

JOB DESCRIPTION

DEPARTMENT OF ENGINEERING SCIENCE

Senior Python Developer for Computer Vision

Engineering Science, MPLS

Summary

Job title	Senior Python Developer for Computer Vision
Division	Mathematical, Physical and Life Sciences Division
Department	Engineering Science
Location	Department of Engineering Science, Parks Road, Oxford, OX1 3PJ
Grade and salary	Grade 8: £50,067 - £59,396 per annum
Hours	Full time
Contract type	Fixed term (to 31 January 2028)
Reporting to	Prof Jean-Baptiste Lugagne, Prof Idris Kempf
Vacancy reference	188441

Research project details	Research topic	Deep learning-based microscopy data analysis for industrial applications
	Principal Investigator / supervisor	Prof Jean-Baptiste Lugagne, Prof Idris Kempf
	Project website	https://gitlab.com/delta-microscopy/delta
	Funding partner	The funds supporting this research project are provided by the EPSRC and the Institute for Research Software
	Recent publications	https://journals.plos.org/ploscompbiol/article?id=10.1371/journal.pcbi.1009797 https://journals.plos.org/ploscompbiol/article?id=10.1371/journal.pcbi.1007673

Athena Swan Silver Award · Race Equality Charter Bronze Award · Stonewall SILVER EMPLOYER 2022 · Oxford Living Wage · We are a Living Wage Employer

The role

We are looking for a Senior or Experienced Developer in Computer Vision to join our team at the forefront of engineering biology and control engineering. In this role, you will take the lead in developing our computer vision software for quantitative microscopy: Deep Learning for Time-lapse Analysis (DeLTA). Originally developed by Dr Jean-Baptiste Lugagne and collaborators in the Dunlop lab at Boston University, DeLTA has be-come a widely recognised open-source tool for analysing bacterial time-lapse microscopy. Now a reference in academic research, it is used in labs worldwide, and this post will support expansion of itscapabilities as well as help maintain it as a robust, accessible platform for academic and industrial use, including for partners of the EEBio programme.

DeLTA tracks cells across microscope images, reconstructs lineages, and extracts cytometry data such as cell length and growth. It has originally been implemented for post-processing images but we are currently preparing a release that will support real-time processing. The pipeline is written in Python and follows modern software engineering practices, including modular design, unit tests, and continuous integration. This project aims to scale up DeLTA's development for broader applications, including commercial use. You will be responsible for strengthening DeLTA's foundations, including expanding automated testing and edge-case coverage; maintaining and completing the existing Qt/napari GUI plugin; refactoring APIs and dependencies; improving packaging and documentation; supporting real-time integration; and helping the project meet open-source sustainability standards. As part of this project, we are also exploring routes to commercialise certain features of DeLTA through a dedicated spinoff or consulting company. The successful candidate will have the opportunity to contribute to this process and, if interested, play an active role in shaping the spinoff's technical direction and development.

The candidate will be based in the Department of Engineering Science and will be expected to provide guidance to other members of the group. By co-supervising undergraduate and graduate projects, the candidate will also contribute to the group's research on new AI-based algorithms for cell tracking and more efficient training procedures. There will be opportunities to collaborate with partners of the EEbio programme and to visit one of our industrial collaborators in Boston. If required, visa and IHS costs will be covered by the project.

Responsibilities

Specific Duties

- Refactor and modularise DeLTA's API and internal functionality to make the codebase easier to use and test.
- Extend DeLTA's automated test suite, including unit, integration and end-to-end tests across supported platforms, backends and full microscopy movies.
- Complete and harden the existing GUI plugin for interactive data visualisation, post hoc data correction, data review and model-related workflows.
- Support real-time processing integration by testing APIs and performance on Oxford microscopy hardware and working closely with other team members.
- Improve user-facing and developer-facing documentation, examples and training materials, and help prepare DeLTA for PyOpenSci submission or equivalent external review.
- Coordinate and integrate community-contributed models and datasets, including versioning and documentation where appropriate.
- Support DPhil students with using the software, both for real-time processing in the lab during experiments and for post-processing of experiments.

Additional Duties

- Manage Gitlab repository, issues, pull/merge requests, and software releases, and contribute to technical notes, documentation, and research publications.
- Manage own development and administrative activities. This involves small scale project management, to co-ordinate multiple aspects of work to meet deadlines.
- Contribute ideas for new development, roadmapping, and research projects.
- Develop ideas for commercialisation and generating research income, and present detailed proposals to potential investors and senior researchers.
- Collaborate with academic groups and industrial partners of the EPSRC EEBio, and initiate new collaborations.
- Act as a source of information and advice to other members of the group on DeLTA usage.
- Represent DeLTA at external meetings/seminars, either with other members of the group or alone.
- Contribute ideas for sustainable software development, community building and, where appropriate, commercialisation or research-income opportunities.
- 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 master's projects in collaboration with principal investigators). Permission must be sought in advance for each opportunity.
- Any other duties appropriate with the role.

