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| Job title | Postdoctoral Research Assistant in Motion Planning for Legged Locomotion |
| Division | Mathematical, Physical and Life Sciences Division |
| Department | Engineering Science |
| Location | Oxford Robotics Institute (ORI), 23 Banbury Road, Oxford |
| Grade and salary | Grade 7: £32,817 - £40,322 per annum |
| Hours | Full time |
| Contract type | Fixed-term to 31st March 2021 |
| Reporting to | Dr. Ioannis Havoutis |
| Vacancy reference | 142734 |
| Additional information | Reimbursement of relocation costs for postdoctoral positions is only available where allowed on the project. |

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| Research topic | Fundamental research in the fields of mobile robot navigation, motion and mission planning |
| Principal Investigator / supervisor | Dr. Ioannis Havoutis |
| Project team | Dynamic Robot Systems Group, Oxford Robotics Institute (ORI) |
| Project web site | [www.ox.ac.uk/drs](http://ori.ox.ac.uk/drs) , <https://youtu.be/cLX16jdFIm0> |
| Funding partner | The funds supporting this research project are provided by the EPSRC, under the ORCA Hub project. |
| Recent publications | <https://ori.ox.ac.uk/labs/drs/drs-publications/>  https://ihavoutis.github.io/pubs.html |

### The role

This advertisement is for a Post-Doctoral Research Assistant to join the [Dynamic Robot Systems Group](https://ori.ox.ac.uk/labs/drs/) of the Oxford Robotics Institute to carry out fundamental research in motion planning and navigation with particular application to legged robots.

The project will develop navigation and planning approaches suitable for legged mobility in the context of industrial facilities. The goal is to further develop our motion planning approaches, that are capable of utilizing different modes of locomotion to adapt to different terrain, and close the loop with online perception. A broad range of approaches is applicable and the focus will be decided according to the background and aims of the successful candidate.

You will be responsible for the design, development, implementation and evaluation of motion planning methods suitable for legged locomotion in physically realistic simulated environments and on the r[eal ANYmal quadruped robot](https://youtu.be/cLX16jdFIm0).

### Responsibilities

**Specific Tasks**

* Research, adapt existing and develop techniques for dynamic path/motion planning, particularly for the ANYmal quadruped robot in the context of large scale-facilities.
* Write software adhering to group standards to implement these techniques and algorithms.
* Work with legged mobile robots in lab and external environments.
* Organise and deliver trials within the lab and in the field.
* Write scholarly articles in top tier journals (IJRR, TRO, AR, JFR) and conferences (RSS, ICRA, NIPS, Humanoids).
* Work with other team members to further the core academic mission of the Dynamic Robot System Group and the Oxford Robotics Institute.
* Take an active, **leadership** role in the development of software aspects of DRS robots, including collaboration with our engineers.
* Represent ORI and DRS at meetings & seminars, either with other team members or alone.

**Additional Tasks**

* Manage own academic research and administrative activities. This involves small scale project management, to co-ordinate multiple aspects of work to meet deadlines
* Test hypotheses and analyse scientific data from a variety of sources, reviewing and refining working hypotheses as appropriate
* Contribute ideas for new research projects, develop ideas and present detailed research proposals to senior researchers
* Collaborate in the preparation of scientific reports and journal articles and occasionally present papers and posters
* Act as a source of information and advice to other members of the group on scientific protocols and experimental techniques
* Represent the research group at external meetings/seminars, either with other members of the group or alone
* Carry out collaborative projects with colleagues in partner institutions, and research groups
* The researcher may have the opportunity to undertake ad-hoc paid teaching (this includes lecturing, demonstrating, small-group teaching, tutoring of undergraduates and graduate students and supervision of masters projects in collaboration with principal investigators). Permission must be sought in advance for each opportunity and the total must not exceed 4 hours a week.
* Any other duties appropriate with the role.

## *This job description should be viewed as a guide to the role and is not intended as a definitive list of duties. It may be reviewed in light of changing circumstances with consultation with the post holder.*

## Selection criteria

### Essential

* PhD/DPhil (or near completion\*) in robotics, computer science, machine learning, artificial intelligence, informatics, AI or closely related field.
* Excellent academic track record in topics relevant to legged locomotion; path and motion planning, whole-body control, multi-contact locomotion, model predictive control, machine learning and optimization or related areas.
* Experience and skills relevant to the afore mentioned research areas as well as Unix/Linux and C++/Python software development and version control (git).
* Ability to plan and execute real robot experiments and to work to deadlines.
* Ability to contribute ideas for new research projects and research income generation.
* Excellent communication skills, including publications in conferences and journals such as RSS, IJRR, JFR, ICRA.
* Team working skills and the interest in lead an exciting research effort.
* Self-motivation and the ability to work both independently and as part of a busy team.

