IMPERIAL

Research Associate in Cell-free Synthetic Biology

Department/Division/Faculty:	Department of Life Sciences, Faculty of Natural Sciences
Campus/Location:	South Kensington Campus, with regular work at the Translation and Innovation Hub (I-HUB) and London Biofoundry (White City)
Job Family/Level:	Research Job Family, Research Associate* (Research salary scale)
Responsible to:	Dr. Simon Moore
Line management for:	N/A (day-to-day mentoring of one PhD student)
Key working Relationships (Internal):	Dr. Simon Moore, Dr Marko Storch and Dr David Bell (London Biofoundry), a PhD student, other members of the group, and their collaborators at Imperial.
Key Working Relationships (External):	Partners in the AIMARIA Horizon Europe consortium (coordinated by NTNU, Norway), and industry and international academic collaborators on related projects.
Contract type:	Full time - fixed term, 24 months in the first instance.

The Department of Life Sciences:

The Department of Life Sciences (DoLS) at Imperial College London, headed by Professor Dan Davis, embraces the full breadth of modern life sciences activity. It is one of the largest life sciences groups in Europe, with approximately 100 academic staff, 180+ research fellows and post-doctoral researchers, 50+ technical services staff, 40+ professional services staff, 200+ PhD students, 200+ Masters students and 800+ UG students. The Department's research and teaching activities are funded by a wide variety of research councils, charities and industries bodies, with the value of current external research grants totalling more than £100 million.

DoLS is located on 2 campuses at South Kensington and Silwood Park. Research activity is organised into 12 themes; in addition, staff are integrated into a number of multidisciplinary, cross-departmental research centres. We run 2 undergraduate degrees (Biology and Biochemistry/Biotechnology), and 16 Masters courses.

We proudly hold an Athena SWAN Bronze Award and strive to provide a working environment where all our staff feel fully supported to flourish and excel. We are committed to promoting the wide range of Family Friendly policies and associated initiatives offered by the College.

The DoLS Newsletters provide a useful insight into the activities and life in our department. Further information about Life Sciences Athena SWAN can be accessed via our website.

Purpose of the Post

The Moore laboratory (www.mooresynbio.com), Imperial College London, is recruiting a Postdoctoral Research Associate with expertise in biochemistry, microbiology, molecular biology, or a related discipline, to express prioritised biosynthetic gene clusters, mined from metagenomic data, using both *E. coli* and *Streptomyces* cell-free protein synthesis (CFPS) systems. The Horizon Europe project AIMARIA funds the post, which involves work at the Translation and Innovation Hub (I-HUB) and the London Biofoundry on Imperial's White City campus.

Project Scope: Marine microbes hold a vast but underexploited biosynthetic capacity, with most marine microorganisms remaining unexplored. AIMARIA (Accelerating Innovation in Marine AI-powered Bioprospecting) is a four-year Horizon Europe project, coordinated by Professor Rahmi Lale at NTNU in Norway, that combines AI-driven prioritisation with cell-free systems and engineered microbial chassis to give sustainable and scalable access to high-value marine natural products. In the Moore group, you will express marine biosynthetic gene clusters in *E. coli* and *Streptomyces* cell-free systems, and characterise the natural products they encode. The postdoc will work alongside and mentor a PhD student also on the project, and will directly engage with our highly interdisciplinary consortia, which includes world leading academics and industry partners integrated across bioinformatics, microbial ecology, natural product chemistry, synthetic biology, and artificial intelligence expertise.

Preliminary Work: Related work leading up to this project include a *Streptomyces venezuelae* cell-free protein synthesis toolkit (ACS Synth. Biol. 2021, 10, 402-411, https://doi.org/10.1021/acssynbio.0c00581), while an expert opinion cell-free synthetic biology for natural product biosynthesis and discovery was published recently (Chem. Soc. Rev. 2025, 54, 4314-4352, https://doi.org/10.1039/d4cs01198h). We also have optimised *E. coli* cell-free systems for the scalable synthesis of peptides and proteins, up to 3 mg/mL, to complement the experiments.

