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Hartree Centre for Digital Innovation in Life Sciences

Call for Proposals

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Summary

The application of Artificial Intelligence (AI), data-driven methodologies and omics data has significantly influenced the field of drug discovery, offering significant insights into disease mechanisms, and streamlining the therapeutic development process.

AI and omics are being utilised to identify and optimise therapeutic targets and AI and data-driven strategies are accelerating the identification of novel drug candidates, optimising clinical trials, and personalising patient care.

The Hartree National Centre for Digital Innovation (HNCDI) partners, STFC and IBM Research, in co-operation with Bionow and The European Laboratory Research & Innovation Group (ELRIG) are issuing a call for proposals for HNCDI projects from organisations in the biomedical and healthcare life sciences sector.

HNCDI is a collaborative programme between STFC Hartree Centre and IBM Research which enables businesses to acquire the skills, knowledge, and technical capability required to adopt emerging digital technologies including supercomputing, data analytics, AI, machine learning and quantum computing.

HNCDI provides a safe and supportive environment for organisations to explore the latest digital technologies and skills, develop proofs-of-concept, and create roadmaps to apply them to industry and public sector challenges effectively. This HNCDI Life Sciences call seeks in collaboration with organisations in the life sciences sector to create HNCDI projects that apply these emerging digital technologies to industrially relevant and impactful research and innovation to further biomedical technology, drug discovery and precision medicine in the UK.

This is in line with the five-year Hartree Centre Strategy to work at the intersection of applied research and innovation to place advanced digital technologies into the hands of UK businesses, regardless of their size.

This call delivers against the Government's updated life science sector priorities that underpin the importance of harnessing data to improve services for patients and power cutting-edge medical research and data-driven technologies like AI to tackle some of the biggest challenges in healthcare such as personalised medicine and disease understanding. Heterogeneous omics data underpins most of the growth trends in this sector, and through this call, we aim to contribute towards the UK Life Sciences priorities by building industry-led real-life usecases enabled through the Hartree Centre's advanced computing facilities.

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Call outline

The call aims to support a programme of coordinated sector projects on themes including drug discovery, personalised medicine, patient-specific responses to drug treatment and predictive analytics for patient outcomes, by leveraging advances in high performance computing, data science, AI and quantum computing.

This call is open to pharmaceutical and life science businesses of any size, providing unique access to the latest technologies and highly skilled staff in the fields of bioinformatics, machine learning, big data, AI and quantum computing for omics analysis and drug discovery, all powered by the latest generation of HPC facilities and platforms.

The aim is to apply new methods and tools, and de-risk the uptake of new technologies in the life sciences industry. The projects will validate the new technologies capabilities as applied to key life sciences sector challenges. Through these projects new avenues for additional research and development of these and other new technologies may be uncovered. The success of our life sciences sector also depends on access to talent. However the sector is experiencing skills shortages, especially when it comes to digital and data skills. The Hartree Centre's 'Explain' training is freely available and enables individuals and businesses to develop the depth of skills needed to thrive in a digital economy.

As a result, we are seeking proposals from the life sciences sector to turn into a series of projects, which demonstrate primary use of new digital technologies required to address a specific challenge in the sector.

The Innovation in Life Sciences competition is offering up to **72 months of staff time** (combined from STFC and IBM resources) and **compute resources** to enable the initiation **of between 4-8 projects** to commence between April 2025 to June 2025 (and conclude by March 2026). This corresponds to an allocation of approximately **£2-3 M** of the total HNCDI budget (£210m) that will fund STFC and IBM staff time and cloud/computing access. No direct funding is available to organisations outside of the HNCDI partners.

Scope

The Innovation in Life Sciences programme is intended for UK organisations working in or with the life sciences sector, through access to advanced digital technologies and supporting expertise, to help apply next generation digital methods and tools to overcome challenges in the life sciences which have a high impact on the sector.

We are seeking project proposals that will combine newly researched and developed digital technologies and existing digital technologies, improving speed, accuracy, and efficiency of solutions within the life sciences sector.

