

STEPHEN W. HAWKING PROFESSORSHIP OF COSMOLOGY

DEPARTMENT OF APPLIED MATHEMATICS & THEORETICAL PHYSICS, CENTRE FOR MATHEMATICAL SCIENCES

1 The Professorship

Background

The Professorship has been created through the generous benefaction of the Avery-Tsui Foundation to honour the unique scientific legacy of the late Professor Stephen Hawking, who was a member of the Department of Applied Mathematics and Theoretical Physics in the University of Cambridge for 40 years (including as Lucasian Professor of Mathematics 1979-2009 and Director of Research 2009-2018). This is the first occasion that the University is seeking to make an election to this Chair.

Selection Criteria

Candidates will be considered for the Professorship on the basis of the following selection criteria, which they should address in their application.

- An outstanding research record of international stature in the field of cosmology, which includes analysis as to the origins of matter and of the universe, theoretical cosmology and gravitation and all other fields of academic scholarship as may from time to time be generally considered cosmology and theoretical physics.
- The vision, leadership experience and enthusiasm to build on current strengths in maintaining and developing a leading research presence, and an established record in attracting research grant support to further this development.
- The ability to further the academic planning and strategic development of cosmology in the University and, where appropriate, to facilitate its development within the UK.
- The ability to manage and interact effectively with staff and students at all levels.
- An enthusiastic commitment to the recruitment, training and mentoring of the next generation of researchers, including undergraduates, research students, and postdoctoral research fellows

Candidates will hold a PhD or equivalent postgraduate qualification.

2 The Department of Applied Mathematics & Theoretical Physics

The Department of Applied Mathematics and Theoretical Physics is one of the largest and strongest departments of its kind in Europe. The Department currently consists of 29 Professors (9 of whom are FRS), 9 Readers, 1 Senior Lecturer and 11 Lecturers, approximately 80 Post-doctoral Fellows and approximately 110 Research Students. Over 900 undergraduate and postgraduate students are enrolled in Parts I to III (years 1 to 4) of the Mathematical Tripos. Part III is not only the 4th year of the undergraduate course, but attracts more than 100 students each year from outside Cambridge, who take it as a one-year postgraduate course, leading to a Masters degree.

DAMTP shares responsibility for teaching in the Mathematical Tripos with its sister Department, the Department of Pure Mathematics and Mathematical Statistics (DPMMS). DAMTP also has responsibility for teaching mathematics to undergraduates taking Natural Sciences. DAMTP and DPMMS are accommodated, along with the Isaac Newton Institute for Mathematical Sciences and the Betty and Gordon Moore Library (covering mathematics, physical sciences and technology) at the Centre for Mathematical Sciences, a purpose-built complex in Wilberforce Road.

The Faculty of Mathematics is a supporter of the Good Practice Scheme developed by the London Mathematical Society's Women in Mathematics Committee (<http://www.lms.ac.uk/women/good-practice-scheme>). The Faculty is actively engaged with the Athena SWAN Award Scheme (holding a Bronze Award from 2013). The Department would particularly welcome applications from women, since women are, and have historically been, underrepresented on our academic staff. The Department is also keen to attract applications from candidates who have a genuine interest in, and commitment to, developing the role of women in Mathematics and who can demonstrate the potential to be strong role models to female mathematicians.

Research

Current research in DAMTP is loosely organised into eight broad subject areas: Applied and Computational Analysis, Astrophysics, Geophysics, Fluid and Solid Mechanics, Mathematical Biology, Quantum Information, High Energy Physics and General Relativity and Cosmology. The boundaries between the areas are not rigid and evolve with time. Many members of staff contribute to more than one area and this is regarded as a key factor in the continuing success of DAMTP.

Research in each of DAMTP's subject areas involves collaboration with strong groups nationally and internationally, and participation in numerous interdisciplinary projects and programmes. Many members of DAMTP have valuable links with industry and other non-academic sectors. For more information please see:

<http://www.damtp.cam.ac.uk/research>.

Theoretical Physics in DAMTP

There are two large research groups in Theoretical Physics, the High Energy Physics group and the General Relativity and Cosmology group. The progress of research has naturally led to an evolution and weakening of the historical boundaries between the two groups and several staff members are members of both. The work of the research groups is funded by two substantial consolidated grants from STFC, one in Theoretical Particle Physics and the other in Fundamental Physics and Observational Cosmology. Theoretical Physics also has important support from EPSRC and from European Research Council

Investigator Awards. A further important ingredient is the Centre for Theoretical Cosmology (CTC), founded in 2007 and funded by donations to support the work of Stephen Hawking and his colleagues. CTC is devoted to the development and testing of fundamental theories of the Universe and involves staff from both theoretical physics research groups.

