



Announcement of Opportunity

Centre for Doctoral Training (CDT): The use of smart and autonomous observation for the environmental sciences

Deadline for Outline Proposals: 16:00 Thursday 16 April 2015

Deadline for Full Proposals: 16.00 Thursday 30 July 2015

Please note - Update to Paragraph 52

“Applicants should demonstrate matched funding from academic or other partners at the full proposal stage.”

Has been changed to:

“At the full proposal stage, any agreed or expected in-kind support or additional funding for supporting additional studentships within the CDT should be outlined.”

Summary

1. Proposals are sought to host a new Centre for Doctoral Training (CDT) specialising in the use of smart and autonomous observation for the environmental sciences.
2. Funding for eight studentships will be awarded per annum for three years of new student intake, i.e. 24 studentships in total, from the start of the academic year 2016/17.
3. NERC recognises the value of delivering studentships in partnership and encourages proposals from organisations that can show they are working across boundaries, including across departmental boundaries within a single organisation, or across boundaries between academic and non-academic organisations.
4. This opportunity is open to organisations eligible for NERC research grant funding, i.e. applicants based in UK Higher Education Institutions (HEIs), NERC research centres, and Independent Research Organisations (IROs) approved by NERC. Please refer to <http://www.rcuk.ac.uk/funding/eligibilityforrcs/> for details; this competition is a managed mode scheme.
5. This is a two stage application process.
6. The closing date for outline proposals is 16:00 on Thursday 16 April 2015.
7. Full proposal applications must be submitted via the Research Councils' Joint

electronic-Submission system (Je-S). The deadline for full proposals is 16:00 on Thursday 30 July 2015.

Background

8. Environmental scientists increasingly work across a wide range of spatial and temporal scales, in order to elucidate relationships between e.g. global climate change, natural hazards, and anthropogenic pressures on the environment. Traditional modes of operation have typically involved small-scale, short-term *in situ* field observations, or large-scale, long-term remote sensing and fixed arrays. Consequently, there has been a relative lack of data of high spatial and temporal resolution covering large regions over time, which is hindering our ability to accurately assess drivers of change and predict future trends.
9. Recent advances in Smart and Autonomous Observation Systems (SAOS), including manufacturing processes, auto-calibration, miniaturisation, navigation and communication, endurance, artificial intelligence, data/image analysis, and physical, chemical and biological sensor concepts, are now meeting this challenge of obtaining 'more and better' data. In addition to the benefits these systems provide in terms of scale, consistency, and volume of data, they can be deployed in areas previously considered too challenging for appropriate sampling using traditional methods.
10. SAOS are already transforming data collection for the environmental sciences. For example, since Autonomous Underwater Vehicles (AUVs) were first sent under polar ice sheets in the 1990s, the number and range of autonomous platforms within the NERC fleet has grown to over 40 vehicles. These vehicles are now routinely deployed for pioneering ocean exploration, e.g. discovery of the world's deepest hydrothermal vents, and long-term observing of fundamental earth system processes, e.g. deployment of submarine gliders to support RAPID array monitoring of the Atlantic Meridional Overturning Circulation.
11. SAOS have application and impact across the entire NERC science remit as well as beyond the sciences in both the public and private sectors. The effective use of SAOS is directly applicable and highly beneficial to many industries, including renewables, oil and gas, deep-sea mining, agri- and aquaculture, carbon capture and storage monitoring, and weather forecasting. They are also generating increasing interest from policy-makers such as Defra for their statutory environmental mapping and monitoring obligations, e.g. flood zone mapping using Remotely Piloted Aircraft. In addition, the "Science Dividend" of investing in training in this area will have significant secondary benefits to the robotics, technology, computer sciences and engineering sectors.
12. To be able to take full advantage of these new technologies and maintain the UK as a world-leader in environmental sciences, the next generation of environmental scientists will require a broad skill base including: the design and manufacture of novel autonomous vehicles, systems and sensors; validation of sensor concepts; understanding of operation and piloting of autonomous systems in challenging environments; creation, management and curation of large environmental datasets; data processing, modelling and interpretation; image analysis; and data visualisation.

13. SAOS have been identified as an area of priority investment to secure the UK's scientific and economic future growth. The UK Robotics and Autonomous Systems (RAS) 2020 National Strategy¹ led to £400m in government funding being earmarked for key sectors such as marine industry, while the UK Government 'Eight Great Technologies' initiative² has recently led to >£10m of investment in marine autonomous systems within NERC (which now owns the largest research fleet of marine autonomous vehicles in Europe). Despite this significant investment at a capital and demonstration project level, there has been little linked investment in training and capacity building for the application of these technologies within the environmental sciences.
14. A NERC CDT in SAOS will enable the next generation of UK environmental scientists to contribute to the creation, development and ambition of these systems, to ensure the long-term expertise is present to safeguard the future of this key sector and ensure the UK continues to be recognised as a centre of strong international expertise in the field of environmental observation. To be able to effectively design, develop, manufacture and deploy autonomous systems to solve interdisciplinary environmental questions requires long-term knowledge, skills and equipment bases unavailable through training in a workshop or course format. This CDT will create a highly skilled community of researchers with specialist skills linked to these strategic priorities, as well as broader, transferable skills that can be applied across the environmental sciences.