The suggested focus areas of this call could include, but are not limited to, the application of bioinformatics, AI, machine learning and data-driven approaches to collaborative research and advances through:

- **Data-driven Drug Discovery.** Through the utilization of advanced AI, it is possible to identify patterns within multi-modal datasets, such as those derived from advances in omics technology, to generate insights, confirm whether a particular target is suitable for drug development, and assist in the discovery and optimisation of new targets, as well as refining the design of drug molecules for greater drug efficacy.
- **Personalised Medicine and treatment recommendations.** A benefit of using computational approaches in life sciences, such as modelling and simulation, big data, digital twins, machine learning and AI, is the ability to accelerate the drug development process. This could for example be applied to personalised medicine and drug repurposing, integrating data across omics, technologies, electronic health records, and clinical data to increase understanding of drug modes of action, disease progression and optimised dosing and clinical trial design.
- **Predictive analytics for patient outcomes. B**y integrating patient data such as genetic information, medical history, lifestyle habits, and environmental factors, data-driven approaches such as bioinformatics, machine learning and AI can be leveraged to develop early diagnostics tools and technologies, assisting the early identification of disease indications, improving long term prognosis, and reducing costs for health care providers.
- **Quantum enhanced techniques for drug discovery, patient representations, and healthcare optimization problems.** We help businesses in the healthcare and lifescience sectorsin navigating the emerging technology landscape and advise where the integration of quantum computing can provide a tangible benefit for their businesses. We support the development of proof-of-concept techniques and help to scale them where appropriate.

After choosing one of the above themes, the applicable technology areas for consideration can include the following. However, exact specification of digital technologies applied to solve the application challenge will be decided in collaboration in Stage 2.

- **MODELLING & SIMULATION** | Accelerating discovery and innovation through AI-enriched large-scale, multi-disciplinary, computational modelling & simulation. Providing targeted and faster results through the application of AI techniques to modelling & simulation applications.

- **DATA ANALYSIS AND ENGINEERING** | Exploration of methods and processes for automated data integration and analysis, underpinning the delivery of new insights through the application of data science, high performance computing and AI to build innovative products and processes.

- **SCALABLE ARTIFICIAL INTELLIGENCE** | Enabling the scaling of workflows and algorithms to deliver data pipelines, machine learning and AI with high performance computing and data engineering, enabling solutions to operate at the size, speed, and complexity required to deliver effective capabilities.

- **QUANTUM COMPUTING** | Exploiting the laws of quantum mechanics to solve problems that are too complex for classical computing and exploring how emerging digital technologies can offer the next generation of competitive advantages. Developing quantum computing approaches to in-depth simulations, complex multi-dimensional optimisation challenges, and enabling discovery.

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Support type and expected outcomes

The Innovation in Life Sciences call will fund all STFC and IBM staff and compute resources. No direct funding is available to organisations outside of the HNCDI partners.

Most projects are anticipated to fall in the **3-12 month** timeframe, with maximum project duration being fixed at 12 months.

We are looking for committed partners and as such in kind contribution is expected but no fixed amount is specified. In kind covers data, staff effort, materials to test the new technologies, and time taken in testing the developed solution and providing continuous feedback.

During projects, we expect to use the digital technologies being researched and developed by STFC and IBM Research. Within the projects, new areas of research and development may be required to address the life sciences sector challenges. It is hoped that any digital tools or platforms either developed or applied within a project should demonstrate a **Technology Readiness Level** of **3 to 7 by the end of the project**.

For successful proposals in the Innovation in Life Sciences call, you will receive:

1. dedicated resource from the HNCDI partners for projects aiming to collectively address your challenge.
2. the ability to collaborate with the STFC Hartree Centre and IBM Research – home to world-leading science facilities and knowledge.
3. the opportunity to de-risk innovation by providing access to a supportive environment and the ability to test new digital concepts and technologies.

Training in digital technologies is offered under HNCDI and you will be advised which of our available training courses would be suitable for you to enable the most effective understanding and use of the technologies used within the projects.

Due to the nature of the support, the digital assets solely generated by either STFC or IBM during the course of the project will be owned by HNCDI. Any jointly created (non-separable) foreground IP generated during the course of the project will be jointly owned, and each owner may use freely without accounting to the other owner(s). Industry participants can expect to receive outputs from the projects including reports on the work carried out and associated results, models, algorithms and a software evaluation to **trial the developed methods/technologies** (the evaluation period term is negotiable and formalised in a legal agreement, for further details please contact the HNCDI team).

Eligibility

To be eligible for participation to the submission and project delivery phases, your organisation **must**:

- Be a UK based organisation of any size registered at Companies House;
- Have a development base for the relevant product or service in the UK or provide the relevant product or service from or in the UK;
- If "in kind contribution" is provided, carry out its project work in the UK;
- Intend to exploit the results from or in the UK;
- Start the project in the window between 1st April 2025 to 1st June 2025;
- End the project no later than 31st March 2026.

Application process

The application process for this call has **two stages**.

i) **Stage 1. Expression of Interest (EOI)** | **DEADLINE 29th NOVEMBER 2024**
The initial application process requires companies to submit a concise EOI through a 'Expression of Interest' Form (shown in Appendix D), describing the area of focus.