Selection criteria

Essential selection criteria

- Relevant experience in software development
- Expertise in python
- Expertise in software management and releasing, including continuous integration, testing, packaging, and dependency management
- Ability to manage own projects and associated activities
- Ability to collaborate and communicate with users from different fields
- Excellent communication skills for a highly interdisciplinary environment

Desirable selection criteria

- Experience in computer vision applications
- Experience in quantitative microscopy
- Ability to contribute ideas for new developments and commercialisation
- Ability to contribute ideas for new research projects and research income generation
- Experience of independently managing a discrete area of a research project
- Experience of actively collaborating in the development of research articles for publication

Pre-employment screening

Standard checks

If you are offered the post, the offer will be subject to standard pre-employment checks. These include:

- **right to work and identity checks -** you will be asked to provide proof of your right-to-work in the UK and proof of your identity;
- **references, -** if we have not already done so, we will contact the referees you have nominated;
- **previous University employment -** if you have previously worked for the University, we will verify key employment information with the relevant department or unit, including your dates of employment and reason for leaving and;

- **health declaration -** you will be asked to complete a health declaration so that you can tell us about any health conditions or disabilities for which you may need us to make appropriate adjustments.

For more information about the University's pre-employment screening, please read the candidate guidance https://www.ox.ac.uk/about/jobs/explore-our-careers/applications-process/pre-employment-screening

About the University of Oxford

We are the University of Oxford, the world's oldest and top-ranked university, sitting in the heart of one of the UK's most dynamic and diverse cities. 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.

Our people are central to our success, and we are committed to fostering an inclusive environment where everyone can thrive. We recognise that diversity is a strength and is vital for innovation and creativity. We aspire to build a truly diverse community which values and respects every individual's unique contribution.

Join us and you will become part of a unique, democratic and international community, with a great range of staff benefits and access to a vibrant array of cultural activities in the beautiful city of Oxford. Further information regarding the staff benefits can be found on the final page.

For more information, please visit https://www.ox.ac.uk/about.

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 specialties, which include most branches of the subject. We have especially strong links with computer science, materials science, and medicine. The Department employs 140 academic staff and has around 770 research students, 700 undergraduates and 200 researchers at any one time. Our research and education activities are supported by over 230 Professional and Technical staff.

Direct funding of research grants and contracts, from a variety of sources, amounts to an annual turnover of approximately £73m, of which research grant income is approximately £34m. Research activities fall into 8 broad headings, though there is much interdisciplinary research in practice: Information Engineering (Robotics, Computer Vision and Machine Learning); Control; Thermofluids; Materials and Mechanics; Civil and Offshore; Electrical and Optoelectronic; Chemical and Process; and Biomedical.

Research Excellence

The results of the seven-yearly UK-wide assessment of university research, REF2021, published on 12th May 2022, demonstrate that the University of Oxford made the highest volume of world-leading research submissions. The Department of Engineering Science had 71% of submissions which met the requirements for the highest grading of 4*(research that is world-leading in terms of originality, significance, and rigour).

Teaching

Each year 170-180 new undergraduates start the 4-year course leading to the MEng degree in Engineering Science. The course is accredited at MEng level by major engineering institutions. The syllabus has a common core extending through the first two years, with specialist options introduced in the third year, and the fourth year offering further specialist material and a major project.

Working for the Department

The Department of Engineering Science is a diverse, inventive, and dynamic place to work. There are many benefits to working for the University of Oxford, including flexible working arrangements, competitive benefits including a contributory salary scheme, travel discounts, and attractive family policies, as well as many training and self-development opportunities and a wealth of support for mental health and work-life balance.

The Department holds a bronze Athena Swan award to recognise advancement of gender equality: representation, progression and success for all. We have an active Equality and Diversity Committee who evaluate our position and help formulate plans to take us forward.

Researchers are supported via training, a researcher committee, regular events, career development support and opportunities to develop science communication and other useful skills. We have a well-established and active Women in Engineering network which fosters a supportive community for women engineers across various disciplines, organizes engaging and inspiring events for all.

Further information about the Department is available at www.eng.ox.ac.uk/about/.

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 (Home - Oxford Sparks) 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

Applications are made through our online recruitment portal. Information about the application process is available on our Jobs website https://www.ox.ac.uk/about/jobs/explore-our-careers/applications-process/how-to-apply

Your application will be assessed solely on the basis of your ability to meet the selection criteria stated in the job description.

