GUIDELINES FOR CRUK CSC-ICB CDT STUDENTSHIP APPLICATIONS 2025/26 ENTRY

ICB CDT OVERVIEW

The Institute of Chemical Biology (ICB) has been awarded an Engineering and Physical Sciences Research Council (EPSRC) Centre for Doctoral Training (CDT) in Chemical Biology: Empowering UK BioTech Innovation.

One of the aims of the ICB CDT is to train a new generation of PhD graduates in the art of multidisciplinary Chemical Biology research, giving them the opportunity to develop the next generation of molecular tools and technologies to tackle challenges in biological systems. We define "chemical biology" in its broadest term – namely physical science innovation (using expertise from e.g. chemistry, physics, mathematics, engineering) to develop a novel tool or technology to tackle challenges in the biological/life sciences.

Students will merge the development of these molecular tools and technologies with Lab of the Future platforms, by dovetailing them with industry 4.0 breakthroughs in e.g. robotics, artificial intelligence and machine learning which will revolutionise the state of the art for making, measuring, modelling and manipulating molecular interactions in biological systems, leading to novel R&D workflows. These will unlock rapid design-test cycles with the advances and biological insight generated being exploitable in biological/clinical/industrial applications as well as tackling societal challenges.

To support this vision, students will benefit from bespoke training that will enable them to work seamlessly across the physical-life sciences and human-machine interfaces. This is a skill set that is in great demand from industry and addresses the future needs of employers in the pharmaceutical, biomedical, healthcare, personal care, biotech, agri-science and SME sectors.

In addition, students will be armed with an in-depth understanding of product development pipelines across a variety of sectors, acquired through first-hand experience of multi-disciplinary translational research and early-stage commercialisation. This will enable them to become leaders of technology innovation and translation in the medical, pharma, life science, personal care and agri-science industries.

CRUK CSC OVERVIEW

The Cancer Research UK (CRUK) Convergence Science Centre (CSC) was established as a strategic partnership between the Institute of Cancer Research (ICR) and Imperial College London. Its mission is to bring together engineering, natural sciences, physical sciences, life sciences and medicine to develop innovative ways to address challenges in cancer research to benefit patients. This is achieved through multidisciplinary collaborations that integrate otherwise distinct approaches to co-create new tools, technologies and methodologies. The bringing together of two of the UK's leading academic research institutions create a unique opportunity to train the next generation of convergence scientists in cancer research.

The training Programme, which forms the heart of the CSC aims to brings together cross-institutional research teams with supervisors from distinct disciplines to equip our students with cutting-edge convergence research skills and remove disciplinary language barriers that would normally restrict progress.

The aim of the CSC is to train students in the art of convergence research, giving them the exciting opportunity to develop innovative ways to address the toughest issues in cancer. The overarching goal is to bring several expertise together to help people affected by cancer. Students will gain skills, knowledge and training to drive new innovations in clinical care and research and become a future cancer research leader.

THE RESEARCH THEME

Background to the ICB: Chemical Biology is the development and application of molecular tools and techniques for biological and biomedical understanding, and industrial/clinical benefit. It is critical to supporting the development and translation of the next generation of molecular tools and technologies for making, measuring, modelling and manipulating molecular interactions in biological systems across multiple length scales. These include protein-nucleic acid, lipid-drug, lipid- nucleic acid & protein-protein interactions. Despite their importance as biological intervention targets, their exploitation is hampered by many factors which are being tackled by the ICB community e.g. (i) large contact surface areas, (ii) lack of identifiable binding pockets, (iii) low binding partner concentrations, (iv) multiple interaction times &

THE RESEARCH THEME

length-scales and (v) limited understanding of how interactions generate higher order functions. The development of *quantitative* molecular technologies coupled with automation and robotics able to address these bottlenecks is vital to generating the *quantity, quality and type of curated datasets* needed for predictive modelling, exploitation by AI/ML approaches and industrial, commercial and medical deployment. From enabling biomedical research by unlocking mechanisms of disease, to stimulating agrochemical design, chemical biology is pivotal in reducing product and healthcare costs.

Importance of Lab of the Future Platforms: These will revolutionise the life sciences with technology development and rapidly accelerating research blurring the lines between disciplines and between man and machine. Developments in robotics are driving the integrated control of lab hardware, enabling R&D workflow automation. Rapid prototyping is reducing technology innovation cycles. Big data offers unprecedented opportunities for AI and machine learning. AI is stimulating developments that can underpin smarter high-throughput approaches for data handling with the promise of offering creative insight. Coupled with the rise of machine learning it is now possible to promote knowledge driven systems design from discovery data. Dovetailing these approaches with new molecular tools and technologies will lead to game-changing rapid design-test cycles that speed up product development.