Companies are not required to describe the project they want to do; instead, they will need to describe the challenge, its nature, any techniques already tried and the value of solving it.

In addition, the application should include some assessment of how solving the challenge would benefit sales and other business outcomes, as well as the contribution that the company would like to provide (in-kind).

This application will be assessed by a board comprising members from STFC, IBM against the selection criteria.

The submission of an EOI is a pre-requisite for participation in the full project proposal, but it does not guarantee that a future proposal derived from it will be chosen.

Submissions should be sent to hartreecentre@stfc.ac.uk by midnight of the 29th November 2024.

ii) **Stage 2. Full Project Proposal** | **DEADLINE 1st MARCH 2025** (although project proposals ready before this date will be evaluated and will commence earlier – at the earliest from January 2025). For approved Expression of Interest Statements, the next stage is the development of a Full Project Proposal in which the companies that have been successful in 'Stage 1. Expression of Interest' will work with the HNCDI staff. Although input information is required from the successful company, it is expected that the HNCDI staff will be leading the 'Full Project Proposal' activities such as detailed scoping of work packages and project risks.

In this stage specifics of the work to be done and further technical details will be addressed.

The 'Full Project Proposal' will then be reviewed by the HNCDI Management Board for final approval or rejection.

During each stage, the life sciences sector call team will be offering an interactive consultancy service on a 1:1 basis to assist participants developing their proposal.

Selection Criteria

The 'Stage 1. Expressions of Interest' are evaluated by the Innovation in Life Sciences Advisory Board, which comprises a minimum of 8 members:

- The STFC life sciences lead or an alternative STFC life science sector representative;
- The STFC life sciences Business Development Manager or an alternative STFC Business Development Manager representative;
- The STFC HNDCI Explore Workstream Lead or an alternative STFC contact nominated by the STFC Management Board;
- The IBM HNDCI Explore Workstream Lead or an alternative IBM contact nominated by the IBM Management Board;
- The STFC HNDCI Excelerate Workstream Lead or an alternative STFC contact nominated by the STFC Management Board;
- The IBM HNDCI Excelerate Workstream Lead or an alternative IBM contact nominated by the IBM Management Board.

The projects will be assessed through the same procedures and marking system, as per below.

The projects will be evaluated considering **two main categories**:

- **ATTRACTIVENESS** | i.e. how the project proposal is aligned to the strategic objectives of HNCDI and of the UK life sciences sector.
- **ACHIEVABILITY** | i.e. how easy it is to deliver the proposed project outputs in terms of complexity, capacity and risks.

Both the categories are divided in 6 subcategories as per the table below:

	ATTRACTIVENESS		ACHIEVABILITY	
	Sub-category	**Description**	**Sub-category**	**Description**
1	STRATEGIC ALIGNMENT	*The project aligns well with UK government priority R&D investment areas, and key industry and governmental organisation innovation strategies, the HNDCI strategic technology areas, and in particular with the relevant UK life sciences sector bodies engaged in promoting the call (represented by Bionow and ELRIG).*	SCOPE CLARITY	*The scope of the project is clearly defined with a logical delivery approach, output & expected outcomes and impact, producing relevant Case Study to industry at the end of it, i.e. answering the question "What success looks like".*
2	NOVELTY	*The proposed solution is novel and quantifiably advances the state-of-the art in a particular field(s), generating new or improving relevant capabilities.*	ABILITY TO DELIVER	*The HNCDI team,* in collaboration with the proposal initiation, *can deliver the project under the constraints of the Innovation in Life Sciences Programme and available skills.*
3	SECTOR IMPORTANCE, POTENTIAL IMPACT AND SPILLOVER OPPORTUNITY	*The project is impactful to the sector and beyond, and key stakeholders in HNCDI strategic areas, e.g., increasing productivity (better, faster, cheaper), ROI.*	TIMING OF THE PROJECT	*The project fits with the Innovation in Life Sciences Call time window.*
4	TRANSFERABLE SKILLS	*The project is generating skills usable by current and future workforce and that could be re-deployed in other sectors for cross-pollination.*	RISKS OF THE PROJECT	*There is a pro-active risk management process in place to identify and mitigate/accept risks.*
5	LIKELIHOOD OF TRANSITION	*The project outputs are likely to lead to adoptable solutions.*	INVOLVEMENT OF UK INDUSTRY / GOVERNMENT ORGANIZATION	*The engaged partners have relevant/appropriate skillsets, ability to dedicate time to the project, can provide data assets to support capability development. External partners can evidence a desire to collaborate and co design-solutions.*
6	LIKELIHOOD OF CAPABILITY TRANSFERENCE INTO INDUSTRY	*The project outputs are likely to be directly implemented into industry following project completion.*	DEPENDENCIES OF THE PROJECT	*The internal and external project dependencies are clearly identified and do not impact scope/timing.*

Each sub-category will be given a score from 0 (lowest) to 10 (highest).

