

Job Description

Imperial College London

Job Title:	Research Associate in Security of ML-based Personal Assistants
Department/School/Faculty:	Department of Computing, Faculty of Engineering
Campus location:	South Kensington
Job Family/Level:	Research Associate Level
Responsible to:	Prof Alessio Lomuscio
Key Working Relationships	PI, Department of Computing, relevant management/admin support teams, collaborators at King's College London
Contract type:	Full-time, Fixed-term to start ASAP until 30/11/2023

Purpose of the Post

We are seeking a talented Research Associate with a background in either machine learning, verification, or security, to be employed on the UKRI grant "Secure AI Assistants", jointly held at King's College London and Imperial College London. The overarching aim of the project concerns the development of various methods to assess the security of personal AI assistants, including the identification of unwanted aspects of the system so that they can be rectified. The successful applicant will focus on specification and verification methods for AI assistants based on machine-learning. This will concern both the development of off-line verification methods, and methods for online monitoring when training happens at runtime during user interaction. Familiarity with existing methods for verification of neural networks, e.g., MILP-based methods, SAT-based methods, abstraction, and optimisation is highly desirable, but candidates demonstrating an ability and willingness to become familiar with these topics and able to contribute to them will also be considered. Working knowledge of neural networks, including recurrent networks such as LSTM and related ML methods is highly desirable.

The successful applicant will join the "Verification of Autonomous Systems" research group at Imperial College London, led by Professor Alessio Lomuscio, which is presently working on topics within Safe Artificial Intelligence, including but not limited to verification of autonomous systems, swarms, robustness, and safe reinforcement learning.

***Candidates who have not yet been officially awarded their PhD will be appointed as Research Assistant within the salary range £ 36,045 to £39,183 per annum.**

Research Duties

- Verification and analysis of feed-forward, recurrent, LSTM and other neural networks as used in personal assistants.
- Machine Learning with particular emphasis on robustness.
- Tool building and engineering aspects of code analysis
- To take initiatives in the planning of research
- To direct the work of small research teams
- To identify and develop suitable techniques, and apparatus, for the collection and analysis of data
- To conduct data analysis
- To ensure the validity and reliability of data at all times
- To maintain accurate and complete records of all findings
- To write reports for submission to research sponsors
- To present findings to colleagues and at conferences
- To submit publications to refereed journals
- To provide guidance to staff and students
- To attend relevant workshops and conferences as necessary
- To develop contacts and research collaborations within the College and the wider community

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- To promote the reputation of the Group, the Department and the College
- To provide guidance to PhD Students
- Contribute to bids for research grants
- To conduct and plan own scientific work with appropriate supervision.
- To maintain highly organised and accurate record of experimental Work.
- To actively participate in the research programme of the Group
- To publish in high quality journals and to present data at national and international meetings.
- To participate in Group research meetings and internal seminars.
- To collaborate with other allied scientists within Imperial College and elsewhere in London and abroad, as appropriate.
- To contribute to the smooth running of the Group's laboratories and, facilities with other scientists, clinicians, technicians and students within the laboratories.
- Assist in the supervision of undergraduate and postgraduate research students and research assistants as required.
- To comply with the College, Division, and Unit safety practices and to attend courses on safety when appropriate.
- Any other duties as may be deemed reasonable by Head of group as well as Head of Division/Department/Section.

Where Imperial or funder conditions necessitate, you will be required to complete timesheets for your work on projects in a timely manner.

Other Duties

- To undertake any necessary training and/or development
- To undertake appropriate administration tasks
- To attend relevant meetings

To observe and comply with all College policies and regulations, including the key policies and procedures on Confidentiality, Conflict of Interest, Data Protection, Equal Opportunities, Financial Regulations, Health and Safety, Imperial Expectations (for new leaders, managers and supervisors), Information Technology, Private Engagements and Register of Interests, and Smoking.

To undertake specific safety responsibilities relevant to individual roles, as set out on the College Website [Health and Safety Structure and Responsibilities page](http://www3.imperial.ac.uk/safety/policies/organisationandarrangements) (<http://www3.imperial.ac.uk/safety/policies/organisationandarrangements>).

