Electronic, Electrical and Computer Engineering PhD (Communications Engineering & Remote Sensing specialism)

Postgraduate doctoral research degree in Electronic, Electrical and Computer Engineering PhD/MSc by Research (Communications Engineering & Remote Sensing specialism):

We have a broad range of research centred on the applications of microwave technology into communications and sensor systems, and on novel aspects of network design with research funding from the EU, research councils, MoD and industry.

We have a long tradition of excellence in electromagnetics and its applications, with exciting growth areas in microwave systems and networks.

Study here and find out why the University of Birmingham has been awarded The Times and The Sunday Times University of the Year 2013-14 (http://www.birmingham.ac.uk/news/latest/2013/09/20-sep-Birmingham-announced-as-University-of-the-Year.aspx)

Course fact file

Type of Course: Doctoral research

Study Options: Full time

Duration: PhD - 3 years full-time; MSc by Research - 1 year part-time, 2 years full-time

Start date: Registration for PhD and MSc by Research study can take place at the beginning of any month

Contact

Admissions Tutor: Dr Costas Constantinou

Contact us online (http://bham.hobsons.co.uk/ask.aspx?cid=1223&did=24) or at +44 (0)121 414 4294.

School of Electronic, Electrical and Computer Engineering (/schools/eece/index.aspx)

Details

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The Antennas and Applied Electromagnetics Laboratory has world-leading work on antennas and propagation for body-centric communications and antennas for vehicles. It has extensive facilities, including two $12m^2$ microwave anechoic chambers, a millimetric anechoic chamber, a microwave reverberation chamber, network and spectrum analysers up to 110GHz, access to a $70m^2$ class 10,000 clean room, and a large suite of commercial software for simulation of microwave structures.

The MCI Laboratory is specialised in microwave active circuits and antennas and in the application of computational intelligence to control and adapt them. Facilities include a digitally modulated signal generator and vector signal analyser for the analysis of signal integrity in linearised transmitters and active antennas, interfaced to a PC for 'hardware in the loop' development of control algorithms.

The Microwave Integrated System Laboratory is active in emerging radar technology for remote sensing. In addition to the electrical engineering microwave facilities it has a 40-metre long flight imitator, unique for UK universities, positioned on the building roof, which can carry a 50kg payload.

The Networks Laboratory is engaged in the modelling of large-scale complex networks and is actively developing novel adaptive routing and MAC protocols for wired and wireless networks. It has a range of computationally intensive workstations, a wireless networking testbed and is currently setting up a wired network simulator.

Work in the optics area includes: analysis and modelling of novel optical devices such as optical amplifiers, optical filters, optical transmitters and optical receivers; generation of new codes for optical code-division multiple access (OCDMA) to minimise the multi-user interference and analysis of soliton propagation in optical fibre communications.

Current projects

Projects underway include:

- Antennas and propagation for on-body communications systems
- Low-profile sensors for vehicle radar and communications
- Metamaterial antennas
- Antennas and propagation for medical implants
- Linear microwave transmitter architectures using computational intelligence techniques
- Antennas and front ends for vehicle millimetric communication systems
- Wireless Forward Scattering Radar network for situation awareness
- Space Surface BSAR with non-cooperative transmitter for surface monitoring
- UWB radar for concealed weapon and explosive detection

- Modelling data-loss in large packet switched networks
- Game theoretic MAC protocols
- Distributed soft security in wireless networks
- Vehicular ad-hoc networks
- Reduction of multi-user interference in optical CDMA
- Ultra-short pulse propagation in optical amplifiers
- Novel optical filters for WDM applications

Funding

We currently have funding from: EPSRC, DTI, Highways Agency, EMRC DTC, BAE Systems ATC, Samsung, Toyota, QinetiQ, Eudyma and Semelab.

Related links

School of Electronic, Electrical and Computer Engineering (/schools/eece/index.aspx)

Communications Engineering Group (/research/activity/eece/systems-devices/communications/index.aspx)

Why study this course

Our research and teaching stretches from materials, devices and systems - with close links with physics - through the generation and distribution of electrical energy, the railwaynetwork, communications and applied computing, to activities in serious games and human interaction technologies, which border on applied psychology.