To support this landscape the Scientific Vision of the ICB encompasses four aims:
1. To develop and validate novel tools and technologies for the study of molecular interactions and their applications to strategic biological/biomedical problems and industry priority areas that cannot be undertaken with the current state-of the art. This will connect physical/mathematical sciences innovation push with life-science pull. This includes multi-scale modelling (e.g. graph theory) and experimental approaches (micro-physiological environments) for studying molecular interactions and biological systems.
2. To dovetail these technologies with Lab of the Future platforms to maximise insights from molecular interaction studies.
3. To translate research advances for exploitation in industrial/medical applications.
4. To extend the capabilities of previous ICB CDT-technologies, so that these can be translated to end users in different sectors.

CRUK CSC Research Theme

The CRUK CSC has two research themes: i) Convergence Discovery Research, aiming to identify cancer vulnerabilities through the integration of Discovery Research and clinical materials, and ii) Interventional Science, covering technological innovations in early detection and diagnosis, novel interventions and therapy monitoring.

The primary focus of **Convergence Discovery Research theme** is to support collaborative endeavours that develop new technologies to address currently intractable problems in cancer biology, and to translate these innovation to the clinic, whenever possible. Closely supported by our Clinical Development initiative, our Convergence Discovery Research theme aims to create a virtuous loop between Discovery and Clinical research (Iterative and reverse translation), allowing clinical trial materials (e.g, trial data, liquid and solid biopsies) to drive Discovery Research to, in return, inform and guide future clinical trials. Our ambition is to engage engineering and physical science (EPS) research groups to utilise the extraordinary potential of patient-derived models to solve unanswered biological questions, and find solutions to unmet clinical needs. This mission will also require a multi-modal Data Science approach combining OMICs, imaging, and mixed-methods research data to decipher in depth what the cancer biology can tell us in term of cancer emergence, adaptation, response to treatment, resistance, metastasis and recurrence.

The Interventional Science theme aims to put the patient at the centre of our innovations. The Centre's ambition is to support novel technologies bringing solutions to unmet needs along the patient journey. In early detection, we focus our efforts on bringing the continued development of ultrasensitive low-cost devices to detect specific early disease signals, supported by clinical positioning and adoption strategies. As modern devices need heavy data processing and analysis, we will support both hardware and software development through our Data Science initiative to connect new devices to achieve real-time analysis and smarter processing. For novel interventions, we will continue to develop technologies and methodologies to improve strategies for local control of advanced-stage cancers.

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THE STUDENTSHIP

The studentships will start in the 2025/26 academic year, and comprise a 4-year PhD.

It will include training programmes such as Big Concepts in Oncology, Hackspace education (giving students experience of rapid prototyping (additive manufacturing, electronics, robotics, laser cutting, microfluidics, microcontrollers), software engineering/modelling (Python/Machine Learning, Matlab, Fusion 360, biological "toy models") and biohacking (protein engineering, proteomics, metabolomic assays)); the 'ICB CDT Biz Catalyst', providing students with entrepreneurial training and training in Responsible Research and Innovation and Sustainability in the first year of the four year programme. Subsequent years' training will include additional transferable skills training, for example Science Communication with the BBC, a course in Human Centred Design, Science Policy, CSC Patient and Public Engagement Workshop, CSC Think like Seminar series, the ICB CDT flagship EVOLVE programme and the opportunity to take part in our new InnovaLab (tech accelerator) and Industry Hackathons.

The studentship will cover tuition fees and stipend for a total of 4 years. In addition, there is a consumable allowance of up to £8,000 p.a., a total of up to £2,000 towards conferences/travel and up to £2,000 for the EVOLVE programme per studentship.

SUPERVISOR ELIGIBILITY

General rules	Supervisors must fulfil the usual College criteria for eligibility to act as a PhD supervisor. ICR supervisors must receive approval from their Head of Division to apply for this studentship.
Cross-institutional	Proposed projects **must be cross-institutional** bringing together expertise from at least two different disciplines. There should be at least Institute of Chemical Biology, and 1 from Institute of Cancer Research (ICR).
Number of supervisors and tenure	At least two supervisors on the application must hold an academic position at Imperial College that is tenured over the complete period of the studentship. At least one supervisor on the application must hold an academic position at ICR that is tenured over the complete period of the studentship. This does not mean that supervisors who do not hold a position for the full four-year period cannot apply. However, in such circumstances an additional supervisor who could continue the student supervision (if the original supervisor's tenure was not extended) would have to be added.
Expertise	The supervisors should provide different skill sets, and the most usual division will be to have one supervisor with "cancer" expertise and one supervisor with "physical/ engineering/ mathematics/lab of the future" expertise. These definitions are not meant to be restrictive, nor are they necessarily defined by departmental affiliations. What is important is exposure of the student to multiple disciplines, wherever these are located, to address an unmet need in cancer. *Refer also to "Multidisciplinarity" under "Project requirements" below.*
External supervisors	The primary supervisor can be based at either Imperial or ICR, but the degree awarding institution will be Imperial. At least two supervisors on the application must hold an academic position at Imperial College, and at least one supervisor on the application must hold an academic position at ICR as it is vital that the student has a multidisciplinary lab experience. *The inclusion of non-IC or non-ICR supervisors should be discussed with the CSC or CDT director/deputy directors before submission of the application form. Please contact them early in the process.*
Student registration	For reporting and auditing purposes, all students will be registered in Chemistry, regardless of the departmental affiliation of the supervisors. If there are no Chemistry supervisors, a formal

