic interests, co-ordinates the Researcher Development Programme and the Global Skills Award, and facilitates cross-disciplinary interaction and social networking.

## Funding

Kent provides a variety of financial support opportunities for postgraduate students. These range from research studentships, location-specific funding, sport and music scholarships, and funding specifically for overseas fee-paying students. For further information, see [www.kent.ac.uk/pgfunding](http://www.kent.ac.uk/pgfunding)

## Enhanced career prospects

At Kent, we want you to be in a good position to face the demands of a tough economic environment. During your studies, you acquire a high level of academic knowledge and specialist practical skills. We also help you to develop key transferable skills that are essential within the competitive world of work.

### Location

Canterbury and Medway

### Faculty

Faculty of Sciences

### School

School of Computing

### Contact

School of Computing,  
University of Kent,  
Canterbury,  
Kent CT2 7NF, UK

T: +44 (0)1227 824180

E: [computing@kent.ac.uk](mailto:computing@kent.ac.uk)

### Applications

#### Taught programmes

Online at  
[www.kent.ac.uk/courses/postgrad/apply](http://www.kent.ac.uk/courses/postgrad/apply)

#### Research programmes

See p31 or contact the School for further details.

**Terms and conditions:** the University reserves the right to make variations to the content and delivery of courses and other services, or to discontinue courses and other services, if such action is reasonably considered to be necessary. If the University discontinues any course, it will endeavour to provide a suitable alternative. To register for a programme of study, all students must agree to abide by the University Regulations (available online at: [www.kent.ac.uk/regulations](http://www.kent.ac.uk/regulations)).

**Data protection:** for administrative, academic and health and safety reasons, the University needs to process information about its students. Full registration as a student of the University is subject to your consent to process such information.



# COME AND MEET US

To find out more about visiting the  
University, see our website  
[www.kent.ac.uk/visit](http://www.kent.ac.uk/visit)