| CRUK CSC OVERVIEW |
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| [The CRUK Convergence Science Centre](https://www.convergencesciencecentre.ac.uk/homepage) is a partnership between the Institute of Cancer Research (ICR) and Imperial College London, which brings together world leading expertise in cancer research, engineering and the physical sciences (EPS) to address the big challenges in cancer. One of our strategic goals is to train future scientists by building cross-institutional research teams with supervisors from distinct disciplines who will equip our PhD students with cutting-edge convergence research skills. |

| StatML CDT OVERVIEW |
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| [StatML](https://statml.io/) is a cohort-based doctoral programme based at Imperial and Oxford. The Statistics and Machine Learning programme is a four-year PhD/DPhil research programme. It trains the next generation of researchers in statistics and statistical machine learning, who will develop widely-applicable novel methodology and theory and create application-specific methods, leading to breakthroughs in real-world problems in government, medicine, industry and science. |

| Research Theme |
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| 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.  These studentships at their core need to develop novel statistical and machine learning methodology for application in one of these research themes. |

| THE STUDENTSHIP |
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| The students will be registered on the StatML CDT and the focus of their research will be in novel statistics and machine learning methodology. They typically come from a background of mathematics, computer science or related disciplines. During the first year, they undertake 2 mini-projects, with the expectation that one of them will lead to their main research project. At the admission stage, students will choose one individual mini project. From mid-November 2025 to mid-February 2026, students will be working on this mini project. From early-March to late-May 2026, students will be working on a second mini project. The students will then begin their main PhD project, which should be based on one of the two mini projects.  The StatML course involves taught elements throughout all four years of their studies, with a particular concentration in their first year from October to mid-November and February. These courses cover modern statistical and machine learning methods and theory, as well as additional transferable skills training from StatML and CSC, including communication, computation, responsible research and innovation, and patient and public engagement.  The studentship will cover tuition fees and stipend (£23000 per year) for a total of 4 years. In addition, there is a Research Training and Support Grant of to cover travel, conference participation, academic placements and small consumables as allowed under the terms and conditions of CRUK and EPSRC. |

| SUPERVISOR ELIGIBILITY | |
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|  | 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** (there should be at least [1 supervisor from the Department of Mathematics, Imperial College London](https://www.imperial.ac.uk/mathematics/about-us/people/academic-and-research-staff/), and 1 from [Institute of Cancer Research (ICR).](https://www.icr.ac.uk/our-research/researchers-and-groups) Imperial supervisors outside the Department of Mathematics are also eligible as supervisors. |
| Number of supervisors and tenure | At least one supervisor 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. They can be part of the broader supervisory team. |
| Expertise | The supervisors should provide different skill sets, and the most usual division will be to have one “cancer” and one “mathematics” supervisor. Other expertise can be also represented for example EPS disciplines. |
| External supervisors | Non-Imperial supervisors may be included but at least one supervisor 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 research experience. The inclusion of external supervisors should be discussed with the CDT director/ deputy directors before submission of the application form. Please contact them early in the process. |
| Student registration | All students will be registered in the StatML CDT and the Department of Mathematics, Imperial College London. |
| Cap on number of applications | A maximum of 2 applications per supervisor is allowed for a given studentship call. |

| **PROJECT REQUIREMENTS - ASSESSED COMPONENTS** | |
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| StatML and Cancer led | Develop novel statistical and machine learning methodologies that addresses an unmet need in cancer which aligns with the strategic research theme. |
| Convergence approach | * Addresses the need for a convergence science approach to meet the challenge * The appropriateness of the research teams and how the student will be trained in multidisciplinary research/share their time appropriately between teams. |
| Feasibility and Suitability | Studentships are fully funded for 4 years. In addition to compulsory taught components (that continue in all years), the first year includes two mini projects that last 6 months in total. Even though the mini research project directly feeds into the PhD, the proposal must put forward a self-contained project that can be achieved within 3 months. |
| Impact | Describe the intended impact / scientific merit that would arise from this work. This can include fundamental insight into 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 StatML and CSC, such as outreach, new collaborations (with companies) and follow-on funding. Indicate the timeframe for the achievements listed in your impact statement. |
| Novelty | * Quality and originality of the research * Clear and justified research questions * Translational potential |