	supervisor from Chemistry (either the director or one of the deputy directors of the ICB) will be added at 1% for administrative purposes.
Cap on number of applications	A maximum of 2 applications per supervisor is allowed for a given studentship call.

PROJECT REQUIREMENTS "ANNUAL CALL" - ASSESSED COMPONENTS		Threshold / maximum score
Science – Cancer Led	Proposals will typically be concerned with the development of novel molecular tools and technologies in Chemical Biology to study specific molecular interactions that address **an unmet need in cancer**. Project proposals concerned with either translational or basic research will be considered, but in both instances there must be underpinning innovation in the physical sciences (see below). This section should describe the biological challenge. In this call, projects must address an unmet need in cancer which aligns with CSC's research themes. i) Convergence Discovery Research, aiming to identify cancer vulnerabilities through the integration of Discovery Research and clinical materials, and ii) Interventional Science, covering technological innovations in early detection and diagnosis, novel interventions and therapy monitoring. Further details can be found here.	(5.0/10.0)
Physical science innovation	The application must demonstrate **innovation in the physical sciences** (which includes e.g. chemistry, physics, mathematics and engineering). The focus should be on the development of the next generation of tools and technologies for making, measuring, manipulating and modelling molecular interactions in biological systems across multiple length scales, that can be applied to tackle biological /medical challenges. A solely biological/medical proposal, no matter how interesting, is unfortunately not within our remit. Typically, projects will involve the development *or* the translation of a new technology applied to a biological problem. Modification of an existing technology to solve a specific biological problem is allowable, but there must be considerable novelty in the development of the technology underpinned by innovation in the physical sciences. Translation into a new sector without innovation in the physical sciences is not within the remit of the ICB CDT.	(5.0/10.0)
Multidisciplinarity	It is fundamental that the project is inherently multidisciplinary. Therefore, it must include at least one supervisor from Imperial and one from ICR. The supervisors should provide the different skill sets, and the most usual division will be to have one supervisor with expertise in "cancer" and one with "physical science" expertise. These definitions are not meant to be restrictive, nor are they necessarily defined by departmental affiliations. What is important is that the student is exposed to cross-institutional research. It is expected that the student will typically undertake work in each research environment during their studies.	(4.0/6.0)

Feasibility and Suitability	CRUK CSC-ICB CDT studentships are fully funded for 4 years. Proposals should include information on the research structure and availability of resources and equipment available for the studentship and how these will be accessed, including whether this is by a collaboration. Proposals should also highlight the supervisors' relevant expertise in delivering the proposed studentship. If the proposed project builds on a previously funded studentship, you must include details of the innovation that has been **successfully** achieved to date and how the new studentship pushes this forward through innovation in the physical sciences. OR If the suggested technology is completely new, please explain why you think the proposed research will be successful and include a discussion of a risk mitigation plan ("plan B for the student")	(5.0/10.0)
Responsible Research Innovation and sustainability	Explain how the project was designed with Responsible Research and Innovation (RRI) and sustainability in mind. e.g. is the topic that you are researching potentially controversial? Is there a significant ethical or moral component? How has the project been planned with environmental sustainability in mind? For more information on RRI please go to: https://www.ukri.org/councils/epsrc/guidance-for-applicants/what-to-include-in-your-proposal/health-technologies-impact-and-translation-toolkit/research-integrity-in-healthcare-technologies/responsible-research-and-innovation/	
Impact	Describe the intended impact / scientific merit that would arise from this work. This can include fundamental insight into e.g. identifying new approaches to monitor responses to therapy more accurately and more frequently, and with lower impact on patients' lives and / or any other added value that the project can bring to the ICB CDT and CSC, such as outreach, new collaborations (with industry) and follow-on funding. Indicate the timeframe for the achievements listed in your impact statement.	(2.5/4.0)
Lab of the Future	Describe how the project and student training therein is aligned with Lab of the Future / industry 4.0 technologies. These could include but are not restricted to automation, additive manufacturing / 3D printing, AI, machine learning, augmented reality, cloud computing, big data and analytics and Internet of Things.	(3.0/5.0)
Please note the different weighting and threshold of each requirement!	**Maximum Score: 50**	