An averaged, non-weighted score will be derived for each category. We are seeking a balanced portfolio of projects, ranging from highly novel research projects to those with a very high level of capability transference.

Projects that will position as high-ranked in both categories will be considered for the next phase.

To diversify the portfolio of projects, the assessors will also take into consideration:

- the UK life sciences sector priority areas that the project is addressing and how the portfolio is balanced;
- the cost of the project to the HNCDI team and its impact to the available budget;
- the value of the project to HNCDI team with respect to validation of its strategic and technological goals;
- input from sector bodies including BIONOW and European Laboratory Research & Innovation Group (ELRIG).

Ultimately, the proposals that make a strong case for a substantial positive effect of productivity on the UK life sciences sector from the adoption of HNCDI strategic technologies and participation in the Innovation in Life Sciences programme carry the highest chances of being successful.

Contracting process

For projects enabled under this call, there is a **two-stage** contracting process in place:

i) 3 or multi-way CDA
ii) Participation Agreement

Examples of both are available on request.

Dates

The competition will be open for Expression of Interest forms from 14 October 2024 to 29 November 2024 with projects anticipated to commence at the start of March 2025.

Contacts

For more information about the Life Sciences Sector Call, please use the following contact:
hartreecentre@stfc.ac.uk

Appendix A | The Hartree National Centre for Digital Innovation (HNCDI)

Enabling UK businesses and the public sector to explore and adopt innovative new digital technologies including AI and quantum computing for productivity, innovation and economic growth.

What is HNCDI?

The Hartree National Centre for Digital Innovation is a collaborative programme between STFC and IBM which will enable businesses to acquire the skills, knowledge and technical capability required to adopt digital technologies like supercomputing, data analytics, artificial intelligence (AI) and quantum computing.

Through HNCDI we provide a safe and supportive environment for organisations to explore the latest digital technologies and skills, develop proofs-of-concept and apply them to industry and public sector challenges. Our dynamic and collaborative approach is driven by industry requirements and will help organisations to de-risk investment in new and emerging digital technologies. Whether you're at the start of your digital journey or trying to advance to the next level, we can help you navigate the possibilities of AI and quantum computing technologies to discover the next step for your organisation.

Who is it for?

We're here to help organisations and individuals with an appetite for change, who are ready to innovate and create useful solutions, enhance, and adapt products and processes, adopt new digital technologies and expand into new markets.

Whatever the size of your business or organisation we have an established track record working with industry, from start-ups and SMEs to large corporates, and public sector organisations such as NHS Trusts and local government.

We also offer training on an individual and group basis.

Why work with us?

The Hartree National Centre for Digital Innovation (HNCDI) is uniquely positioned at the intersection of exciting new science and industry applications and will grow a community of discovery that combines advanced digital technologies and applies the scientific method to address key challenges across UK industry. The partnership between STFC Hartree Centre and IBM Research will bring together an established track record in applied research and innovation with a strong network of collaborators across industry and research communities built on shared interest and a goal to accelerate innovation by reducing the risk of exploring and adopting emerging technologies.

HNCDI is part of IBM's global Discovery Accelerator initiative, which seeks to accelerate discovery and innovation based on a convergence of advanced technologies by establishing research centres that foster collaborative communities and advance skills and economic growth through large-scale programmes. This programme builds on our previous Innovation Return on Research partnership

with IBM Research, which was committed to solving industrial challenges and creating societal and economic impact.

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Appendix B | Bionow and the European Laboratory Research & Innovation Group (ELRIG)

Bionow is a membership organisation that supports the life sciences and biomedical sectors in Northern England. Bionow hosts events across the North to bring people together and share knowledge, support programmes and access to a network of businesses for its members.

Bionow's membership base includes startups, early stage firms, and established growth-oriented companies. https://bionow.co.uk/

The European Laboratory Research & Innovation Group (ELRIG) is a leading European not-for-profit organisation that exists to provide outstanding scientific content to the life science community. The foundation of the organisation is based on the use and application of automation, robotics and instrumentation in life science laboratories. ELRIG supports the needs of biopharma by developing scientific programmes that focus on cutting-edge research areas that have the potential to revolutionise drug discovery.

