UNIVERSITY OF LINCOLN
JOB DESCRIPTION

JOB TITLE	Post-Doctoral Research Associate (PDRA) (Field Robotics)				
DEPARTMENT	Lincoln Institute for Agri Food Technology (LIAT)				
LOCATION	Riseholme Campus				
JOB NUMBER	COS745	GRADE	7	DATE	February 2022
REPORTS TO	Marcello Calisti				

CONTEXT

The University of Lincoln is seeking to appoint a Postdoctoral Research Associate (PDRA) with skills and interests to support investigation of novel approaches to construction and control of bio-inspired robots for safe exploration and interaction in realistic environments (including extreme and challenging environments, such as the underwater benthic zone, agricultural fields, forests, etc.). The post will sit within an interdisciplinary team of robotics and AI experts, working closely with life sciences, to produce innovative solutions to difficult problems. The ideal candidate will be creative and curious, an active thinker who is motivated to try new and different things, unafraid to get their hands dirty designing and building hardware prototypes and happy to collaborate with a diverse team comprised of hardware, software and application domain experts.

Applicants should hold a PhD or be near to completion and should be able to demonstrate an excellent track record in Robotics, Mechanical Engineering, Mechatronics or a related field, including but not limited to: locomotion, grasping & manipulation and/or soft robotics. Experience with engineering design and development of new hardware devices is desirable.

Once in post, the PDRA will contribute to shaping the collective research portfolio, which includes contributing to the acquisition of external funding, helping to supervise PhD students, publishing in the highest quality journals and conferences, contributing to real-world applications with positive impacts on the wider society and economy, and conducting research in line with the targets set by the University of Lincoln. The PDRA may also have opportunities to help with supervision of masters student projects and/or give occasional guest lectures in related taught programmes (e.g. MSc Robotics and Autonomous Systems or MSc Data Science and Applied Analytics).

The PDRA will join two of the University of Lincoln's leading research groups: the Lincoln Centre for Autonomous Systems (L-CAS) and Lincoln Agri-Robotics (LAR). Researchers in these two groups work closely together striving to make an impactful difference by deploying robotics to address global challenges such as environmental monitoring and restoration, climate change, population growth, political pressures affecting migration, the demographics of an ageing population and human labour shortages in social care and food production.

In addition, the PDRA may have opportunities to participate in and/or contribute to professional development programmes, as well as public engagement activities, such as demonstrations for university open days and industry visitors.

JOB PURPOSE

The Post Doctoral Research Associate is responsible for conducting research on the project, as directed by the Principal Investigator, and is expected to operate with a significant degree of autonomy. They are not expected to operate as an independent researcher.

The post holder may have the opportunity to help supervise the work of more junior researchers.

The PDRA will develop their research focussing on aspects of field robotics, as related to the conception, design, and development of novel bio-inspired robots for safe exploration and interaction in realistic environments (including extreme and challenging environments, such as the underwater benthic zone, agricultural fields, forests, etc.). Examples of duties include the realization of novel robots as in [1] (a legged robot for underwater exploration), and/or the employment of the mathematical modelling of [2] (continuum modelling) for the design of novel soft grippers. The key technologies targeted for research contributions within this challenge include: locomotion, grasping, manipulation and soft robotics.

The PDRA will contribute to the writing of external funding bids, helping to supervise PhD students, publishing in the highest quality journals and conferences, contributing to real-world applications with positive impacts on the wider society and economy, and conducting, directing and supervising research in line with the targets set by LIAT and the University. Working with the LIAT directors, the post holder is expected operate with an appropriate degree of autonomy within the team. Further responsibilities include:

- Contributing to the research profile of the Lincoln Institute for Agri-food Technology and the Lincoln Centre for Autonomous Systems.
- Carrying out a limited number of additional activities in support of the academic work of the university, such as participation in demonstrations for industry visitors or public engagement activities.

The post holder may have opportunities to give guest lectures and/or help supervise projects on taught programmes related to their skill set (e.g. MSc Robotics and Autonomous Systems).