| APPLICATION FORM | |  |
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| Proposal Title | Please provide a short title that accurately summaries your project. | |
| Supervisors | Please provide the name and contact details of the supervisors including their expertise. Please include any additional supervisors whom you deem necessary for the success of your project, e.g., institutes, partners or associates. | |
| Proposal Outline | Outline the scientific aims and approaches to be employed explaining why this meets our remit, in particular the application of novel approaches to address the research question and any translational potential. Within this section, you should include any relevant preliminary data that supports your hypothesis and proposed approach. (Up to 1000 words and 1 additional page of figures. Figure legends should not be used to add additional experimental details.) | |
| Convergence science approach | State the novelty of the technologies and methodologies from the different disciplines to be employed. Outline the roles and contributions of the supervisors/teams. Give details of the project timeline and how you anticipate your student will share their time across the participating teams. Please note that applications that do not justify the convergence of distinct disciplines and approaches or only use well established methodologies to address the research question will not be considered within remit. (Up to 500 words) | |
| Research theme alignment | Outline how your work aligns to our [two Research themes](https://www.convergencesciencecentre.ac.uk/research/resesearch-themes). (Up to 300 words) | |
| Literature references | Include a bibliography in the standard Harvard format listing any articles referred to in your proposal. | |
| Advertising details | If your application is successful, we will advertise your project on external websites. Please list up to 5 key words/phrases that students might type into search engines to find your project. | |
| One-page summary of project | This will be sent to short-listed candidates during the admissions process. It should include a description of the 3 month mini-project, demonstrate clear scope for it being extended into a full PhD project, and suitable references. It should appeal to candidates coming from a maths/quantitative background. | |

| APPLICATION AND REVIEW PROCESS | |
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| Register expression of interest | If you are planning to submit a proposal, please fill [this form](https://forms.office.com/e/tKK0bGvTtx) by Monday 16th September 2024. |
| How to apply | The awards will be made based on written applications. 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. Please specify your research infrastructure, including the access to resources already in place and any additional needs in the feasibility section. |
| Review and Award | Each proposal will be reviewed by the CSC Training Committee and the StatML Scientific Committee, whose expertise cuts across cancer biology, convergence research and StatML. |
| **Relevant Dates** | **APPLICATION DEADLINE:** Please email the completed application form as pdf, .doc or .docx file to CRUK CSC team ([icr-imperial-convergence.centre@imperial.ac.uk](mailto:icr-imperial-convergence.centre@imperial.ac.uk)) and StatML CDT Manager; Gabriella Caminotto ([g.caminotto@imperial.ac.uk](mailto:g.caminotto@imperial.ac.uk)) by **Monday 14th October 2024, 9 am.** |
| Any Questions? | We actively encourage participants to discuss potential projects CRUK CSC team ([icr-imperial-convergence.centre@imperial.ac.uk](mailto:icr-imperial-convergence.centre@imperial.ac.uk)) and with CDT Directors ([statml.director@imperial.ac.uk](mailto:statml.director@imperial.ac.uk)) and/or if they are unsure of the procedure or the remit. |

| POST AWARD | |  |
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| Student Eligibility | The awarding body for these joint studentships is the CRUK and EPSRC. Students must therefore conform to the eligibility requirements laid down by both funding bodies, which normally means that the student must be categorised with UK fee status.  All students must have a good honours degree (2.1 or above) in Mathematics, Computer Science, Physics, Engineering, or related disciplines, at MSc/MSci level (or equivalent). | |
| CSC Training Programme and 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 Human transformation studies course. | |
| CDT Courses | The CDT programme involves several compulsory taught components. Attendance at these programmes is a mandatory requirement for students. | |