



**UNIVERSITY OF LINCOLN
JOB DESCRIPTION**

JOB TITLE	Data Scientist – KTP Associate				
DEPARTMENT	MSK Doctors and University of Lincoln				
LOCATION	MSK Doctors, Sleaford				
JOB NUMBER	EL1205	GRADE	N/A	DATE	September 2022
REPORTS TO	Dr Bethan Lee (MSK Doctors) & Lei Zhang (University of Lincoln)				

CONTEXT

MSK Doctors and the University of Lincoln have been successful in winning a government grant through the Knowledge Transfer Partnership (KTP) scheme administered and managed by Innovate UK. This has created an exciting and innovative partnership opportunity between MSK Doctors (<https://www.msksdoctors.com/>), the Laboratory of Vision Engineering (LoVE) (<https://www.visioneng.org.uk/>) at the School of Computer Science, College of Science and the School of Sports and Exercise Science, College of Social Sciences (<https://www.lincoln.ac.uk/sport/>) at the University of Lincoln.

MSK Doctors is an independent private medical clinic specialising in the management of musculoskeletal conditions. Being able to offer both non-surgical and surgical options to patients, MSK Doctors clinics have proven to be popular and have grown rapidly since 2019 from 1 clinic room to 2 dedicated clinics in Lincolnshire and 6 locations across the UK. MSK Doctors' vision is to deliver cutting edge diagnostic and medical therapy options to patients with musculoskeletal issues worldwide. To achieve this vision, its strategy is to provide personalised and precise treatment options with digital and advanced engineering technology.

The LoVE specialises in the capture, transmission, processing and understanding of image, video and other high-dimensional data. The group focuses on several application areas, including healthcare, scientific, security, environmental and behavioural monitoring. LoVE possesses a unique capability within the UK research landscape, namely the expertise and resources to develop new imaging modalities and systems from sensor design and provision to medical image analysis and understanding to assist with the full clinical workflow. It collaborates with major hospitals across the NHS and abroad, as well as leading national and commercial research facilities and industries.

We are seeking an enthusiastic and self-motivated individual to lead the development of a digital platform (MSK Digital) that will apply cutting-edge technology in computer vision, and machine /deep learning for MSK conditions assessment, management, and treatment. Advanced algorithms for automatic medical image interpretation and motion analysis will be developed, which include a 3D motion mesh reconstruction with standard camera capture, MRI image analysis for cartilage segmentation, 3D cartilage and meniscus reconstruction and volume calculation.

The KTP Associate will be mainly based at MSK Doctors in Sleaford, where a research lab will be provided for the experiments and platform development. A Virtual Private Network (VPN) will be constructed to establish a protected network connection between MSK Doctors Lab and the LoVE lab at the University.

JOB PURPOSE

We are looking for an enthusiastic and self-motivated associate who is keen to apply AI techniques to healthcare and work within a multidisciplinary team that includes doctors, data scientists and machine learning engineers.

The main purposes of this role include:

To conduct research under the supervision of senior colleagues and to contribute to the production of research

To provide support to the research project, undertake research work within the overall programme and assist with the day-to-day operation of the project

To assist in the identification and development of potential areas of research and the development of proposals for independent or collaborative research projects.

To manage the 24-month collaboration between the University of Lincoln and MSK Doctors.

KEY RESPONSIBILITIES

Research

To develop, optimise and validate AI algorithms, which provide the prediction of a set of biometrics used to assist in diagnosis and assessment of MSK conditions. The algorithms consist of two categories related to two sub-applications in the system: Automated MRI image interpretation and Motion analysis (kinetic analysis and 3D human motion mesh reconstruction). The Associate also needs to work on other relevant tasks including data collection, IT infrastructure maintenance, and operation of medical devices.

To attend leading conferences in medical imaging to showcase the outcomes of the project and contribute to the production of research reports and publications.

Contributing to preparing learning materials for interdisciplinary team that bridge the medical and computer science faculties.

Platform development

To deliver the MSK digital platform (MSKDPD), which is developed based on the AI models. Two application modules with respect to the MRI image analysis and motion analysis will be extended, deployed, and tested within the platform.

To deploy the MSK digital platform to the cloud server, releasing the cloud solution with MRI interpretation and motion analysis models for the public.

To support clinical validation in practice, MSK Doctors will evaluate the platform in terms of server stability and the model robustness in predictions.

Documentation

To prepare intermediate reports regarding the progress of platform development and bugs progress.

To prepare project documentation, including a system document that reports the technical solutions, design decisions, and architecture descriptions; a user document that provides the instructions on how to operate the platform for both end-user and admin user. Prepare a platform document that introduces the usage of the platform and lists all functions in the platform.

Project management

To perform project management activities, and assist in the daily project management, planning, scheduling, monitoring and reporting on the progress of the KTP projects.

To attend clinical training sessions and provide support to staff and any students who may be assisting with the research

In addition to the above, undertake such duties as may reasonably be requested and that are commensurate with the nature and grade of the post.

ADDITIONAL INFORMATION

Scope and dimensions of the role

The post holder will deliver the work as set out in the 24-month work plan, along with attending development courses, conferences and training events that are deemed suitable for the project delivery. Travel is required between the University and MSK Doctors' various offices.

Key working relationships/networks

Internal	External
<ul style="list-style-type: none">• Academic supervisor and lead• Company supervisor and lead• KTP Office• Research Administrator• Other in-house clinic staff and administrative staff	<ul style="list-style-type: none">• Knowledge Transfer Adviser• Patients



**UNIVERSITY OF LINCOLN
PERSON SPECIFICATION**

JOB TITLE	Data Scientist – KTP Scientist	JOB NUMBER	EL1205
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Selection Criteria	Essential (E) or Desirable (D)	Where Evidenced Application (A) Interview (I) Presentation (P) References (R)
Qualifications:		
MSc by research in Computer Science, Engineering or equivalent experience	E	A,I
PhD in Computer Science, Engineering or equivalent.	D	A,I
Experience:		
Experience in Computer vision, Machine learning and Medical image processing and analysis (object detection and segmentation)	E	A,I,P
Experience in hardware	D	A,I,P
Experience in carrying out both independent and collaborative research	E	A,I,P
Experience in software development	E	A,I,P
Skills and Knowledge:		
Excellent skills in deep learning with Pytorch or TensorFlow	E	A, I
Excellent numerical, written and verbal communication skills	E	A, I
Excellent organisation and self-management skills essential to adhere to KTP timeline and business requirements	E	A, I
Knowledge of a range of research techniques and methodologies	D	A, I
Excellent IT skills and software development skills	E	A, I
Competencies and Personal Attributes:		
Ability to manage and lead a project with multiple stakeholders	E	A, I, P
Ability to learn and work in new technologies in a short time span	E	A, I
Enthusiastic and self-motivated	E	A, I
Hard-working and with a determination to overcome problems and succeed	E	I
Desire and ability to learn new skills	E	A, I
Business Requirements:		
Flexible in working hours – to accommodate travel	E	A, I
Good communication skills to enable the effective presentation of research progress and outcomes to key stakeholders	E	A, I

Ability to develop internal and external contacts in order to enhance knowledge and understanding and form relationships for future collaboration	D	A, I
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Essential Requirements are those, without which, a candidate would not be able to do the job. **Desirable Requirements** are those which would be useful for the post holder to possess and will be considered when more than one applicant meets the essential requirements.

Author	MSK Doctors	HRBP	SL
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