*\*please note that ‘near completion’ means that you must have submitted your PhD thesis.*

**Desirable**

* Experience with dynamic robots including quadrupeds, manipulators and/or humanoids
* A very good understanding of control aspects of multi-articulated robots and rigid body dynamics
* Experience of working with the Robot Operating System (ROS) and real-time code.
* Experience of independently managing a discrete area of a research project.
* Additional computing skills such as Matlab, version control and software development as part of a team.
* Experience using common robot tools and software.

## Dynamic Robot Systems Group (DRS)

## [Dynamic Robotics System Group](https://ori.ox.ac.uk/labs/drs/) is one of the 6 research groups of the Oxford Robotics Institute. [DRS focuses on navigation, motion planning and control, estimation and trajectory optimization for dynamic robots](https://youtu.be/cLX16jdFIm0). Led by Drs. Ioannis Havoutis and Maurice Fallon, the group has a focus on state of the art of walking robot navigation and deploying in practical and realistic field demonstrations. Drs. Havoutis and Fallon have significant experience - leading the locomotion group in IIT’s Dynamic Legged Systems Lab and as perception lead of MIT’s DARPA Robotics Challenge team. The group is working on quadruped navigation through two EU H2020 projects (THING and MEMMO) as well as through a UK-funded robotics hubs (RAIN and ORCA). The group has purpose-built test facilities (completed in 2018) within ORI’s new 300m2 research centre and state of the art equipment such as the ANYmal quadruped robot.

1. **Oxford Robotics Institute (ORI)**
2. The Oxford Robotics Institute (ORI) is an Independent institute within the Department of Engineering Science. We are built from collaborating and integrated groups of researchers, engineers and students all driven to change what robots can do for us. Our current interests are diverse – from flying to grasping, from inspection to running, from haptics to driving, from exploring to planning.  We are the only group in the UK that specialises in large-scale mobile autonomy - both indoors and outdoors. We validate our thinking and challenge ourselves by deploying and running large robotics systems.
3. The ORI currently has more than sixty members and runs several high-profile projects and trials via our six research groups. We operate a large array of robot platforms, which are used on a daily basis, and includes more than twenty different physical machines.
4. For more information please visit: http://www.eng.ox.ac.uk and [http://ori.ox.ac.uk](http://mrg.robots.ox.ac.uk)



**T**he Oxford ANYmal robot during field deployments and industrial demonstrations.

**About the University of Oxford**

Welcome to the University of Oxford. We aim to lead the world in research and education for the benefit of society both in the UK and globally. Oxford’s researchers engage with academic, commercial and cultural partners across the world to stimulate high-quality research and enable innovation through a broad range of social, policy and economic impacts.

We believe our strengths lie both in empowering individuals and teams to address fundamental questions of global significance, while providing all our staff with a welcoming and inclusive workplace that enables everyone to develop and do their best work. Recognising that diversity is our strength, vital for innovation and creativity, we aspire to build a truly diverse community which values and respects every individual’s unique contribution.

While we have long traditions of scholarship, we are also forward-looking, creative and cutting-edge. Oxford is one of Europe's most entrepreneurial universities. Income from external research contracts in 2016/17 exceeded £564m and we rank first in the UK for university spin-outs, with more than 130 companies created to date. We are also recognised as leaders in support for social enterprise.

Join us and you will find a unique, democratic and international community, a great range of staff benefits and access to a vibrant array of cultural activities in the beautiful city of Oxford.

For more information, please visit [www.ox.ac.uk/about/organisation](http://www.ox.ac.uk/about/organisation).

### Engineering Science Department

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 and medicine. The Department employs about 120 academic staff (this number includes 13 statutory Professors appointed in the main branches of the discipline, and 25 other professors in the Department); in addition there are 9 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 22,000 square metres. The Department is ranked third in the world in the latest *Times Higher Education World University Rankings*, behind Caltech and Stanford, but ahead of MIT (4th), Cambridge (5th), Princeton (6th) and Imperial (7th).

*Teaching*

We aim to admit 160-170 undergraduates per year, all of whom take a 4-year Engineering Science course leading to the MEng degree. The course is 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.

*Research*

The Department was ranked the top engineering department in the UK, as measured by overall GPA, in the Research Excellence Framework 2014 exercise. We have approximately 350 research students and about 130 Research Fellows and Postdoctoral researchers. Funding for research grants and contracts, from a variety of sources, generates an annual turnover of approximately £34m in addition to general turnover of about £24m. The research activities of the department fall into seven broad headings, though there is much overlapping in practice: Thermofluids; Materials and Mechanics; Civil and Offshore; Information, Control and Vision; Electrical and Optoelectronic; Chemical and Process; Biomedical Engineering.