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APPLICATION AND REVIEW PROCESS	
How to apply	The awards will be made based on written applications to the ICB and CSC. Applications must be made using the separate application form provided. When filling in the application form it is important to demonstrate that your proposed project meets all the criteria listed. Proposals should clearly outline the innovative aspect of the research counterbalanced by its achievability in terms of time and funds. With the award of a studentship, supervisors automatically become ICB and CSC members. Therefore, you **will be expected to contribute to ICB and CSC activities, examples of which can be found in the Annex below.**
Page Limit and Font	Please complete your application by entering your text only into the tables in the word document and restrict your "Assessed Criteria" part of the application form to the four-page limit. Do not use a font less than 10 pt Arial or change the margins / delete text from the boxes. Note that we cannot consider applications longer than four pages and in any other format than .doc or .docx. Annexes and additional tables are not allowed.
Review and Award	Each proposal will be independently scored by CSC Training Committee members, academic and industrial members of the ICB research board whose expertise cuts across the full remit of the ICB CDT, cancer biology and convergence research. Applicants can suggest Imperial College academics that have the necessary expertise to review the application. Following the ranking according to the scores from the markers, each studentship application will be discussed in a moderation meeting prior to finalising the ranking and project selection.
Relevant Dates	**APPLICATION DEADLINE:** Please email the completed application form as .doc or .docx file to ICB Admin icbadmin@imperial.ac.uk and CSC team (icr-imperial-convergence.centre@imperial.ac.uk) by **Wednesday 16th October 2024, 5 pm.** Applicants will be informed as soon as possible after the reviewing process.
Any Questions?	We actively encourage participants to discuss potential projects with the ICB CDT Management team and/or CRUK CSC team for any questions regarding the procedure or the remit.

POST AWARD	
Student Eligibility	We are only able to recruit students with 'Home' fee status to projects awarded via this call. The awarding body for these joint studentships is the EPSRC and CRUK. Students must therefore conform to the eligibility requirements laid down by both funding bodies. All students must have a good honours degree (2.1 or above) in a *physical sciences* subject at MSci level (or equivalent).
Recruitment	Eligible students will be interviewed by both the ICB Board, CSC training committee and the project supervisors. **It is the responsibility of supervisors to ensure that studentship places are filled by 30th of June 2025**. Any studentship that does not have a suitable student signed up at this time will be deemed to have forfeited the award, which will be reassigned to reserve projects – this deadline will be strictly enforced.
Supervision splits	For reporting and auditing purposes, all students will be registered in Chemistry, regardless of the departmental affiliation of the supervisors. If there are no Chemistry supervisors, a formal

	supervisor from Chemistry (either the director or one of the deputy directors of the ICB) will be added at 1% for administrative purposes.
ICB events and EVOLVE programme	The studentship programme, under the administration of the ICB, involves colloquia and student organised conferences. To encourage wide interactions, we make attendance at these programmes a mandatory requirement for both students and supervisors. Students must also attend relevant specific courses in transferable skills and can take part in the EVOLVE programme or InnovaLab tech accelerator programme, both of which last up to 2 months.
CSC Events	Students are required participate in bespoke training and engagement activities organised by the CRUK Convergence Science Centre. They will include but are not limited to, patient and public engagement workshops, and 'Think Like a' seminar series.
ICB membership	With the award of a studentship, supervisors automatically become ICB members and you will be approached by the ICB management regarding ICB activities (see annex below).

ANNEX

ICB core activity to be listed on the application form. Choose at least three activities you agree to be responsible for if you are awarded a studentship.

Successful applicants will be expected to contribute throughout the duration of the 4-year PhD studentship to the training of our cohorts as requested by the ICB Directors. This includes (but is not limited to): marking of assessments; tutoring; mentoring.

In addition to this, we would request that you select at least three of the below activities to be responsible for if you are awarded a studentship:

1. Co-organise an ICB colloquium
2. Give a talk at an ICB colloquium or Summer School
3. Co-organise an ICB careers seminar
4. Supervise ICB cohort site visits to industry partners
5. Contribute to MRes taught training (e.g. lectures, group learning seminars)
6. Contribute to the ICB and CSC newsletter/ website
7. Attend and act as tutor at an ICB and CSC transferable skills courses
8. Take part in industry hackathons
9. Act as member of judging panels at events such as the ICB Tech Accelerator
10. Act as a member of an ICB expert panel to mark future proposals
11. Take part in ICB technology showcase events / SME workshops
12. Join the BOOST mentoring programme (giving advice to student pursuing independent research or starting up their own companies)
13. Act as a cohort mentor for 1 year (includes visiting students at residential courses)
14. Other Click or tap here to enter text.