As part of your application, you will be asked to provide:

- your CV;
- a supporting statement explaining how you meet each of the selection criteria, 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); and
- details of two / three referees, including whether we may contact them at this stage.

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

Applications must be received by **midday** UK time on the closing date stated in the online advertisement.

Additional information for applicants

If you currently work at the University

If you are a current University employee, please note that:

- as part of the referencing process, we will contact an appropriately senior member of your current department to confirm basic employment details, including your reason for leaving;
- although employees may hold multiple part-time posts, they may not hold more than the equivalent of a full-time post. If you are offered this post, and accepting it would take you over the equivalent of full-time hours, you will be expected to resign from, or reduce hours in, your other posts(s) before starting work in the new post.

If you currently work at the University and are a priority candidate:

- Please 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).

If you need help

For application FAQs and technical support, visit: https://www.ox.ac.uk/about/jobs/explore-our-careers/applications-process/support-with-online-applications

You can return to your online application at any time via: https://www.ox.ac.uk/about/jobs/explore-our-careers/applications-process/how-to-apply

You will receive an automated email confirming receipt of your application. If you do not receive this, please check your spam or junk folder.

Important information for candidates

Data privacy

Personal data submitted 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: https://www.ox.ac.uk/about/how-we-are-run/policies-and-statements/policy-hub/job-applicant-privacy-policy.

The University's Policy on Data Protection is available at: https://www.ox.ac.uk/about/how-we-are-run/policies-and-statements/policy-hub/data-protection-policy

The University's policy on retirement

The University operates an Employer Justified Retirement Age (EJRA) for very senior research posts at **grade RSIV/D35 and clinical equivalents E62 and E82** of 30 September before the 70th birthday.

For **existing** employees on these grades, any employment beyond the retirement age is subject to approval.

There is no normal or fixed age at which staff in posts at other grades must retire. Staff at these grades may choose to retire in accordance with the rules of the applicable pension scheme, as may be amended from time to time.

Equal opportunity

The University of Oxford is committed to equal opportunity, and to being a place where everyone belongs and is supported to succeed. We recognise how the diversity of our community enriches our ability to deliver on our academic mission.

We welcome applications from individuals from all backgrounds, including those under-represented within higher education. No applicant or members of staff shall be unlawfully discriminated against on the basis of age, disability, gender reassignment, marriage or civil partnership, pregnancy or maternity, race, religion or belief, sex, or sexual orientation.

Appointment and progression are based on personal merit and the application of criteria relevant to the duties and requirements of the post. In all cases, the primary consideration will be the ability to perform the job.

As stated in the University's Equality Policy and Equality, Diversity and Inclusion Strategic Plan, our commitment to equality and diversity goes hand in hand with our commitment to academic freedom and free speech.

Working at Oxford - Benefits

Join an international community where you can do meaningful work, develop your career and be supported to do your best.

38 days	24/7	6 nurseries
paid holiday	confidential wellbeing support	plus 380+ full-time places

Work-life balance

We recognise the importance of balancing work with your personal life and offer a variety of flexible working options.

Staff benefits at the University of Oxford | Oxford University

Your wellbeing

Free, confidential Employee Assistance Programme available 24 hours a day, 365 days a year, alongside wider health and wellbeing support. We are also committed to supporting colleagues with disabilities or long-term health conditions.

Health and wellbeing

Family-friendly benefits

Extensive family leave and childcare support, including six University nurseries, more than 450 full-time nursery places and salary-sacrifice childcare.

Family benefits and childcare

Belonging and community

Be part of a welcoming and inclusive community, with staff networks, recognised trade unions, opportunities to connect across the University, and the Newcomers' Club for partners of new staff.

Trade unions and employee representation | Oxford University

Pension and financial benefits

If eligible, you will be automatically enrolled into an appropriate pension scheme. Other financial benefits include access to a relocation scheme for eligible new staff, and a Give As You Earn charitable giving scheme.

Staff benefits at the University of Oxford | Oxford University

Travel and commuting

The University offers a range of travel discounts and schemes for University staff.

Transport | Oxford University

Life in Oxford

Free University Club membership, discounted access to the University Sports Centre, and practical support for relocating and settling into Oxford, including a visa loan scheme to help cover UK visa application costs for staff and their dependants.

Life in Oxford

Grow your career

The University offers many opportunities for training and career development. Find out more and access personal and professional development opportunities.

Learning & Organisational Development

For researchers on fixed-term contracts, the Researcher Hub supports career development, connections and next steps.

Researcher Hub

Discover more

Find out more about working at Oxford, our benefits and life in the city: Staff benefits at the University of Oxford | Oxford University