

Professorship of Electrical Engineering

in association with St Hugh's College



Outline of the post

The University intends to appoint a Professor of Electrical Engineering with effect from 1 October 2011 or as soon as possible thereafter.

This appointment is a key part of the department's and University's strategic plan to strengthen research and teaching in electrical engineering at Oxford as a key component of our portfolio in engineering science. Current strengths in the department include communications and ultra-fast systems, signal processing, electrical power and energy, photonics, including applied optics and optical systems, electrical and optical materials (especially liquid crystals). However, while applications in these areas are welcomed, the search is not limited to candidates working in them.

The successful candidate will have an outstanding research record and will be of internationally recognised stature in electrical engineering. He/she will be expected to pursue a research programme at the forefront of the subject, providing research leadership to colleagues working in this field. He/she will have the opportunity to shape the direction of research in the University in the electrical engineering field.

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Further information may be obtained from Prof. G.T. Houlsby, FREng (Head of Department), Department of Engineering Science, Parks Road, Oxford, OX1 3PJ (tel. +44 (0)1865 273003, email guy.houlsby@eng.ox.ac.uk) and all enquiries will be treated in strict confidence; they will not form part of the selection decision.

The Department of Engineering Science

Engineering teaching and research takes place at Oxford in a unified Department of Engineering Science whose academic staff are committed to a common engineering foundation as well as to advanced work in their own specialities which include most branches of the subject. We have especially strong links with computing, materials science, medicine and also with economics and management studies. The Department employs 72 academic staff (this number includes eight statutory Professors appointed in the main branches of the discipline, and 24 other Professors in the Department); in addition there are ten Visiting Professors. There is an experienced team of teaching support staff, clerical staff and technicians. The Department has well-equipped laboratories and workshops, which together with offices, lecture theatres, library and other facilities have a net floor area of about 16,000 square metres. Further information about the Department is available at www.eng.ox.ac.uk.

The Department is part of the Mathematical, Physical and Life Sciences Division of the University. More information about the MPLS Division may be found at www.mpls.ox.ac.uk.

Research

Research in the Department is particularly strong. We have approximately 280 research students and about 80 Research Fellows and Postdoctoral researchers. Direct funding of research grants and contracts, from a variety of sources, amounts to an annual turnover of approximately £10M in addition to general turnover of about £12M. In the Research

Assessment Exercise of 2008, 85% of the Department's research was rated as 4* or 3* (world-leading or internationally excellent). The research activities of the department fall into seven broad headings, though there is much overlapping in practice: **Turbomachinery; Materials Engineering; Civil and Offshore; Information, Control and Vision; Electrical and Optoelectronic; Chemical and Process; Biomedical Engineering.**

Electrical Engineering

A group of 11 academic staff conducts research and teaching in the broad area of *Electrical and Optoelectronic Engineering*, though there are many points of contact with those working in *Information, Control and Vision*, and indeed in other areas in the department. The Professor of Electrical and Electronic Engineering is Professor Lionel Tarassenko FEng, whose research in signal processing is mostly of biomedical application, and who is currently the Director of the Institute of Biomedical Engineering. The post now advertised is thus a new post created to provide leadership within the broad field of Electrical Engineering. In addition to this Professorship, it is the department's intention to fill further academic posts in the general area of electrical engineering. Areas in which we are now active include:

- **Communications and ultrafast systems** – research focuses on electromagnetic wave propagation, subsurface radio propagation, under-water sensor systems, metamaterials, superconductors and physical medical imaging, resulting in a strong publication record and patent portfolio.
- **Power** – novel nonlinear power electronics, high power transmission line transformers and inductive voltage adders, dusty, solar and z-pinch plasmas and high performance induction motors. “Energy” projects include: fuel cells for hydrogen-powered road vehicles; a patented energy-saving device that identifies what appliances are switched on, in an industrial or domestic setting; non-tracking solar concentrators. Spin-outs in domestic energy saving, and tidal power generation are in progress.
- **Circuit design and testing** funded by EPSRC, Analog Devices and DSTL has concentrated on research into analogue interfaces to sensors (particularly optical detectors for digital cameras, optical communications, MEMs and microphones) and in developing techniques and tools for automatic diagnosis of defects in ICs. These activities are finding wide application in industry.
- Research on **materials** investigates a range of electronic and optical composite materials mainly aimed at the energy sector, especially window coatings for thermal control and energy saving in glass manufacture. In the area of nanoparticles there has been collaborative electrospray research and a major joint activity with the Department of Materials on safety. Licence agreements have led to sunscreen and cosmetic products appearing in high street pharmacies.
- **Optical systems** – research focuses on simulation of photonic devices and crystals and on their use in the design of components (optical splitters and demultiplexers) and in model propagation within optical fibres. In this area there is also collaborative research on communications using micromachines and other components and systems in the optical domain as well as on high speed optical wireless communications.
- **Liquid crystals** – research is carried out in close collaboration with the world's leading material manufacturer and the three leading device manufacturers who, with EPSRC, provide funding. Important outputs include methods to measure residual chirality (a key property), novel display devices, understanding of flexoelectric switching in bi-stable structures, and the first use of mesh-free methods to determine liquid crystal structures in two and three dimensions. We expect these techniques to become industry standards.

