



**FURTHER PARTICULARS**  
**DEPARTMENT OF PHYSICS**



**Researcher in Software for Radio Astronomy**

**Grade 7 £27466 to £36912 per annum**

**UNIVERSITY OF OXFORD**  
**DEPARTMENT OF PHYSICS**

**The post**

The MeqTrees system (<http://www.astron.nl/meqwiki>) was developed as a flexible environment for simulation and calibration of radio astronomical data (but is not necessarily restricted to such.) At its core is the ability to rapidly implement any numerical model for which the math can be written down, through a Python-based scripting language called TDL, and have that model evaluated by a relatively efficient computational kernel. The system also provides a rich array of visualization tools. This allows for very rapid experimentation, with turnaround time of minutes rather than the usual days or even months.

The system is now used in a number of institutions. It has produced the first all-sky LOFAR images (<http://www.lofar.org>). It is one of the cornerstones of the European SKA Design Studies (SKADS) project, where it is used for telescope and sky simulations. It is being used at DRAO (Canada) to evaluate focal-plane array technologies. It has been adopted as a collaboration tool by the LOFAR Long Baseline Working Group. It has also served as a teaching tool at a number of workshops.

Further distribution and development of the system, however, is placing strain on our relatively small team. MeqTrees development has been based at ASTRON (The Netherlands) and DRAO (Canada); Oxford (Astrophysics/OeRC) is now looking to expand its role from user to key collaborator.

These institutions are now collaborating to develop MeqTrees into a mature, widely used as well as state-of-the art tool for instrumental modelling and calibration, in astrophysics and potentially in other fields.

The post will be based at the Oxford e-Research Centre under the supervision of Dr Stef Salvini, but will form part of the SKADS and PrepSKA projects led in Oxford by Prof Steve Rawlings in Astrophysics.

**Main duties and responsibilities**

The successful candidate will tackle a number of key aspects of the development of MeqTrees:

- Devise and carry out the work required to allow ease of deployment and use of MeqTrees
- Extend the applicability of MeqTrees to a wider range of systems, including various flavours of Linux MacOs, etc
- Ensure the efficiency and power of Meqtrees over a range of platforms, including modern parallel architectures
- Help and advise as well as collaborate with scientists in developing MeqTrees applications suitable for their research

### **Selection Criteria (skills, experience and knowledge required)**

- Be fluent in English
- A degree or better in a suitable discipline: physics, maths or computer science
- Good mathematical background
- Proven record of software development and deployment
- Experience in C++

Also, preference will be given to the candidates who

- Have experience in scripting languages, particularly Python
- Have some experience in numerical computing

### **BACKGROUND TO ASTROPHYSICS WITHIN OXFORD**

The post-holder will be based in the Astrophysics department, which is one of the six sub-departments that together make up the Department of Physics. The other sub-departments are (1) Atomic and Laser Physics, (2) Atmospheric, Oceanic and Planetary Physics, (3) Condensed Matter Physics, (4) Particle Physics and (5) Theoretical Physics. The Department of Physics currently comprises about 80 University-funded academic staff, 150 other postdoctoral researchers and visitors, 200 graduate students and 580 registered undergraduate students. Since 1 October 2000, the Department of Physics is part of the Division of Mathematical and Physical Sciences.

The Department of Physics currently comprises 96 University-funded academic staff, 209 other postdoctoral researchers and academic related staff, 303 graduate students and 625 registered undergraduate students. Since 1 October 2000, the Department of Physics is part of the Division of Mathematical and Physical Sciences.

The Sub-Department of Astrophysics is situated in the Denys Wilkinson Building, which is close to the centre of Oxford and the extensive University Parks. The Laboratory has excellent teaching and workshop facilities. The Sub-Department has grown steadily in recent years.

Professor Steve Rawlings is currently Head of Astrophysics. Professor Roger Davies, (Philip Wetton Professor of Astrophysics) is now Chair of Physics. Their work on galaxy evolution and observational cosmology at both radio and optical wavelengths, has led to substantial increases in the department's work in astronomical instrumentation. The theoretical research group is led by Professor

Joseph Silk, (Savilian Professor of Astronomy) studying cosmology, galaxy formation and dark matter. The recently opened Beecroft Institute for Particle Astrophysics and Cosmology provides a focus for this activity. Oxford Astrophysics has been successful in attracting STFC Senior/ Advanced/Post-doctoral and Royal Society Research Fellows. STFC rolling grants support research into observational and theoretical cosmology.

