Job Description – Lecturer in Applied Mathematics

Full Time (part time/ job share will be considered)
AC3 £41,526 to £49,553
Fixed Term Contract until 31st July 2021
Walton Hall, Milton Keynes

About the Role

The School of Mathematics and Statistics is a thriving community of teachers and researchers, known for its innovative development and presentation of teaching materials that can be flexibly studied by students at a distance, taking advantage of the new opportunities afforded by recent advances in technology.

Our courses are taught through distance learning and the successful candidate will contribute to developing and delivering teaching materials for our applied curriculum. The teaching materials are primarily written texts, which increasingly also make use of online technologies, such as online quizzes and short videos, to enhance the learning experience. It is crucial that the module texts express mathematical ideas and concepts clearly, and care and attention to detail in written work is essential. Deadlines for teaching materials can often be tight and inflexible, and it is important that teaching materials are delivered on time and are of a high quality. Teaching at the Open University is collaborative and team-based, and the ability to work successfully as part of a team is an essential part of the job. The team-based approach to teaching allows excellent support for the training and induction of new staff into the Open University teaching process.

The successful candidate will be based at the main Open University campus in Milton Keynes.

They will be expected to contribute to the research of the Applied Group: consideration will be given to any area of research in Applied Mathematics or Theoretical Physics. The successful candidate will be expected to be involved in the Applied Group’s research and scholarship activities.

In addition, the successful candidate will be expected to undertake administrative roles as required, such as those associated with presenting a module, membership of exam boards, and interviewing PhD students.
Person Specification

The post-holder will have:

**Essential**

- Essential: PhD, or equivalent, in an area of applied mathematics, theoretical physics, or another related discipline
- Ability to contribute to high-quality distance learning teaching materials across the applied mathematics curriculum
- Ability to develop original and independent research in applied mathematics or theoretical physics.
- A proven track record of research in a relevant discipline, demonstrated by high-quality publications and indicating potential for future excellence.
- Excellent communication skills, both oral and written
- Ability to work successfully in a team, including the ability to offer and receive constructive criticism
- Ability to plan and organise work to agreed deadlines
- Willingness to contribute to the life of the School beyond the core teaching and research activities

**Desirable**

- Teaching experience
- Evidence of ability to obtain external research funding
- Experience of interacting with the wider applied mathematics or theoretical physics community
- Preference may be given to candidates whose interests strengthen or augment our existing research areas, however exceptional candidates with other research interests will also be considered.
- Experience of curriculum development and knowledge of a broad range of mathematical topics
- Appreciation of the particular needs of part-time distance learning students
- Enthusiasm for supporting higher education distance learning and for the application of new technologies to teaching and supporting students
About the Unit/Department

Faculty of Science, Technology, Engineering & Mathematics

The Faculty of Science, Technology, Engineering and Mathematics (STEM) comprises:

- School of Computing & Communications
- School of Environment, Earth & Ecosystem Sciences
- School of Engineering & Innovation
- School of Life, Health & Chemical Sciences
- School of Mathematics & Statistics
- School of Physical Sciences
- Knowledge Media Institute
- Deanery

“We aspire to be world leaders in inclusive, innovative and high impact STEM teaching and research, equipping learners, employers and society with the capabilities to meet tomorrow’s challenges”

We provide STEM higher education at a scale and reach unsurpassed in the UK, with a sizeable international reach. The Faculty of STEM consists of 700 staff and 1,800 Associate Lecturers. The Faculty delivers over 185 modules across undergraduate and postgraduate curriculum, supporting more than 20,000 students (full time equivalents) which is 29% of the OU total.

The Faculty generates more research income (circa £20M) than any other Faculty in the University, supported by a comprehensive laboratory infrastructure.

School of Mathematics and Statistics

The School is the largest UK provider of higher education mathematics and statistics teaching, with well over 15,000 student registrations each year. Our courses cover both undergraduate and postgraduate curriculum which is taught both inside and outside the UK. The School’s research and teaching covers a broad range of topics in mathematical sciences, across Applied Mathematics, Mathematics Education, Pure Mathematics, Statistics and Theoretical Physics.

Within the School there is a vibrant research environment, with about 50 academic members of staff together with postdoctoral researchers and PhD students. Our staff include two LMS Whitehead Prize winners, a Fellow of the American Statistical Association and a Fellow of the Institute of Mathematical Statistics, and our emeritus staff include an AMS Whiteman Prize winner, an IoP Maxwell Medallist and a RSS Bradford Hill Medallist. In the 2014 Research Excellence Framework, 75% of our research outputs were rated as world leading or internationally excellent.