With 30 academic staff andnearly 40 support staff, it's likely that we will be active inwhichever aspect of Electrical and Computer Engineeringis of interest to you. Our turnover on research is around £3million per year, which comes from a variety of sources includingUK government and industry as well as the EU. We are keen to welcome new students who have ability, enthusiasm and commitment.

Over 25 years, the Institution of Engineering and Technology(IET) has recognised our taught programmes as the first stepstowards professional chartered engineer status, and accreditationof our courses was confirmed by the IET in 2008.

In the 2008 Research Assessment Exercise, 85% of our research was judgedto be of international standing while 60% was internationally leading. Our aim is to maintain and improve on this high qualityin all aspects of our work.

Fees and funding

Standard fees (/postgraduate/dr-fees/tuition.aspx) apply.
Learn more about **fees and funding (/postgraduate/dr-fees/index.aspx)**

Scholarships and studentships
For home/EU applicants, full funding from EPSRC or from other sources can often be arranged through us; the closing date for EPSRC studentships is late June, please contact the School directly for more information. Alternatively email **financialsupport@bham.ac.uk (mailto:financialsupport@bham.ac.uk)**.

International students can often gain funding through overseas research scholarships, Commonwealth scholarships or their home government.

Entry requirements

The normal entrance requirements for MSc by Research or PhD study are a first degree of at least good UK upper second-class Honours standard, an appropriate standard of English and adequate financial support. The requirements also allow for entry based on comparable ability, as indicated by a good UK MSc performance or a lower first degree performance plus substantial relevant experience.

Learn more about **entry requirements (http://www.birmingham.ac.uk/students/dr/requirements)**.

International students
We accept a range of qualifications from different countries – learn more about **international entry requirements (/postgraduate/requirements-dr/step1.aspx)**.

Standard English language requirements (http://www.birmingham.ac.uk/students/pg/requirements/english) apply.

How to apply

Learn more about **applying (/postgraduate/requirements-dr/index.aspx)**

Apply now (https://pga.bham.ac.uk/lpages/EPS019.htm)

When clicking on the Apply Now button you will be directed to an application specifically designed for the programme you wish to apply for where you will create an account with the University application system and submit your application and supporting documents online. Further information regarding how to apply online can be found on the **How to apply pages (http://www.birmingham.ac.uk/students/courses/postgraduate/apply-pg/index.aspx)**

Apply now (https://pga.bham.ac.uk/lpages/EPS019.htm)

Research interests of staff

The School of Electronic, Electrical and Computer Engineering (EECE) at the University of Birmingham employs some 30 full-time academic staff and approximately 60 research assistants, and has a population of around 100 Doctoral Researchers. EECE has an annual income of around ?3 million. Research is supported through grants from the European Union, UK Research Councils, the Ministry of Defence, and UK Industry.

EECE has a long-standing international reputation in research related to **Microwave Engineering and Radar Systems** and to **Power and Control**, particularly in **Rail Systems**. Over the past decade, it has been investing in,

and growing, research in areas related to **Computer Systems Engineering**.

Research themes

Microwave systems and devices (http://www.birmingham.ac.uk/research/activity/eece/systems-devices/index.aspx)

The primary (but not only) concern of this research centre is the development of devices and systems for communications and radar. The centre's research covers both basic science and applications. An example of basic science is the work on materials such as dielectrics, ferroelectrics and superconductors. This basic work is complemented by the development of devices such as new, passive and active microwave circuits for real world applications. In addition there is significant work on radar and communication systems.

Birmingham Centre for Railway Research and Education (http://www.birmingham.ac.uk/research/activity/railway/index.aspx)

The Birmingham Centre for Railway Research and Education brings together a multidisciplinary team from across the University to tackle fundamental railway engineering problems. The team actively engage with industry, other universities through Rail Research UK-A, and international partners. The centre also delivers the MSc postgraduate programme in Railway Systems Engineering and Integration.

Human computer interaction (http://www.birmingham.ac.uk/research/activity/eece/human-computer/index.aspx)

Research at the HCI Centre includes intelligent interaction, natural interaction, utilizing speech, gesture, activity and emotion, social computing, digital economy, future digital technologies, fusing physical and virtual domains, mobile and ubiquitous computing, and the psychology of interaction.