For more information please visit:

<http://www.eng.ox.ac.uk/>

The Department of Engineering Science holds a bronze Athena Swan award to recognise advancement of gender equality: representation, progression and success for all.

**The Mathematical, Physical, and Life Sciences Division**

The Mathematical, Physical, and Life Sciences (MPLS) Division is one of the four academic divisions of the University. In the results of the six-yearly UK-wide assessment of university research, REF2014, the MPLS division received the highest overall grade point average (GPA) and the highest GPA for outputs. We received the highest proportion of 4\* outputs, and the highest proportion of 4\* activity overall. More than 50 per cent of MPLS activity was assessed as world leading.

The MPLS Division's 10 departments and 3 interdisciplinary units span the full spectrum of the mathematical, computational, physical, engineering and life sciences, and undertake both fundamental research and cutting-edge applied work. Our research addresses major societal and technological challenges and is increasingly focused on key interdisciplinary issues. MPLS is proud to be the home of some of the most creative and innovative scientific thinkers and leaders working in academe.  We have a strong tradition of attracting and nurturing the very best early career researchers who regularly secure prestigious fellowships

We have around 6,000 students and play a major role in training the next generation of leading scientists. Oxford's international reputation for excellence in teaching is reflected in its position at the top of the major league tables and subject assessments.

MPLS is dedicated to bringing the wonder and potential of science to the attention of audiences far beyond the world of academia. We have a strong commitment to supporting public engagement in science through initiatives including the Oxford Sparks portal (<http://www.oxfordsparks.net/>) and a large variety of outreach activities. We also endeavour to bring the potential of our scientific efforts forward for practical and beneficial application to the real world and our desire is to link our best scientific minds with industry and public policy makers.

For more information about the MPLS division, please visit: <http://www.mpls.ox.ac.uk/>

## How to apply

Before submitting an application, you may find it helpful to read the ‘Tips on applying for a job at the University of Oxford’ document, at [www.ox.ac.uk/about/jobs/supportandtechnical/](http://www.ox.ac.uk/about/jobs/supportandtechnical/).

If you would like to apply, click on the **Apply Now** button on the ‘Job Details’ page and follow the on-screen instructions to register as a new user or log-in if you have applied previously. Please provide details of two referees and indicate whether we can contact them now.

You must upload a CV and a supporting statement. The supporting statement should explain how you meet the selection criteria for the post using examples of your skills and experience. This may include experience gained in employment, education, or during career breaks (such as time out to care for dependants).

Your application will be judged solely on the basis of how you demonstrate that you meet the selection criteria stated in the job description.

**References**

Please give the details of people who can provide a reference for you. If you have previously been employed, your referees should be people who have managed you, and at least one of them should be your formal line manager in your most recent or current job. Otherwise they may be people who have supervised you in a recent college, school, or voluntary experience. It is helpful if you can tell us briefly how each referee knows you (e.g. ‘line manager’, ‘college tutor’). Your referees should not be related to you.

We will assume that we may approach them at any stage unless you tell us otherwise. If you wish us to ask for your permission before approaching a particular referee, or to contact them only under certain circumstances (for example, if you are called to interview) you must state this explicitly alongside the details of the relevant referee(s).

Please upload all documents **as PDF files** with your name and the document type in the filename.

All applications must be received by **midday** on the closing date stated in the online advertisement.

**Information for priority candidates**

*A priority candidate is a University employee who is seeking redeployment because they have been advised that they are at risk of redundancy, or on grounds of ill-health/disability. Priority candidates are issued with a redeployment letter by their employing departments.*

*If you are a priority candidate, please ensure that you attach your redeployment letter to your application (or email it to the contact address on the advert if the application form used for the vacancy does not allow attachments)*

Should you experience any difficulties using the online application system, please email [recruitment.support@admin.ox.ac.uk](mailto:recruitment.support@admin.ox.ac.uk). Further help and support is available from [www.ox.ac.uk/about\_the\_university/jobs/support/](http://www.ox.ac.uk/about_the_university/jobs/support/). To return to the online application at any stage, please go to: [www.recruit.ox.ac.uk](http://www.recruit.ox.ac.uk/).

Please note that you will be notified of the progress of your application by automatic emails from our e-recruitment system. **Please check your spam/junk mail** regularly to ensure that you receive all emails.