In observational astronomy, our programme spans galaxy evolution and cosmology, including stellar dynamics and populations, galaxy clusters, the physics of active galaxies and their use as cosmological probes, and galaxy and quasar surveys. The group is the focus for UK involvement in the Gemini Observatories hosting the UK Gemini Support Group. We have a growing instrumentation group that, in collaboration with RAL, is constructing the fibre-fed infrared MOS for the Japanese 8m Subaru telescope and the VISTA wide field near-infrared camera. We are participating in the design and construction of integral field units, optical and infrared spectrographs, including KMOS & MUSE for the ESO VLT and design studies for the WFMOS & Extreme AO instruments for Gemini. Oxford has a newly established experimental cosmic microwave background group that is participating in experiments such as CLOVER and QUIET.

The University of Oxford is over 700 years old and has a strong collegiate nature, the individual Colleges being a microcosm of multi-disciplinary academic expertise, whilst the science departments have a conventional structure. Teaching is shared between the two aspects - lectures, classes, laboratories, examinations and post-graduate research supervision being normally department-based, while tutorial teaching (in small groups) is college-based, as also is the undergraduate selection process.

## **BACKGROUND TO OeRC WITHIN OXFORD**

The Oxford e-Research Centre builds on the achievements of the Oxford e-Science Centre, through the application of innovative computational and information technologies the OeRC enables the exploration of new research areas in the sciences, and increasingly in the humanities and social sciences, and the development of multidisciplinary collaborations. The focus of the Centre's activities is the development and use of new advances in information technology to allow groups of researchers to tackle problems with increasing scale and complexity, facilitating interdisciplinary research and creating appropriate e-Infrastructure for the support of research. The Centre will develop a role in the education and training of students and researchers in the use of advanced computing and information technologies, it will also provide a natural interface with industry, building on existing industrial collaborations and expanding into less developed areas.

## **Computing Facilities in Astrophysics**

Oxford Astrophysics computers run in support of a wide range of observational and numerical/theoretical research programmes. In addition to multi-node BEOWULF clusters, users will typically each have a powerful desktop (running their choice of

Mac OS X, linux or in some cases Windows). We benefit from the expertise of the Central Physics IT Support team.

### **Computing Facilities in OeRC**

Large scale computing facilities are provided by the Oxford Supercomputing Centre (OSC), itself a part of OeRC. The OSC currently operates three main systems: two clusters plus a shared memory system. Each of the clusters has 512 cores, one using Intel, the other AMD CPUs, to make sure that the different computational requirements of the wide variety of applications available at Oxford University are met. The shared memory system, based on dual-core Intel Itanium 2, is one of the largest of its kind in the UK, currently consisting of 256 cores with 1 TB memory. The OSC is currently finalising the installation of a further cluster. OSC also provides a central storage facility.

Further detail can be found on the OSC Web page

<http://www.oerc.ox.ac.uk/resources/osc>

OxGrid, a Oxford University campus infrastructure, is also based at OeRC. OxGrid allows registered users to access transparently the computing and storage resources of many different departments and colleges. For users with high-end needs the system interfaces with OSC and with the UK National Grid Service.

Further details can be found on the OxGrid web page

<http://www.oerc.ox.ac.uk/resources/oxgrid>

### ***Appointment Procedure***

A selection panel from within the sub-department of Astrophysics will consider all applications. Preference will be given to applicants with research experience in the areas indicated above.

The applicant finally selected will then be offered an appointment from **1 October 2008**, with a starting salary on the **07S** salary scale, **£27466 to £36912 pa**, depending on the selection panel's assessment of skills and experience. Applicants should ensure that their application includes contact numbers and addresses (email, telephone and fax) which can be used to contact them and that all documents are marked with the reference number **DB08004**.

### **How to apply**

Applicants should send a statement of research interests, curriculum vitae, list of publications, and the names and addresses of three referees by the closing date of **1 September 2008**, quoting reference **DB08004**. In addition candidates should arrange for letters from the referees to be sent to the address below by the closing date. While preference will be given to applications that arrive by the closing date, we will also consider late applications which arrive prior to the final short-listing of candidates.