The School provides a friendly, flexible and inclusive working environment and is actively striving to achieve gender equality in terms of opportunity and success for all, both within the School and for our students. The School holds an Athena SWAN bronze award and is currently working towards a silver award. Further information about the School of Mathematics and Statistics is available at [http://www.mathematics.open.ac.uk/](http://www.mathematics.open.ac.uk/).
Applied Mathematics Group research

Research in the Applied Mathematics Group is predominantly in the area of theoretical or mathematical physics although there are other active areas including mathematical biology, inverse problems, optimisation and the mathematics of energy systems. In addition to the permanent members of staff, we currently employ two EPSRC postdoctoral researchers and a healthy number of PhD students.

**Uwe Grimm** works on aperiodic order and quasicrystals. His recent work has centred on properties of aperiodic systems, in particular the characterisation of the diffraction patterns of aperiodic structures. He also has a strong publication record in statistical mechanics, including work on applications in biology.

**Robert Hasson** contributes to the theory of inverse problems in general, and he is particularly interested in their application to magneto encephalography.

**Tim Lowe** is interested in the use of computer-based systems to support and enhance the learning of mathematics. He has a background as an applied mathematician, with interests in fluid mechanics, geometric modelling, optimization and numerical methods.

**Ben Meste**l has contributed to the theory of low-dimensional dynamical systems, with an emphasis on the use of renormalisation-group methods. Applications include investigations of Harper's equation, a model for an electron in a quasiperiodic potential, which has remarkable criticality properties. He is also applying his expertise to modelling energy supply networks.

**Marc Pradas** has research interests which cover a wide range of topics on the interface of applied mathematics, statistical physics, and engineering science. He is particularly interested in soft condensed matter theory and fluid dynamics, including multiphase flows, microfluidics, and hydrodynamic instabilities; additionally stochastic processes and emergent collective phenomena in complex and biological dynamical systems.

**Katrine Rogers** researches in mathematical and numerical modelling, including optimisation, within a range of applications. She is currently working on optimising superoscillations for optical imaging which could, in principle, remove all limits on the achievable resolution of optical images. Her previous work has included applications in structural engineering and astrophysics.

**Andrey Umerski**'s research is focussed on magnetic properties of matter and electronic transport phenomena, particularly spintronics. His work on spintronics focuses on both, fundamental aspects of spin and charge transport in magnetic nanostructures, and real-world applications in novel electronic devices. His pioneering work on tunnelling magnetoresistance lead to a new design of read-head currently employed in all commercially manufactured hard disk drives.

**Paul Upton**'s research is on statistical physics and quantum field theory with applications to phase transitions and critical phenomena, interfacial and surface phenomena, thermodynamic Casimir effect, wetting transitions, correlations in lattice gauge theories and mass spectra in confining gauge theories. He is also interested in applying nonlinear dynamics and stochastic methods to models of neurons, including applications to pitch and rhythm perception.
Michael Wilkinson, one of our emeritus professors, is a theoretical physicist with wide-ranging interests. He contributes to statistical, solid-state and quantum physics and dynamical systems. Current topics include shape statistics of dynamical fractals and quantitative understanding of rainfall.

Reem Yassawi, who joined us recently, works in topological dynamics. Her research focusses on substitution dynamical systems, invariant measures for cellular automata, and combinatorial aspects of automatic sequences.

Applied Mathematics Group teaching

Students take our applied mathematics courses for many reasons: intrinsic interest, career progression, or to support their studies in other areas of mathematics, computing, science or other disciplines. The main teaching activity of Open University academics consists of working in teams to write courses and the associated assessment materials although there is scope for face-to-face teaching. The School is proud of the innovative nature of its courses and is constantly striving to be at the forefront of new developments in the teaching of mathematics.

The Applied Mathematics Group is directly responsible for several undergraduate modules, some of which support curriculum of other faculties (in physical sciences, engineering and economics):
MST210 Mathematical Methods, Models and Modelling: 60 credits;
MST224 Mathematical Methods: 30 credits;
MST326 Mathematical Methods and Fluid Mechanics: 30 credits;
MS327 Deterministic and Stochastic Dynamics: 30 credits;
M373 Optimisation: 30 credits;

In addition, the applied maths group shares responsibility for the school’s introductory modules, MU123 Discovering Maths, MST124 and MST125 Essential Mathematics 1 and 2 with a total of approximately 10,000 students per year. These are the courses on which students wishing to study mathematics, statistics and other disciplines, usually start their Open University studies and they are of major importance to the University.

All these undergraduate modules form optional or compulsory components of the BSc degrees in Mathematics, Mathematics and Statistics, Mathematical and Physics, Mathematics and its Learning, Economics and Mathematical Sciences, Data Science, Computing and IT with a second subject (mathematics), and a new qualification in Data Science.

The Applied Mathematics Group also contributes towards the school's highly successful MSc in Mathematics programme. This currently has about 500 part-time students, accounting for almost 35% of the entire (FTE) UK MSc Mathematics provision. Our contribution includes courses on the calculus of variations, nonlinear ordinary differential equations, applied complex variables, advanced mathematical methods with Maple, and a variety of dissertation topics.

Further details of these degrees and courses are available from the University’s website at:
http://www3.open.ac.uk/courses