- **Applied optics** – the applied optics group receives EPSRC, BBSRC, Royal Society and industry funding for research in microscopy, adaptive optics, diffractive optics and electromagnetic systems. Funding from RCUK under the Basic Technology Programme has been used to develop deep-tissue imaging technologies in inter-disciplinary collaboration with other UK centres. The group's technology is exploited through licence agreements with international microscope manufacturers and the spin-out company Aurox.

The Department has well-equipped laboratories with a range of specialised equipment and facilities. It also has access to facilities across the University and at the Begbroke Science Park.

Teaching

We aim to admit 160-180 undergraduates per year, all of whom take 4-year courses leading to the MEng degree. Around 80% of the undergraduates read the broadly-based Engineering Science course. The remainder study for a joint degree in Engineering, Economics and Management. The courses are accredited at MEng level by the major engineering institutions. The syllabus has a common core extending through the first two years. Specialist options are introduced in the third year, and the fourth year includes further specialist material and a major project.

The Oxford Collegiate system

As well as working in the Department of Engineering Science, the appointee will also be a fellow of St Hugh's College. There are 38 self-governing and independent colleges at Oxford, giving both academic staff and students the benefits of belonging to a small, interdisciplinary community as well as to a large, internationally-renowned institution. The collegiate system fosters a strong sense of community, bringing together leading academics and students across subjects, and from different cultures and countries.

St Hugh's College

The appointee will be elected to a Professorial Fellowship at St Hugh's College. The Fellowship carries full membership of the College's Governing Body, together with membership of the College's Senior Common Room, and full rights at common table (lunch and dinner free of charge when the kitchens are open). The Fellow may also be invited to sit on College committees.

St Hugh's College was founded in 1886 as a women's college and became fully mixed in 1986. The College has some 400 undergraduates and around 200 graduates, academic staff of 58, 30 college lecturers and 90 non-academic staff members. From its beautiful site in North Oxford, the College promotes a thriving culture of research and intellectual engagement.

Engineering is strongly represented in St Hugh's. The College admits up to 7 undergraduates in Engineering and its Joint Schools each year together with up to 5 graduate students to read for research degrees. The College has two Tutorial Fellows in Engineering: Professor Stephen Duncan and Dr Christopher Stevens, together with a Career Development Fellow: Dr Vito Tagarielli.

More details about St Hugh's can be found at www.st-hughs.ox.ac.uk.

Duties of the post

The Professor will be a member of both the University and the college community. He or she will be part of a lively and intellectually stimulating research community which performs to the

highest international levels in research and publications and will have access to the excellent research facilities which Oxford offers. He or she will have a role to play in the running of the college as a member of its Governing Body.

The Professor's duties will include the following.

- Research and the general supervision and leadership of research in electrical engineering and more generally in the Department of Engineering Science.
- Teaching, including lectures, classes laboratory demonstration, supervision of undergraduate and masters' projects, and supervision of doctoral students.
- University examining, as and when requested to do so by a committee for the nomination of examiners.
- Administration, including participation and chairing of relevant committees in the Department and in the wider University, and undertaking relevant administrative roles.
- Headship of Department: every professor or reader who is employed by the University may be invited by the Divisional Board to act as Head of Department and, unless individually exempted, has the formal obligation to accept the headship. The present Head of Department is Prof. Guy Houlby, FREng, whose period in office extends to 30th June 2014.

Selection criteria

Applications will be judged only against the criteria which are set out below. Applicants should make sure that their application shows very clearly how they believe that their skills and experience meet these criteria.

Oxford is committed to fairness, consistency and transparency in selection decisions, and unsuccessful applicants may request feedback against the published selection criteria for the specific post. (We are, however, unable to provide general advice about the suitability of applicants' cvs for future vacancies in Oxford or elsewhere.) Chairs of selection committees (known as electoral boards) will be aware of the principles of equality of opportunity and fair selection and there will be a member of each gender on the selection committee.