There are strong links between theoretical physics in DAMTP and work in high-energy physics at the Cavendish Laboratory, in theoretical cosmology at the Institute of Astronomy and in mathematical analysis in the Department of Pure Mathematics and Mathematical Statistics. There are several regular seminar series in Theoretical Physics in DAMTP, some run jointly with groups from these other Departments.

The Department has access to excellent computational resources with a sophisticated heterogeneous network of UNIX workstations and Linux PCs, with support for Windows and Macintosh systems. Together with DPMMS, the Department has procured a state-of-the-art Computing Development Platform consisting of a 6TB in-memory server, linked to a cluster with Xeon Phi and GPU accelerators, and supported by specialist parallel programmers. At University level, large PF clusters are available via the University High Performance Computing Service (<http://www.hpc.cam.ac.uk/>).

The Department is home to the GK Batchelor Laboratory, in which numerous fluid mechanical and biophysical experiments are undertaken. The laboratory has extensive infrastructure, including facilities for microfluidics, confocal microscopy and micromanipulation, high-speed imaging, tracking microscopy, cell growth and molecular biology. A dedicated, centrally funded machine/electronics shop provides world-class device fabrication and technical expertise in the service of the experimental groups.

There are strong links with the Isaac Newton Institute for Mathematical Sciences. At any time, the Institute runs two parallel research programmes, each usually lasting six months and attracting several dozen mathematical scientists nationally and internationally. In several areas there are also links to research in DPMMS <https://www.dpmms.cam.ac.uk/>, including in general relativity and the analysis of Einstein's equations, and to other Departments within the School of Physical Sciences (<http://www.physsci.cam.ac.uk/researchinsps>).

Further general information about the University of Cambridge, the Department of Applied Mathematics and Theoretical Physics, and Mathematics in Cambridge may be found on the websites: <http://www.cam.ac.uk>, <http://www.damtp.cam.ac.uk> and <http://www.maths.cam.ac.uk>

3 Standard Duties

Teaching and research

The Professor will be required to deliver lectures and give instruction in applied mathematics and theoretical physics, and in particular to perform the following duties:

- (i) to lecture, or hold classes (the departmental teaching load is approximately 42 hours, typically one undergraduate course and one graduate-level course). There is a normal sabbatical entitlement of one term in seven on full pay, subject to University regulations.

- (ii) to undertake original work and the general supervision of research and advanced work in his/her subject and Faculty/Department, and to assist students in their studies by supervision or informal instruction.

Examining

The Professor will be required to undertake such university examining as may be required by the relevant Faculty Board or comparable body.

Supervision

The Professor will be required to act as the supervisor of graduate students as and when requested.

Administration

Administrative duties are shared equitably among the teaching members of the Faculty. The Professors are expected to play significant roles from time to time on the Faculty Board and Faculty Committees dealing with such matters as academic and other appointments, admission of graduate students, research and teaching assessments, the libraries and computing arrangements. They are also encouraged to accept appointment to University Committees.

4 The Colleges

The University, the Faculties and Departments, and the Colleges are linked in a complicated historical relationship that is mutually beneficial but not simple. Students (both graduate and undergraduate) are admitted by one of the 31 Colleges, although in the case of graduate students the Faculties and Departments determine admissions before the Colleges are involved. Almost all undergraduates, and many graduate students, live in a College. The teaching of undergraduate students is shared between the Colleges and the Faculties and Departments, with the Colleges arranging small group teaching ("supervision") and the Departments providing lecturing, laboratory classes, and advanced supervisions. Most academic staff will also be invited to join a College as a teaching or professorial fellow. College teaching is remunerated separately from the University teaching, and appointment to a College is a separate matter from a University appointment. Membership of a College adds an important social and intellectual dimension for many of the academic staff. The Chair of the Faculty/Head of Department or senior colleagues can give more advice.

The Scheme for newly-appointed University Officers seeking a College Fellowship is set out at:

<https://www.ois.cam.ac.uk/uto-scheme/guidance-for-applicants/view>

5 Procedure for Appointment

The appointment will be made by the General Board of the Faculties on the advice of an Advisory Committee, chaired by the Vice-Chancellor or his Deputy, with a membership which includes members of the Faculty/Department, members of cognate Departments and external experts.

All applications will be acknowledged. The Advisory Committee will decide how they wish to proceed towards making a recommendation for appointment, which may include interviews and/or presentations. Short-listed candidates may be invited to visit the Faculty / Department to give a seminar on their work and meet prospective colleagues in the course of the process.

Candidates will be informed of the progress of their applications as agreed by the Committee.

It is anticipated that the successful candidate will take up the appointment on 1 October 2021 or as soon as possible thereafter.

The successful applicant will hold concurrently the positions of the Stephen W Hawking Professorship of Cosmology and Professor of Cosmology in the University of Cambridge. The tenure of the Stephen W Hawking Professorship of Cosmology is limited by statute to 7 years with the possibility of re-appointment for a further two terms of 5 years each.

