



**UNIVERSITY OF LINCOLN
JOB DESCRIPTION**

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|-------------------|-------------------------------------|--------------|---|-------------|----------|
| JOB TITLE | Research Fellow (Sensory Biologist) | | | | |
| DEPARTMENT | School of Life Sciences | | | | |
| LOCATION | Brayford Pool | | | | |
| JOB NUMBER | COS494 | GRADE | 7 | DATE | Feb 2018 |
| REPORTS TO | Professor of Sensory Biology | | | | |

CONTEXT

The postholder will be part of a new interdisciplinary research group with the freedom to work on an exciting project for an extended period. The post is funded by an ERC Consolidator Award to the Professor of Sensory Biology, entitled '*The Insect cochlea: a non-invasive path towards enhanced sound detectors*'. The project's overarching aim is to develop new technological improvements that constitute the grounds of new theoretical advances in the design of super-sensitive acoustic sensors, using the katydid (or bush-cricket) ear as primary model.

This project will integrate two major objectives: 1) to develop a method that allows in-real time measurements of sensory cell activation using calcium imaging and Laser Doppler Vibrometry in intact hearing organs; and 2) to measure the natural response of the ear sensory cells to multiple sound inputs in intact hearing organs.

The sensory biology lab offers a dynamic research environment and facilities where the successful applicant will be a member of a multi-disciplinary group working closely together on a defined problem applying techniques from fields as diverse as acoustics, electro-physiology, hearing, material engineering, applied mathematics and biophysics.

JOB PURPOSE

The Research Fellow is responsible for conducting research on the project, as directed by the Professor of Sensory Biology, and is expected to operate with a significant degree of autonomy.

The postholder will be required to help supervise the work of more junior researchers and students.

KEY RESPONSIBILITIES

Literature Surveys

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

Programme of Research

Design and undertake programme of research under the direction of the Professor of Sensory Biology, demonstrating a significant level of autonomy. Lead in the organisation of fieldtrips to South America and Asia.

Lead in the production of high quality research outputs, including grant 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: weekly lab meetings, seminars, research meetings and conferences, as well as caring for ethics protocols, and health and safety in the research environment.

Continuous Professional Development

Undertake continuous professional development activities.

Grant Applications

Contribute to the production of grant applications.

Teaching Support

Engage in 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).

Instruct students in basic programming using Matlab, and in the use of the state-of-the-art facilities in the lab (e.g. LDV, Micro-CT scanner, segmentation methods for 3D reconstruction). 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

Using their skills and experience, the postholder will drive research on the structure and physiology of the bush-cricket tympanal organ with iterative exchanges of results between this project and that of other group members. The postholder will carry full responsibility for the practical implementation of electrophysiological and mechanical measurements, and for driving iterative exchanges with results from other group members. They will also be involved in the practical supervision of undergraduate and postgraduate students, as well as in the planning and execution of fieldwork. They will be responsible for the close monitoring of technical staff on the maintenance of the insect colonies.

Our recent research has shown that the ear of the bush-cricket has general functional similarities with the mammalian ear: they both exhibit outer, middle and inner ear components. Frequency analysis in the inner ear depends on travelling waves and the tonotopic organisation of the auditory mechanoreceptors. However, these similarities are very general and we do not yet understand the bush-cricket hearing process in detail. Much research remains to be done in order to determine to which extent the mammalian and the bush-cricket ears are equivalent. For this position, the research programme will aim at implementing non-invasive techniques to measure inner ear activity.

The postholder will use Calcium imaging techniques, LDV, and provide insight into the function of all steps of the hearing process of the bush-cricket tympanal organ (outer, middle, and inner ear components). This project has two main themes: 1) the development of a technique that allows us to map the effect of mechanical waves on sensory cell activation using calcium imaging and LDV in intact hearing organs. 2) the characterization of the natural response of the ear sensory cells to multiple sound inputs and their role in directional hearing, using Calcium imaging and LDV in intact hearing organs. This project will involve one PhD student and close collaboration with Dr. Berthold Hedwig in Cambridge.

The postholder will help write and publish high quality peer-reviewed scientific papers. In addition to contributing to the development of research proposals and applications for external funding, will contribute to the dissemination of the results to the scientific community through presentation at international conferences and workshops, and to the general public through public lectures and interviews with the media where appropriate.

Key working relationships/networks

| Internal | External |
|---|--|
| <ul style="list-style-type: none"> • Professor of Sensory Biology • Head of Research Group • Head of School • Other research and academic staff within the school | <ul style="list-style-type: none"> • Research collaborators • Funder (ERC) |



**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 |
| Experience: | | |
| Extensive experience of relevant research methods (LDV, µCT, micro-dissections, use of dyes. | E | A/I/P |
| Authorship of research outputs of national/international standing | E | A/I |
| Experience of research in specific project area (sensory biology: hearing) | E | A/I/P |
| Experience conducting and leading fieldwork in tropical countries | E | A/I |
| Teaching support | D | A/I |
| Skills and Knowledge: | | |
| Extensive knowledge specific to project/area | E | A/I/P |
| Ability to design, conduct and project manage original research in the subject area | E | A/I/P |
| 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/P |
| Skills specific to project/area | E | A/I/P |
| Competencies and Personal Attributes: | | |
| Flexible approach to workload | E | A/I |
| Ability to work on own and as part of a team | E | A/I |
| Enthusiasm and commitment | E | A/I |

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 postholder to possess and will be considered when more than one applicant meets the essential requirements.

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| Author | FM-Z | HRBP | SP |
|---------------|------|-------------|----|