Job descriptions cannot be exhaustive and so the post holder may be required to undertake other duties, which are broadly in line with the above key responsibilities.

Imperial College is committed to equality of opportunity and to eliminating discrimination. All employees are expected to adhere to the principles set out in our Equal Opportunities in Employment Policy, Promoting Race Equality Policy and Disability Policy and all other relevant guidance/practice frameworks.

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Person Specification

Requirements	Essential (E)/ Desirable (D)
Candidates/post holders will be expected to demonstrate the following	
Education	
Research Associate A PhD in an area pertinent to the subject area, i.e. Computing or Engineering	E
Research Assistant Be close to completion or waiting to be awarded a PhD in an area pertinent to the subject area, i.e. Computing or Engineering	E
Experience	
Applicants are expected to have either of the following: <ul style="list-style-type: none"> A strong background in either formal verification, SMT solving, optimisation, or security. A strong background in machine learning with particular emphasis to either verification or robustness. 	E
A strong publication track record in relevant conferences or journals	E
Knowledge	
Proven knowledge and track record in one or more of the following areas: Deep learning, Security, Verification, Optimisation	E
Skills & Abilities	
Ability to conduct a detailed review of recent literature	E
Creative approach to problem-solving	E
Excellent verbal and written communication skills and the ability to deal with a wide range of people	E
A proven ability to program and maintain state-of-the-art toolkits	D
Ability to organise own work with minimal supervision	E
Ability to prioritise own work in response to deadlines	E
Advanced computer skills, including word-processing, spreadsheets and the Internet	E
Ability to direct the work of a small research team and motivate others to produce a high standard of work	E
Other	
Willingness to work as part of a team and to be open-minded and cooperative	E
Flexible attitude towards work	E
Discipline and regard for confidentiality and security at all times	E
Willingness to undertake any necessary training for the role	E
Willingness to travel both within the United Kingdom and abroad to conduct research and attend conferences	E
Willingness to work out of normal working hours (including weekends) if the requirements of the project demand	E

Please note that job descriptions cannot be exhaustive, and the post-holder may be required to undertake other duties, which are broadly in line with the above key responsibilities.

Imperial College is committed to equality of opportunity and to eliminating discrimination. All employees are expected to follow the [7 Imperial Expectations](#) detailed below:

- 1) Champion a positive approach to change and opportunity
- 2) Communicate regularly and effectively within and across teams
- 3) Consider the thoughts and expectations of others
- 4) Deliver positive outcomes
- 5) Encourage inclusive participation and eliminate discrimination
- 6) Support and develop staff to optimise talent

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7) Work in a planned and managed way

Employees are also required to comply with all College policies and regulations paying special attention to:

- Confidentiality
- Conflict of Interest
- Data Protection
- Equal Opportunities
- Financial Regulations
- Health and Safety
- Information Technology
- Smoking
- Private Engagements and Register of Interests

They must also undertake specific training and assume responsibility for safety relevant to specific roles, as set out on the [College Website Health and Safety Structure and Responsibilities](#) page.

The College is a proud signatory to the San-Francisco Declaration on Research Assessment (DORA), which means that in hiring and promotion decisions, we evaluate applicants on the quality of their work, not the journal impact factor where it is published. For more information, see <https://www.imperial.ac.uk/research-and-innovation/about-imperial-research/research-evaluation/>

The College believes that the use of animals in research is vital to improve human and animal health and welfare. Animals may only be used in research programmes where their use is shown to be necessary for developing new treatments and making medical advances. Imperial is committed to ensuring that, in cases where this research is deemed essential, all animals in the College's care are treated with full respect, and that all staff involved with this work show due consideration at every level.

<http://www.imperial.ac.uk/research-and-innovation/about-imperial-research/research-integrity/animal-research/>

Committed to equality and valuing diversity, we are an Athena SWAN Silver Award winner, a Stonewall Diversity Champion, a Disability Confident Employer and work in partnership with GIRES to promote respect for trans people.