SUSTAIN AI CDT Call For Studentship Proposals

Deadline for consideration in Round 3: noon on 7th March 2025

This is an open call, to all potential SUSTAIN CDT supervisors and industry partners, for Studentship Proposals. Collaborative proposals are defined, in partnership, between an industry partner and supervisor. The projects are to be largely funded by UKRI, together with a financial contribution from an industry partner(s). Projects can be created with one industry partner, or group of companies collaborating with at least one academic supervisor. If there are multiple companies involved, nominally we would expect up to 3 companies to belong to a thematic pool however we will consider alternatives on a case-by-case basis. Alternatively, a single company can be the sole sponsor of the student.

Before being finalised and a student assigned, all projects will have a Primary Supervisor, a Secondary Supervisor (based at one of the other universities in the consortium and, ideally, from a different discipline to the Primary Supervisor), and at least one Industry Advisor. We welcome the involvement of more than two academic supervisors if input is needed from multiple disciplines.

The Primary Supervisor, or an industry lead, should complete the SUSTAIN Student Project Proposal Form and return it to the SUSTAIN Delivery Team for consideration by the SUSTAIN Admissions Committee. Proposals will be classed as 'successful,' 'needs revision,' or 'out of scope.' Proposers whose submissions fall into the latter two categories may re-work and re-submit their proposals. We suggest seeking guidance from a member of the SUSTAIN leadership team prior to a re-submission.

Email address for sending completed Project Proposal Form: SUSTAIN@lincoln.ac.uk
We also welcome queries about the process to this same email.

Who can submit a proposal?

A PhD project can be proposed by members of academic staff authorised to supervise PhD students within the SUSTAIN CDT at the Universities of Lincoln, Aberdeen, Queen's Belfast and Strathclyde. The academic leading on the proposal will become the Primary Supervisor.

A PhD project can be proposed by SUSTAIN industry partners via authorised personnel from within the organisation, ideally the "Project Lead/Industry Advisor" (although this role can be allocated at a later date, if beneficial). The opportunity is for the organisation to engage in a PhD studentship focused on their specific business challenge(s). The aim is for the PhD project outputs to relate directly to the business interests of the industry sponsor, as well as the wider intelligent sustainable agri-food community. The industry sponsor's Return on Investment will be derived from the benefits that the organisation will draw from the selected project and wider engagement with the CDT. The Industry Advisor and the PhD student

will benefit from leading University research supervision provided by the consortium, working alongside and complementing the expertise present within the organisation.

How will we match students to the project?

SUSTAIN students complete a 4-year PhD, based at one of the four universities within the consortium. As part of the student recruitment process, successful proposals will be advertised on the SUSTAIN website and externally (e.g. findaphd.co.uk). Student applicants will apply to a specific project and may contact proposal leads prior to applying. Proposals will be balanced across topic themes and universities to ensure the pool of projects meets the objectives of the interdisciplinary SUSTAIN CDT, maintaining a diversity of themes.

It is expected that the Primary Supervisor will participate on an interview panel for their project, and the Industry Advisor will also be invited to participate on the panel. It should be noted that some proposals may not attract student applications. In this situation, you and your industry collaborator will be contacted to discuss whether you would like your PhD proposal to be advertised on the SUSTAIN website in readiness for the next academic year's intake.

Student applications will be anonymised at the shortlisting stage. Full applications will be made available to the interview panel prior to the interview and candidates will not be anonymous during the interview, which will be held online (e.g. via Teams).

Student applicants are invited to apply for any proposals that they are interested in. If an applicant applies for more than one project, they will be asked to rank order their preference. This ranking information will not be shared with the interview panels.

The Interview Panel will inform the SUSTAIN Admissions Committee of acceptable student/s for their proposal. Should more than one student apply for an individual proposal, the Interview Panel will rank student applicants in preference order.

The Admissions Committee will adapt a proven matching algorithm[1] from the mechanism design literature to aid in decision making. Data fed into the algorithm will include all interview panels' rank-ordered lists of acceptable students and applicants' rank-ordered preferences. The algorithm will assess this against the CDT topic themes, the spread of projects across the four partner universities, and the UKRI restrictions on the number of international students recruited.

The final review and decision will be made by the SUSTAIN Admissions Committee.

On what topic?
SUSTAIN focuses on three application areas:

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[1] Abdulkadiroğlu, Atila, Parag A. Pathak, and Alvin E. Roth. "The New York City High School Match." *American Economic Review* 95.2 (2005): 364-367.

1. Advancing our ability to measure and analyse key sustainability factors across the agri-food system (e.g. GHG[2] emissions, resource use, crop yield, supply chain, human interactions);

2. Reducing the environmental impact of agri-food practices (e.g. lowering NOx[3] emissions from nitrogen input and GHG from animal systems, increasing sustainable productivity and biodiversity, enhancing carbon sequestration); and

3. Informing human decision-making across the agri-food system, from researchers and producers to consumers (e.g. trade-offs with energy consumption of AI technologies like deep learning, use of in-field agri-robotics, food choices to maintain sustainable diets).

Within this application context, SUSTAIN focuses on training PhD students in three key areas of AI:

1. Machine Learning (deep/reinforcement/evolutionary learning with real-world data challenges, e.g. sparse data, heterogeneous data, integration of domain knowledge, federated learning);

2. Explainable AI (neuro-symbolic/cognitive modelling, reasoning under uncertainty, computational argumentation/dialogue, natural language generation, human-machine interaction); and

3. Trustworthy and Ethical AI (responding to bias in data sets and digital twins, system verification/validation, reproducibility at scale, data sharing, consideration of fairness/disruption/impact).

Proposal Content

Proposals should demonstrate that the student will be engaged on a rewarding and relevant research project that will provide them with a first-class research experience.

- The proposal should have clearly articulated aims, objectives and focus.
- The research methodology should be appropriate and well defined.
- The proposal should demonstrate scientific rigour in its approach and anticipated outcomes.
- The project should clearly enable the student in learning to demonstrate a level of independence and originality, to test ideas and hypotheses, and to make a contribution to research that would be potentially worthy of publication.
- *Academic Supervisors:* If possible, the proposal should detail industrial participation, including agreed financial contributions. Academics are strongly encouraged to commence conversations with potential industry partners, however the SUSTAIN Management Team will offer support to academics who require assistance. *
- *Industry Advisors:* If possible, the proposal should include the name of a Primary Supervisor from within the consortium. Industry are strongly encouraged to commence conversations with

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[2] Green House Gas (GHG)

[3] Nitrogen Oxide (NOx)

potential supervisors, however the SUSTAIN Management Team will offer support to industry who require it. *

- Proposals with a letter of support, including financial contributions, from an industry partner will be given preference.

Suitability & Feasibility

The project should be well-suited to an interdisciplinary PhD. Review of proposals will consider the following:

- The project is feasible within the given resource limitations (including financial constraints).
- The project is achievable within the given time frame.
- Risks to the completion of the project are identified, and robust contingency plans described that would allow the student to successfully conclude a programme of doctoral level research in the event of delays to, or failure of, the original work plan.
- The project should be ambitious and pioneer advancements in the AI and agritech sectors.

How to apply

By sending the Project Proposal Form by email to SUSTAIN@lincoln.ac.uk.

Please download the current Project Proposal Form from the SUSTAIN website.

Main Proposer: In addition to the Project Proposal (and industry letter of support if available), please also enclose a curriculum vitae.