The selection criteria for this post are as follows:

REQUIREMENTS	ESSENTIAL or DESIRABLE	ASSESSED BY:
<i>The postholder must be able to demonstrate:</i>		
<i>Substantial international reputation in scholarship and research and excellent publication record in international journals in electrical engineering.</i>	<i>Essential</i>	<i>application, interview</i>
<i>The vision, leadership and ability to manage a substantial research team, to train, guide and motivate research students and junior colleagues, and to establish a leading research presence in the University.</i>	<i>Essential</i>	<i>application, interview</i>
<i>The ability to develop and present proposals for funding, and an established record in, and in attracting research grant support.</i>	<i>Essential</i>	<i>application, presentation, interview</i>

<i>An ability and readiness to contribute to the development and management of the Department of Engineering Science and the wider University.</i>	<i>Essential</i>	<i>application, interview</i>
<i>Past record and commitment to providing effective teaching at undergraduate and postgraduate level, including supervision of graduate students.</i>	<i>Essential</i>	<i>application, presentation, interview</i>
<i>Ability to communicate effectively (written and orally).</i>	<i>Essential</i>	<i>application, presentation, interview</i>
<i>Engagement with the wider engineering profession at a senior level</i>	<i>Desirable</i>	<i>application</i>

Sabbatical leave and outside commitments

All professors may apply for sabbatical leave to allow them to focus on their research. In general, one term of leave is available for each six terms worked. This leave may either be taken as one term of leave after 6 terms of service, or accumulated and taken as one year of leave after 6 years of service.

Professors may also spend up to 30 working days in each year on projects outside their employment duties, such as consultancy, spin-out activity and membership of research councils and other bodies, and there is no limit to the amount of money which staff may earn from these activities. Full details are available on the University website at www.admin.ox.ac.uk/ps/staff/codes/outsidecov.shtml. Guidance on ownership of intellectual property (www.admin.ox.ac.uk/statutes/regulations/182-052.shtml) and managing conflicts of interest (www.admin.ox.ac.uk/rso/integrity/#Conflict) is also available on the university website.

Pay and conditions

Salary, benefits and pension

The salary of the appointee will be determined by the Vice-Chancellor, after appropriate consultation. In addition the professor will be eligible for consideration, in regular reviews, for one of a number of additional salary awards which may be made in recognition of outstanding academic distinction and/or contribution to the academic work of the University (e.g. in leadership in, or in the development of, some field of study).

The salaries of professors at Oxford are generally above the average of those in other leading UK universities.

An additional pensionable allowance (currently £21,174 per annum) will be payable in respect of any period during which the professor is Head of Department. Any allowance payable for a period of less than three years will not, however, be pensionable.

Eligible staff may join the Universities Superannuation Scheme. Details are available on the website at <http://www.admin.ox.ac.uk/finance/pensions/uss/>.

Relocation expenses

The University has a generous relocation expenses scheme for eligible staff, which covers removal and travelling expenses connected with relocation, as well as up to £6,500 to cover professional fees in appropriate cases. Further details are available on the website at <http://www.admin.ox.ac.uk/finance/expenses/relocationscheme/>.

Assistance with house purchase

Where difficulty arises in regard to housing for a professor moving to the Oxford area to take up appointment (e.g. as may be the case where the move is from an area in which housing costs are substantially lower than in Oxford), the University will facilitate arrangements to assist house purchase.

Residence

Professors are required to reside within the University (i.e. within twenty-five miles of Carfax, the central point of Oxford) during at least six months in each academic year, between 1 October and 1 August, and in particular during not less than six weeks of each term.

Length of appointment

The professorship is tenable until retirement. The normal retirement age is 65, but those who are able to demonstrate an interest in a later retirement date under the University's procedures (details are available on request) may retire at a later date.

Family support

The University has generous maternity and adoption leave arrangements, and also offers support leave to fathers and partners. Details are available on the website at www.admin.ox.ac.uk/ps/staff/family.

All staff are eligible to apply to use the University nurseries (although there is a long waiting list for nursery places), and the full range of tax and National Insurance savings scheme is in operation. Details are available on the University's childcare website at <http://www.admin.ox.ac.uk/eop/childcare/>.

The University will try to accommodate flexible working patterns as far as possible and there is considerable flexibility in the organisation of duties. More information on family support and flexible working policies is available on the website at www.admin.ox.ac.uk/ps/staff/family.

Facilities and services

The University has a range of facilities and benefits for its staff; more details are available on the website at <http://www.admin.ox.ac.uk/ps/staff/benefits/>.

The University Disability Office provides support to staff and students with a disability and may be contacted through its website at www.admin.ox.ac.uk/eop/disab.

Equality of opportunity

The policy and practice of the University of Oxford require that all staff are offered equal opportunities within employment. Entry into employment with the University and progression within employment will be determined only by personal merit and the application of criteria which are related to the duties of each particular post and the relevant salary structure. In all cases, ability to perform the job will be the primary consideration. Subject to statutory provisions, no applicant or member of staff will be treated less favourably than another because of age, disability, gender reassignment, marriage or civil partnership, pregnancy or maternity, race, religion or belief, sex, or sexual orientation.