Related research

- **Communications Engineering Group - Electronic, Electrical and Computer Engineering research (/research/activity/eece/systems-devices/communications/index.aspx)**
- **Electronic, Electrical and Computer Engineering Research (/research/activity/eece/index.aspx)**

Related staff

Dr Costas Constantinou (/staff/profiles/eece/constantinou-costas.aspx)

Employability

University Careers Network

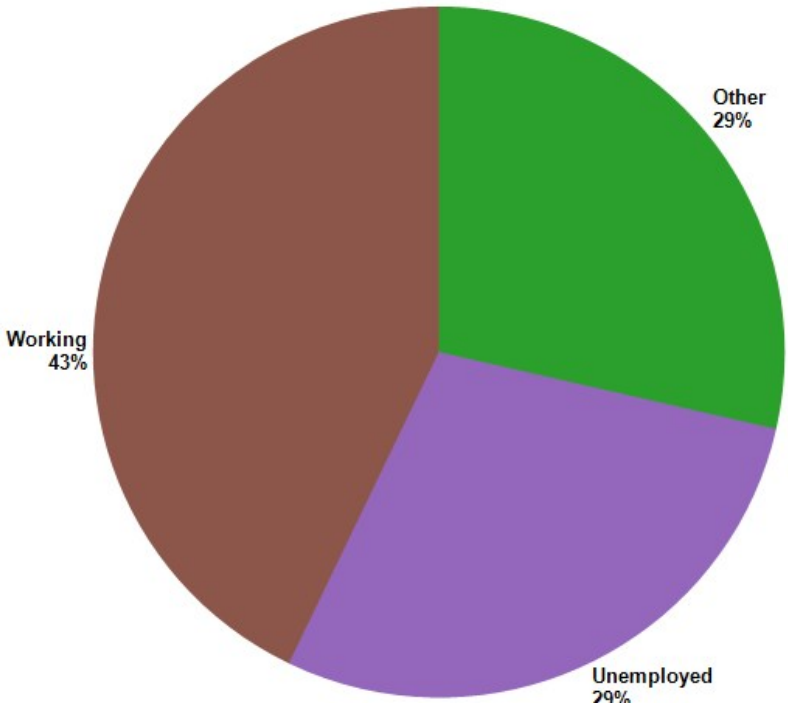
Preparation for your career should be one of the first things you think about as you start university. Whether you have a clear idea of where your future aspirations lie or want to consider the broad range of opportunities available once you have a Birmingham degree, our Careers Network can help you achieve your goal.

Our unique careers guidance service is tailored to your academic subject area, offering a specialised team (in each of the five academic colleges) who can give you expert advice. Our team source exclusive work experience opportunities to help you stand out amongst the competition, with mentoring, global internships and placements available to you. Once you have a career in your sights, one-to-one support with CVs and job applications will help give you the edge.

If you make the most of the **wide range of services (https://intranet.birmingham.ac.uk/as/employability/careers/college/eps/index.aspx)** you will be able to develop your career from the moment you arrive.

Destinations of Leavers from Higher Education (DLHE) 2011/12 (postgraduate taught graduates)

The DLHE survey is conducted 6 months after graduation.



Examples of employers

- Aero Engine Controls
- Jaguar Land Rover
- Ministry of Defence
- Price Waterhouse Coopers
- Ernst and Young
- Arup
- Glaxo SmithKline
- NHS
- Talk Talk
- Autologic

Examples of occupations

- Electronic Engineer
- Applications Engineer
- Communications (Electronic) Engineer - Officer
- Optimisation Consultant
- Manufacturing Engineer
- Junior Business Analyst
- Test Engineer
- Service Specialist
- IT Analyst

- Development Engineer

Further study - examples of courses

- MSc Project Management
- MSc Radio Frequency and Microwave Engineering
- MSc Electronic and Computer Engineering
- MSc Physics and Technology
- Postgraduate Certificate in Education - teaching
- AAT accountancy

Visit the **Careers section of the University website (https://intranet.birmingham.ac.uk/as/employability/careers/college/eps.aspx)** for further information.