[1] Picardi, G., M. Chellapurath, S. Iacoponi, S. Stefanni, C. Laschi, and M. Calisti. "Bioinspired underwater legged robot for seabed exploration with low environmental disturbance." *Science Robotics* 5, no. 42 (2020).
[2] Armanini, C., Madiha F., M. Calisti., F. Giorgio-Serchi, C. Stefanini, and F. Renda. "Flagellate Underwater Robotics at Macroscale: Design, Modeling, and Characterization." *IEEE Transactions on Robotics* (2021).

KEY RESPONSIBILITIES

Literature Surveys

Undertake literature surveys and other investigations of the state-of-the-art, and prepare reports as required.

Programme of Research

Undertake a programme of research under the direction of the Principal Investigator, demonstrating a significant level of autonomy.

Lead in the production of high quality research outputs, including reports, papers and other publications of national/international standing.

Project Management

Perform project management activities, planning, scheduling, monitoring and reporting on progress of research projects.

Liaison and Networking

Identify and liaise with internal and external collaborators, and with colleagues in the Department, maintaining positive and effective working relationships.

Internal Research Activities

Participate in and help to organise internal research activities, including seminars, research meetings and conferences.

Continuous Professional Development

Undertake continuous professional development activities.

Grant Applications

Contribute to the production of grant applications.

Teaching Support

Opportunity to engage in optional teaching support activities, up to a maximum of six hours per week, possibly including leading a small number of units (no more than two per annum).

Opportunity to aid in the supervision of postgraduate research students.

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
This is primarily a research focussed role.

Key working relationships/networks	
Internal	**External**
- Principal Investigator - Research Director of LIAT - Director of L-CAS - Head of School (Director of LIAT) - Other research and academic staff within LIAT - Administrative and technical staff within LIAT	- Research collaborators, relevant academic and professional groups - Sponsors and clients, relevant national, regional and international networks in the Agri-food and marine robotics industry

UNIVERSITY OF LINCOLN
PERSON SPECIFICATION

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Selection Criteria	Essential (E) or Desirable (D)	Where Evidenced Application (A) Interview (I) Presentation (P) References (R)
Qualifications:		
PhD or equivalent (good candidates may be accepted with a PhD pending, subject to publication record)	E	A
Extensive knowledge specific to project/area	E	A/I
Experience:		
Extensive experience of relevant engineering and scientific research methods	E	A/I
Authorship of research outputs of national/international standing	E	A/I
Experience of research and interest in specific project area	E	A/I
Evidence of significant activity in at least one of the following: locomotion, grasping, manipulation and/or soft robotics	E	A/I
Interdisciplinary work relevant to mechanical engineering and/or robotics	D	A/I
Working with industry partners to form long term mutually beneficial partnerships	D	A/I
Teaching support	D	A/I
Skills and Knowledge:		
Advanced knowledge of continuum modelling and/or mechanical design, including the knowledge of CAD software (e.g. SolidWorks, Inventor)	D	A/I
Advanced knowledge of non-linear system analysis and/or robot control	D	A/I
Experience in system integration, from hardware and/or software point of view and/or innovative robots development	D	A/I
Experience designing, implementing and analysing experiments with field robots	D	A/I
Advanced skills in at least one programming language commonly used for engineering research, e.g. C/C++, Python, Matlab	D	A/I
Skills specific to project/area, including but not limited to bio-inspired robot design, marine robot deployment, and/or soft robot manufacturing	E	A/I
Ability to design, conduct and project manage original research in the subject area	E	A/I
Excellent written communication, including the ability to write reports and research outputs	E	A/I

Ability to prioritise own workload and work to specified deadlines under pressure	**E**	**A/I**
Ability to communicate complex subjects orally	**E**	**A/I**
Competencies and Personal Attributes:		
Flexible approach to workload	**E**	**I**
Ability to work on own and as part of a team	**E**	**I**
Enthusiasm for and serious commitment to high-quality research	**E**	**I**
Good interpersonal skills	**E**	**I**
Strong attention to detail	**E**	**I**
Business Requirements:		
N/A		

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	Elizabeth Sklar	**HRBA**	DB