6 Enquiries and Applications

Informal enquiries about this Professorship may be directed to Professor Colm-cille Caulfield, Head of DAMTP, telephone +44 (0)1223 337744 or email c.p.caulfield@damtp.cam.ac.uk.

Further information on the University is available at the following address: www.cam.ac.uk.

Applications, consisting of a letter of application together with a statement of current and future research plans, a curriculum vitae and a publications list, should be made online no later than **12 April 2021**.

If you are unable to apply online, please contact the Human Resources, University Offices, The Old Schools, Cambridge, CB2 1TT (email professorships@admin.cam.ac.uk).

GENERAL INFORMATION

All appointments to University Offices are subject to the Statutes and Ordinances of the University.

A Salary

Salary on appointment will be determined by the Vice-Chancellor at the appropriate point on the University's salary spine for grade 12, taking account of the criteria for the respective contribution band. Professorial salaries are reviewed periodically, on the basis of research, teaching and general contribution, by the Vice-Chancellor with the assistance of a small Advisory Committee.

There is a normal sabbatical entitlement of one term in seven on full pay, subject to the University regulations.

B Headship of the Department

Should a Professor be appointed to the Headship of a Department, a pensionable payment in addition to salary is made.

C Recruitment Incentive

The University has a scheme whereby a single recruitment incentive payment may be made on appointment at the Vice-Chancellor's discretion.

D Removal Expenses

If the person appointed is not resident in Cambridge, a contribution from University funds towards expenditure incurred in removal to Cambridge to take up a University office will be made.

E Consultancy Work

The University's policy on consultancy work is that consultancy arrangements must be entered into privately between the employee and the organisation concerned. The consultancy work must not interfere with the duties required of the officer under the officer's contract of employment with the University. Consultancy work is not covered by the University's insurances, even when the University has knowledge that such work is being done. The University must not be regarded as being directly or indirectly involved in any consultancy arrangement through the use of University letterheads, advice given or work done in the individual's capacity as an employee of the University. Individuals undertaking private or consultancy work are advised to take out personal insurance.

Alternatively, professional indemnity cover may be obtained by channelling private work through the University company Cambridge Enterprise Ltd. Anyone wishing to do so should, in the first instance, contact Cambridge Enterprise at www.enterprise.cam.ac.uk.

F Professorial Fellowships

The great majority of Professors at Cambridge hold a professorial fellowship of a college. Although election to a fellowship is a matter for an individual college, the University takes active steps to draw to the attention of Heads of House the names of those Professors eligible for election. The Scheme for newly-appointed University Officers seeking a College Fellowship is set out at: <https://www.ois.cam.ac.uk/uto-scheme/guidance-for-applicants/view>

In seeking the views of referees, their permission will be sought for the release of their comments on the successful candidate if it were to be requested by the professorial fellowship electors of a college.

G Health screening on appointment to University Office and in the case of University Officers undertaking a change of duties

Offers of appointment made to prospective University officers whose work will fall within certain categories are conditional on the completion of a medical questionnaire and, if necessary, on a satisfactory health check by the Occupational Health Service.

Only the person elected will be asked to complete the questionnaire at the time of election.

H Family friendly policies and benefits

The University has a range of family friendly policies to aid employee's work-life balance including maternity, paternity and parental leave, flexible working and career break schemes. In addition, childcare vouchers, access to two nurseries and a holiday play scheme are available through the Childcare Office to help support University employees with childcare responsibilities. Further information can be found at:

<http://www.admin.cam.ac.uk/offices/hr/staff/benefits/family.html>

I Eligibility to work and reside in the UK

UK immigration procedures stipulate that an employer may not consider the appointment of any person unless they have seen evidence of their immigration status. Accordingly, shortlisted candidates, whatever their nationality, will be asked to provide such evidence at an appropriate stage in the recruitment procedure.

J Equal Opportunities Information

The University of Cambridge appoints solely on merit. No applicant for an appointment in the University, or member of staff once appointed, will be treated less favourably than another on the grounds of sex (including gender reassignment), marital or parental status, race, ethnic or national origin, colour, disability (including HIV status), sexual orientation, religion, age or socio-economic factors.

K Information if you have a Disability

The University welcomes applications from individuals with disabilities. Our recruitment and selection procedures follow best practice and comply with disability legislation.

The University is committed to ensuring that applicants with disabilities receive fair treatment throughout the recruitment process. Adjustments will be made, wherever reasonable to do so, to enable applicants to compete to the best of their ability and, if successful, to assist them during their employment. We encourage applicants to declare their disabilities in order that any special arrangements, particularly for the selection process, can be accommodated. Applicants or employees can declare a disability at any time.

Applicants wishing to discuss with or inform the University of any special arrangements connected with their disability can, at any point in the recruitment process, contact, Dr Gosia Wloszycka, who is responsible for the administration of the recruitment process for this position, by email on mw425@admin.cam.ac.uk