Vanessa Ferraro-Wood, Astrophysics, University of Oxford, Denys Wilkinson Building, Keble Road, Oxford OX1 3RH, United Kingdom, Fax: +44 (0)1865 273390, email: [sec@astro.ox.ac.uk](mailto:sec@astro.ox.ac.uk)

Electronic applications are acceptable in PDF, PS, or MS Word formats. Applications will be acknowledged but not reference letters.

## **Working for the University of Oxford**

At the University of Oxford, we're naturally very proud of our outstanding reputation for scholarship and research. But we're also proud to say that we're one of the region's biggest and best-established employers, with a real diversity of staff helping to sustain our success - from lab. assistants, cleaners, technicians and secretaries, to IT, finance and administrative professionals. Join us, and you can expect to find yourself working in a friendly, open-minded atmosphere where your ideas will be welcomed, with an interesting and satisfying job to do, and with plenty of opportunities to learn new skills, or maybe even get some extra qualifications.

As well as pay and other benefits such as generous holidays and an excellent pension scheme, we may be able to help you with:

- **Training** – We train our staff, both in the skills needed for starting the job, and to help them develop afterwards. If you don't have all the skills we are looking for (e.g. computer packages), but you know that you are a quick learner, it's worth asking if training might be available.
- **Working hours** – We may be able to be flexible about working patterns to help you combine work with responsibilities at home. Even for full-time jobs, we can often adjust starting and finishing times, or even sometimes consider term-time-only working: if this is important to you, let us know.
- **Disability** – If you have a disability, we have specialist staff who can help you to start and stay in work.
- **Childcare** – We have several subsidised nurseries for under-fives, a childminding network, a holiday play scheme, and tax and national insurance savings schemes. For further information see [www.admin.ox.ac.uk/eop/child](http://www.admin.ox.ac.uk/eop/child).
- **Parenting** – As well as providing childcare facilities, we have generous maternity, paternity and adoption leave schemes to help new parents on our staff.
- **Cultural and religious needs** – We respect the cultural and religious lives of our staff. If you need time away from work, or special facilities, and can give plenty of notice for arrangements to be made, this will always be considered.
- **Travel arrangements** – We offer an interest-free season ticket loan scheme for bus or train season tickets. Annual passes for Oxford Bus Company routes are available at discounted rates.

- **Use of University facilities** – All University staff can use the study facilities provided by University libraries and museums; join the University Club, a sports and social club which has its own bar, café, and reading room; and make use of the University Sports Complex and the Pulse fitness centre.
- **Discounts** – A number of discounts are available to University staff e.g. for insurance, holiday travel, and computer equipment.

The range of benefits is continuously reviewed and extended. For further information see [www.admin.ox.ac.uk/ps/staff/benefits/](http://www.admin.ox.ac.uk/ps/staff/benefits/)

## Pay and benefits

The salary offered for a full-time appointment to this job is in the grade and range stated above depending on qualifications and experience. If you are appointed at a salary below the top of this range, your salary will automatically be increased each year until you have reached the top point. Increases beyond this point may be available in certain cases. There is also an annual 'cost-of-living' salary review, which normally takes place in summer each year. Pay and benefits for part-time appointments are worked out on a 'pro rata' basis.

For a full-time appointment, the annual holiday entitlement will be 38 days (including 5 days to be taken on fixed dates at Christmas and Easter, and 8 public holidays). The hours of work are **37.5** hours per week, Monday to Friday.

## Equal opportunities at the University of Oxford

As an Equal Opportunity employer, we positively encourage applications from people of different backgrounds. All our jobs are filled in line with our equal opportunities code of practice, which helps us make sure that men and women, people of different religions or beliefs, ages, racial groups, and those with disabilities are all treated fairly.

### **POLICY STATEMENT**

The policy and practice of the University of Oxford require that all staff are afforded 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 his or her gender, marital or civil partnership status, sexual orientation, religion or belief, racial group, age or disability.

If you have any questions about equal opportunities at the University of Oxford, please visit our web-site at [www.admin.ox.ac.uk/eop](http://www.admin.ox.ac.uk/eop).

### **Data protection**

All data supplied by applicants 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.