## Important information for candidates

**Data Privacy**

Please note that any personal data submitted to the University as part of the job application process will be processed in accordance with the GDPR and related UK data protection legislation. For further information, please see the University’s Privacy Notice for Job Applicants at: [www.admin.ox.ac.uk/councilsec/compliance/gdpr/privacynotices/job/](http://www.admin.ox.ac.uk/councilsec/compliance/gdpr/privacynotices/job/). The University’s Policy on Data Protection is available at: [www.admin.ox.ac.uk/councilsec/compliance/gdpr/universitypolicyondataprotection/](http://www.admin.ox.ac.uk/councilsec/compliance/gdpr/universitypolicyondataprotection/).

**The University’s policy on retirement**

The University operates an Employer Justified Retirement Age (EJRA) for all academic posts and some academic-related posts. The University has adopted an EJRA of 30 September before the 69th birthday for all academic and academic-related staff in posts at **grade 8 and above**. The justification for this is explained at: [www.admin.ox.ac.uk/personnel/end/retirement/acrelretire8+/](http://www.admin.ox.ac.uk/personnel/end/retirement/acrelretire8+/).

For **existing** employees, any employment beyond the retirement age is subject to approval through the procedures: [www.admin.ox.ac.uk/personnel/end/retirement/acrelretire8+/](http://www.admin.ox.ac.uk/personnel/end/retirement/acrelretire8+/).

There is no normal or fixed age at which staff in posts at **grades 1–7** have to retire. Staff at these grades may elect to retire in accordance with the rules of the applicable pension scheme, as may be amended from time to time.

**Equality of Opportunity**

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. No applicant or member of staff shall be discriminated against because of age, disability, gender reassignment, marriage or civil partnership, pregnancy or maternity, race, religion or belief, sex, or sexual orientation.

**Benefits of working at the University**

## Employee benefits

University employees enjoy 38 days’ paid holiday, generous pension schemes, travel discounts, and a variety of professional development opportunities. Our range of other employee benefits and discounts also includes free entry to the Botanic Gardens and University colleges, and discounts at University museums. See [www.admin.ox.ac.uk/personnel/staffinfo/benefits](http://www.admin.ox.ac.uk/personnel/staffinfo/benefits).

## University Club and sports facilities

Membership of the University Club is free for all University staff. The University Club offers social, sporting, and hospitality facilities. Staff can also use the University Sports Centre on Iffley Road at discounted rates, including a fitness centre, powerlifting room, and swimming pool. See [www.club.ox.ac.uk](http://www.club.ox.ac.uk) and [www.sport.ox.ac.uk/oxford-university-sports-facilities](http://www.sport.ox.ac.uk/oxford-university-sports-facilities).

## Information for staff new to Oxford

If you are relocating to Oxfordshire from overseas or elsewhere in the UK, the University's Welcome Service website includes practical information about settling in the area, including advice on relocation, accommodation, and local schools. See [www.welcome.ox.ac.uk](http://www.welcome.ox.ac.uk/).

There is also a visa loan scheme to cover the costs of UK visa applications for staff and their dependents. See [www.admin.ox.ac.uk/personnel/permits/reimburse&loanscheme/](http://www.admin.ox.ac.uk/personnel/permits/reimburse&loanscheme/).

## Family-friendly benefits

With one of the most generous family leave schemes in the Higher Education sector, and a range of flexible working options, Oxford aims to be a family-friendly employer. We also subscribe to My Family Care, a service that provides practical advice and support for employees who have caring responsibilities. The service offers a free telephone advice line, and the ability to book emergency back-up care for children, adult dependents and elderly relatives. See [www.admin.ox.ac.uk/personnel/staffinfo/benefits/family/mfc/](http://www.admin.ox.ac.uk/personnel/staffinfo/benefits/family/mfc/).

## Childcare

The University has excellent childcare services, including five University nurseries as well as University-supported places at many other private nurseries.

For full details, including how to apply and the costs, see [www.admin.ox.ac.uk/childcare/](http://www.admin.ox.ac.uk/childcare/).

## Disabled staff

We are committed to supporting members of staff with disabilities or long-term health conditions. For further details, including information about how to make contact, in confidence, with the University’s Staff Disability Advisor, see [www.admin.ox.ac.uk/eop/disab/staff](http://www.admin.ox.ac.uk/eop/disab/staff).

## Staff networks

The University has a number of staff networks including the Oxford Research Staff Society, BME staff network, LGBT+ staff network and a disabled staff network. You can find more information at [www.admin.ox.ac.uk/eop/inpractice/networks/](http://www.admin.ox.ac.uk/eop/inpractice/networks/).

## The University of Oxford Newcomers' Club

The University of Oxford Newcomers' Club is an organisation run by volunteers that aims to assist the partners of new staff settle into Oxford, and provides them with an opportunity to meet people and make connections in the local area. See [www.newcomers.ox.ac.uk](http://www.newcomers.ox.ac.uk).