Expertise and Training: Cell-free protein synthesis and DNA engineering form the core of the post. You will take pre-designed and refactored marine biosynthetic gene clusters and onboard them with in-house cloning workflows (for example, by Golden Gate DNA assembly), express them in *E. coli* and *Streptomyces* cell-free systems, and optimise extract, template and scaled-up reaction conditions. Both batch and semi-continuous reactions will be explored, to improve the separation and detection of product from the background matrix - cell extract and small molecules. You will work alongside Dr Marko Storch and Dr David Bell at the I-HUB and London Biofoundry, where all high-resolution mass spectrometry and downstream analysis will be performed, with additional access to the Agilent facilities at Imperial where required for further analysis. On site training on data collected and analysis will be provided, so no prior mass spectrometry experience is required, although it is beneficial. Clusters with promising bioactivity will be scaled up in microbial cell expression systems and purified from either batch flask or bioreactor cultivations. The project may optionally include biochemistry, involving recombinant protein purification and the design of bespoke enzyme assays. Prior experience of studying and expressing biosynthetic gene clusters from Actinobacteria or related microbes is an advantage. The cell-free research is already established and in-house training will be provided. With our collaborators and the London Biofoundry, we

will train you in cell-free extract preparation, *Streptomyces* genetic engineering, HPLC and LC-MS, and we encourage applicants with a strong background in some, though not all, of these areas to apply. Preferred candidates will also have a clear track record of consistent delivery on previously funded projects into impact deliverables, for example publications, patents or public datasets.

Environment: The Moore group runs both basic and applied research projects, the latter in partnership with industry, and operates a collaborative, non-hierarchical working style in which ideas are developed and tested through open discussion. You will work within a diverse team and benefit from interactions with other postdoctoral group members specialising in *Streptomyces* natural product biosynthesis, cell-free synthetic biology, the engineering of heterologous expression systems, and routine biochemistry and analytical techniques. You will work alongside and mentor a PhD student who is developing the cell-free systems further, and alongside visiting researchers from Brazil, South Korea and other European countries. By joining the group, you will contribute to high-profile research projects and to grant, publication and patent writing, and will help mentor undergraduate and Master's students when required.

Postdoctoral Support: Dr Moore will provide direct support to help you develop your own research path, whether towards academic independence, for example through early-career fellowship applications, or towards an industry-facing career. The post may suit candidates with some prior postdoctoral experience who are already considering this transition, as well as those making their first move from a PhD. The Moore group maintains several active industry collaborations and takes an open, entrepreneurial approach to research outcomes. AIMARIA is a Horizon Europe innovation action with industry partners, so you will have the chance to engage with industry on the scale-up and application of marine natural products. Imperial is a world leader in research translation, with dedicated commercialisation support and strong industry partnerships, providing an excellent environment for an innovation-driven or industry-facing career at any stage.

Key Responsibilities

Research Duties:

- To take responsibility for the day-to-day running of cell-free expression experiments, DNA construction and biochemical research.
- To carry out the design and execution of appropriate experiments based on high-level research goals.
- To design and prepare DNA constructs for marine biosynthetic gene clusters, using cloning and DNA assembly methods such as Gibson assembly.
- To express marine biosynthetic gene clusters in *E. coli* and *Streptomyces* cell-free protein synthesis systems, and to optimise reaction conditions for the detection of their natural products.
- To express and purify biosynthetic enzymes, and to characterise their activity using *in vitro* biochemical assays.
- To prepare samples for high-resolution mass spectrometry and downstream data analysis with Dr Marko Storch and Dr David Bell at the I-HUB and London Biofoundry (White City), and to coordinate the transfer of samples and data between sites.
- To work with AIMARIA consortium partners to share constructs, data and results, and to contribute to consortium meetings and reports.

- To engage with industry collaborators, presenting project progress and contributing to the protection of intellectual property as required.
- To work alongside and mentor a PhD student developing the cell-free systems, and support learning in your field.
- To report to regular laboratory meetings and project team meetings and deliver presentations at internal and external seminars.
- To produce accurate report-ready data and to assist in the preparation of written progress reports and publications as required.
- To be proficient in new approaches and techniques, and integrate these approaches into your research projects.
- To take initiative in the planning and execution of research, and in the development of collaborations with other groups at Imperial, and external collaborators.
- To identify and develop suitable techniques for the collection and analysis of data.
- To conduct data analysis and ensure the validity and reliability of data at all times.
- To maintain accurate and complete records of all findings, and to deposit data in public repositories in line with Horizon Europe open science requirements.
- To write reports for submission to research sponsors.
- To prepare material for presentation in oral and poster formats.
- To attend relevant workshops and conferences (national and international) as necessary.
- To draft publications and prepare them for submission to refereed journals.
- To contribute to writing research grant bids and patent applications.
- To supervise practical work and advise students and visiting researchers on techniques.
- To take responsibility for organising resources and effective decision making in support of research.
- To develop contacts and research collaborations within the College and the wider community
- To promote the reputation of the Group, the Department and the College.
- To maintain confidentiality of the project and background IP, since this is an innovation action funded programme.