The University of Oxford

The University of Oxford aims to sustain excellence in every area of its teaching and research, and to maintain and develop its position as a leader amongst world-class universities. Placing an equally high value on research and on teaching, the colleges,

departments and faculties of Oxford aspire both to lead the international research agenda and to offer a unique and exceptional education to our undergraduate and graduate students.

Oxford's self-governing community of scholars includes university professors, readers, and lecturers, college tutors, senior and junior research fellows and over 2,500 other university research staff. The University aims to provide facilities and support for colleagues to pursue innovative research and outstanding teaching, by responding to developments in the intellectual environment and society at large, and by forging close links with the wider academic world, the professions, industry and commerce. The Strategic Plan, detailing strategy for the period 2008-12, can be found at www.admin.ox.ac.uk/prs/planningcycle/stratplan.shtml.

Research at Oxford combines disciplinary depth with an increasing focus on inter-disciplinary and multi-disciplinary activities addressing a rich and diverse range of issues, from deciphering ancient texts and inscriptions using modern scientific and computational methods developed in Oxford, through to global health, climate change, ageing, energy and the effects on our world of rapid technological change.

Oxford seeks to admit undergraduate students with the intellectual potential to benefit fully from the college tutorial system and small group learning to which Oxford is deeply committed. Meeting in small groups with their tutor, undergraduates are exposed to rigorous scholarly challenge and learn to develop their critical thinking, their ability to articulate their views with clarity, and their personal and intellectual confidence. They receive a high level of personal attention from leading academics.

Oxford has a strong postgraduate student body which now numbers about 7,000, well over a third of the full-time students. Postgraduates are attracted to Oxford by the international standing of the faculty, by the rigorous intellectual training on offer, by the excellent research and laboratory facilities available, and by the resources of the museums and libraries, including one of the world's greatest libraries, the Bodleian.

Medical questionnaire and the right to work in the UK

The appointment will be subject to the satisfactory completion of a medical questionnaire and the provision of proof of the right to work in the UK.

Applicants who would need a work visa if appointed to the post are asked to note that under the UK's new points-based migration system they will need to demonstrate that they have sufficient points, and in particular that:

(i) they have sufficient English language skills (evidenced by having passed a test in basic English, *or* coming from a majority English-speaking country, *or* having taken a degree taught in English).

and

(ii) that they have sufficient funds to maintain themselves and any dependents until they receive their first salary payment.

Further information is available at:

<http://www.ukba.homeoffice.gov.uk/workingintheuk/tier1/general/eligibility/>.

How to apply

There is no application form. Applications must include:

- your full contact details including email and full postal addresses, and a telephone number

- a covering letter or statement explaining how you meet the criteria set out above
- a full CV and publications list
- an indication of where you first heard about this post
- the names and contact details (postal and email addresses, telephone and fax numbers) of precisely **three** referees.

You should contact all three of your referees before applying, to ensure they are aware of your application and of the requirements for the post, and to ensure that they would be content to write a reference for you for this post, if they were asked to do so.

The University will assume that it is free to approach your referees at any stage unless your application specifies otherwise. Therefore if you would prefer a referee or referees to be approached only with your specific permission or if you would prefer them to be approached only if you are being called for interview on the final short list, then you must state this in your application, alongside the details of the relevant referee(s). You should provide the names and full contact details of three referees even if you do not wish them to be contacted yet.

If you are shortlisted but only Oxford references are available for you, you will be asked at a later stage to provide the name of an additional referee outside Oxford.

Applications should be sent by email to Dr Gwen Booth, Personnel Officer, Senior Appointments at professorships@admin.ox.ac.uk.

The deadline for applications is **Monday 25 April 2011**.

Should you have any queries about how to apply, please contact Mrs Elaine Eastgate at professorships@admin.ox.ac.uk or telephone: +44 (0) 1865 280189.

Oxford welcomes applications from candidates who have a disability; applicants invited for interview will be asked whether they require any particular arrangements to make the interview more convenient and effective for them.

All data supplied by candidates will be used only for the purposes of determining their suitability for the post and will be held in accordance with the principles of the Data Protection Act 1998 and the University's Data Protection Policy (available on the website at www.admin.ox.ac.uk/councilsec/dp/policy.shtml).

Consideration of applications

All applications will be acknowledged as soon as possible after receipt and will be considered by the board of electors as soon as possible after the closing date. The membership of the board of electors will be published in the University *Gazette* (www.ox.ac.uk/gazette) as soon as it is finalised.