ELRIG is comprised of a global community of over 12,000 life science professionals, participating in events, including scientific conferences and networking meetings to exchange information, within disciplines and across academic and biopharmaceutical organisations, on an open access basis. All events are free-of-charge to attend.

https://elrig.org/

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Appendix C | Frequently Asked Questions

How are projects being funded?
Projects will be directly funded through the HNCDI Programme through government investment into the STFC Hartree Centre.

How and when will I be notified if my EOI or full proposal is successful?
The HDNCI team will continue to engage with all parties who have submitted an EOI proposal to understand the best route to bring the EOI to the Full Project Proposal stage, guiding the Full Project Proposal phase. As soon as the HDNCI management board believes that the Full Project Proposal contains all the convincing arguments to start the project, the organisation will be notified. The latest date for approval is 31 March 2025.

Do EOI submissions have to come from within the life sciences sector?
The Life Sciences Sector Call team will accept proposals from organisations outside of the life sciences sector. However, the overall scope, objectives and activity carried out within a project should be demonstrated through a primary use case in life sciences.

Do I need to establish a consortium to submit an EOI?
No, the Innovation in Life Sciences call is specifically designed to accommodate a single organisation that would work with the STFC and IBM teams. However, consortia can apply where appropriate.

Can non-UK companies submit an EOI proposal and access the Innovation in Life Sciences call services?
Overseas companies can only submit an EOI proposal if they have UK registered subsidiary and can guarantee that the R&D in a resulting funded project will be carried out in the UK and the results of the projects will be exploited from or in the UK.

How will EOI and Full Proposal submissions be assessed?
The HNCDI management board will apply a simple grading structure to assess proposals in line with the section “Selection Criteria” for both the EOI and the Full Project Proposal. The HNDCI team will provide feedback on how the proposal can be developed and improved on a regular basis.

What is the difference between HNCDI and the Innovation in Life Sciences call?
The HNCDI is the wide initiative under which the Innovation in Life Sciences call is running. Whilst the HNCDI covers a broader scope, the Innovation in Life Sciences call will be targeting the life sciences sector only.

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Appendix D | Expression of Interest form

Introduction & Background

Brief introduction that provides background and context for the reader (approx. maximum 500 words);

Customer Response:

Problem Statement

Describe the problem you are encountering in sufficient detail that allows the reader an understanding of the challenges you face. This should include:

- *Clear description the problem challenge or business need*
- *Describe the current situation and how we expect this project to change it*
- *The expected technical outcomes of overcoming the problem.*

(approx. maximum 500 words)

Customer Response:

Previous Attempts to Solve the Problem

Describe what previous attempts have been made to solve the problem.

- *Approaches taken, including analytical methods used;*
- *Barriers identified*
- *Conclusion of these efforts.*
- *Have you seen a solution to a similar problem in another application / field?*

(approx. maximum 500 words)

Customer Response:

Solution Specification

If defined, what are the key criteria the solution must fulfil? What criteria are desirable but not essential?

- *Things to consider: Functionality, Customisability, Adaptability, Accessibility, Availability, Compatibility, Interoperability Scalability, Accuracy, Precision, Security, Privacy, Ethical, Licensing/IP.*

(approx. maximum 500 words);

Customer Response:

Expected or Estimated Impact/Value of the Project to your Business and/or Potential Impact to Wider Industry, Society, etc.

Please complete the boxes below (approx. maximum 100 words) each:

Will there be an increase in revenue from sales? (Include estimated value in £).	
Will there be an increase in revenue from licensing? (Include estimated value in £).	

Will there be an increase in revenue from exports? (Include estimated value in £).	
Will the quality of products or services improve?	
Will there be an increase in employment of staff?	
What impact on productivity could be achieved? (Include efficiencies in processes, cost reductions in products or skilled services)	
Will the successful completion of the project provide a technological advancement to gain competitive advantage?	
What timescale would you expect to realise the benefits described above?	
Will the successful completion of the project accelerate the route to market for your product or service, and if so, how?	
What benefits could the project have more widely to your industry?	
What benefits could the project have more widely to your geographical region?	
What other impacts could be expected from this work?	

Company Details Please complete the boxes below:	
Company name	

Companies House registration number	
Company's registered address (head office)	
Company's trading address (if different)	
Postcode where majority of work will be carried out	
Lead contact at company and contact details	
Total number of staff and size of organisation	
Where did you hear about the Innovation in Life Sciences call?	
Suggested technologies or equipment to be used (if known)	