Research group infrastructure:

- To help with the smooth running, organisation of the laboratory and ensuring that good laboratory practice is observed in all procedures directly related to the research Programme, including the safe handling of genetically modified microorganisms.
- To participate in all duties associated with support of the research, including laboratory rotas.
- To take an active involvement in maintaining a safe working environment in accordance with Health & Safety procedures.

Additional Duties:

- To undertake appropriate administration tasks.

- To undertake limited teaching duties as required by the Department.
- To attend appropriate courses to develop new skills.
- 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, Ethics related, External Interests, Financial Regulations, Health and Safety, Imperial Expectations (for new leaders, managers and supervisors), Information Technology, and Smoking.
- To undertake specific safety responsibilities relevant to individual roles, as set out on the College Health and Safety Structure and Responsibilities web page: http://www3.imperial.ac.uk/safety/policies/organisationandarrangements.
- To undertake Business Continuity responsibilities relevant to individual roles

Person Specification

Requirements Candidates/post holders will be expected to demonstrate the following:	**Essential (E)/ Desirable (D)**
Education	
Hold (or close to completion) a PhD in microbiology, biochemistry, molecular biology, chemical biology or a closely related discipline, or equivalent research, industrial or commercial experience **Candidates who have not yet been officially awarded their PhD will be appointed as Research Assistant.*	(E)
Experience	
Strong research track record, preferably demonstrated by first author publications in international journals	(E)
Experience in molecular biology, including DNA assembly, cloning and the construction of expression plasmids	(E)
Experience in the heterologous expression of enzymes or biosynthetic pathways in bacteria	(E)
Experience in the genetic engineering of Streptomyces or other actinobacteria, or in the cloning and heterologous expression of biosynthetic gene clusters	(D)
Experience in the detection and analysis of natural products by HPLC or LC-MS	(D)
Experience in recombinant protein expression, purification and enzyme assays	(D)
Experience in the bioinformatic analysis of biosynthetic gene clusters (for example, using antiSMASH)	(D)
Integration of data from structural, *in silico* and biophysical studies	(D)
Mentoring and developing junior team members	(D)
Experience in working with industry partners, or in contributing to patent applications	(D)

Knowledge	
Knowledge of biochemistry, molecular biology, natural product biosynthesis or related disciplines	(E)
Knowledge of research methods and statistical procedures	(E)

Skills & Abilities	
Strong organisation skills, and proficiency in organising data, datasets, samples	(E)
Ability to conduct a detailed review of recent literature	(E)
Ability to develop and apply new concepts	(E)
Creative approach to problem-solving	(E)
Excellent verbal communication skills and the ability to deal with a wide range of people	(E)
Excellent written communication skills and the ability to write clearly and succinctly for publication	(E)
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)
Experience in programming or scripting (e.g., Python or R) for the analysis and visualisation of experimental data	(D)
Ability to mentor a PhD student and motivate others to produce a high standard of work	(E)
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 and project meetings, and to work across the South Kensington and White City campuses	(E)
Willingness to work out of normal working hours (including weekends) if the requirements of the project demand	(E)

Further Information

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.

Our values are at the root of everything we do and everyone in our community is expected to demonstrate Imperial:

- Respect
- Collaboration
- Excellence
- Integrity
- Innovation

Employees are also required to comply with all Imperial policies and regulations.

We are committed to equality of opportunity, to eliminating discrimination and to creating an inclusive working environment for all. We encourage candidates to apply irrespective of age, disability, marriage or civil partnership status, pregnancy or maternity, race, religion and belief, gender reassignment, sex, or sexual orientation. You can read more about our commitment on our webpages.

Imperial 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/

Imperial 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 which are ultimately aimed towards finding new treatments and making scientific and medical advances, and where there are no satisfactory or reasonably practical alternatives to their use. Imperial is committed to ensuring that, in cases where this research is deemed essential, all animals in our care are treated with full respect, and that all staff involved with this work show due consideration at every level. Find out more about animal research at Imperial.

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