Remit of the call

15. Training provided by the CDT must be within the NERC remit³, but may include training at the interface between environmental sciences and other disciplines, e.g. engineering.
16. All applications must include a major component of training in marine systems observations.
17. The CDT must offer training in the 'end-to-end' use of SAOS technologies. Proposals must include training under all of the following areas:
 - a. Development, validation and application of novel SAOS in multiple areas across the NERC science remit.
 - b. Development of conceptual frameworks for statistically robust environmental data collection using SAOS.
 - c. Understanding of deployment, piloting and control of SAOS in challenging environments.
 - d. Skills in mathematics, statistics and spatial modelling for data reduction and analysis of large datasets generated by SAOS.
 - e. New approaches to SAOS data management and visualisation for use by a broad range of stakeholders in NERC science.
 - f. Fundamental understanding and technical ability to develop SAOS

¹ RAS 2020 (Robotics and Autonomous Systems Special Interest Group)- <https://connect.innovateuk.org/documents/2903012/16074728/RAS%20UK%20Strategy?version=1.0>

² Eight Great Technologies (Policy Exchange)- <http://www.policyexchange.org.uk/images/publications/eight%20great%20technologies.pdf>

³ NERC Science Remit: <http://www.nerc.ac.uk/research/portfolio/remit/>

from proof-of-concept to fabrication, testing, field demonstration and commercialisation.

18. An expected key outcome of the CDT will be that the NERC funding will be used to leverage an investment (funding and/or in-kind support) from multiple stakeholders. Proposals must:
- a. evidence a track record of collaborative working; and
 - b. outline a strategy for engaging with multiple stakeholders in industry, policy making, regulation and society to nurture additional investments;
- and
- c. detail how working with these stakeholders will add value to the CDT and to the studentships, e.g. through secondment and future employment opportunities.
19. NERC recognises the value of delivering studentships in partnership and encourages proposals from organisations that can show they are working across boundaries, including across departmental boundaries within a single organisation, or across boundaries between both academic and non-academic organisations.
20. NERC will award eight notional studentships per annum for three years (these awards will be cash-limited within the limits described below). Each notional studentship will be four years in duration; it is expected that individual students will undertake training over a variety of time frames (between three and four years as appropriate, depending on the discipline and the student's experience/knowledge).

Funding

21. Indicative funding total per notional doctoral studentship:

Student Stipend	£56,228
Fees	£16,208
Research Training Support Grant	£11,000
Management Costs	£1,500
Total	£84,936

22. The CDT will have flexibility in how they use the funding ([subject to the normal training grant terms and conditions](#)), as long as the minimum notional numbers of students are supported per annum.

CASE Studentships:

23. Given the expected high level of non-academic partner involvement in the CDT

there are no additional or minimal CASE studentship requirements. However, NERC encourage applicants to incorporate CASE within their training programme and to demonstrate this within their proposals.

Management

24. The CDT will need to have strong leadership and management. The CDT should have both a lead operational manager and steering committee. The steering committee should be comprised of all hosting CDT partners and other partners where justified, have overall responsibility for the effective governance of the CDT and its relationship with NERC and provide a strategic needs framework to aid the prioritisation and development of PhD projects.
25. The CDT will be able to demonstrate that robust and transparent governance arrangements are in place, which may include formal partnership agreements, communication plans and systems for monitoring the CDT's overall progress and success. NERC strongly encourages applicants to incorporate CDT students into the management/running of activities of the CDT.

Eligibility

26. This opportunity is open to organisations eligible for NERC research grant funding, i.e. applicants based in UK Higher Education Institutions (HEIs), NERC Research Centres, and Independent Research Organisations (IROs) approved by NERC. Please refer to <http://www.rcuk.ac.uk/funding/eligibilityforrcs/> for details; this competition is a managed mode scheme.
27. Each CDT must include an accredited higher education PhD award-making body.
28. Organisations ineligible for NERC research grant funding may act as partners in proposals and information regarding the nature of this collaboration must be included within the proposal.

Application process

29. Applicants are asked to submit an outline proposal ahead of being invited to submit a full proposal for this funding opportunity.
30. Outline proposals must be submitted by email to the NERC Studentships and Training Awards Group using the form attached (*Annexes C & D*) by 16:00 GMT on Thursday 16 April 2015. Applications received not using this form will be excluded from the call.
31. The NERC Studentships and Training Awards Group email address is: stag@nerc.ac.uk
32. Outline proposals that do not follow the formatting and page limit requirements within the form will be excluded from this call.
33. Following the outline proposal review process, applicants will be notified whether they have been invited to submit a full proposal for this funding opportunity.

Feedback from the outline proposal assessment process will be provided following the announcement of invitations to submit full proposals.

Outline proposals:

34. All outline proposals must use the form provided on the NERC website and in *Annexes C & D*. The case for support section of the form must not exceed 4 pages of A4 in single-spaced transcript of minimum font size 11 point, Arial font, with margins of at least 2cm.
35. Applicants will need to provide details under the following headings:
 - i. Research Excellence
 - ii. Training Excellence
36. Applicants are strongly encouraged to include a high-level vision statement for their CDT within the case for support section of their outline proposal.
37. No other attachments will be accepted. Wording about links to websites will be ignored.

Full proposals:

38. All applications must use the form provided on the NERC website and in *Annexes E & F* below. The case for support section of the form must not exceed 14 pages of A4 in single-spaced transcript of minimum font size 11 point, Arial font, with margins of at least 2cm.
39. Applicants will need to provide details under the following headings:
 - i. Research excellence
 - ii. Training excellence
 - iii. Multidisciplinary Training Environment
 - iv. Partnership Operational Management (Quality Assurance and Attracting Excellent Students)
40. No other attachments will be accepted, including letters of support. Wording about links to websites will be ignored.
41. Full proposals must be submitted using the Research Council's Joint Electronic Submission System ([Je-S](#)) by 16:00 GMT on Thursday 30 July 2015. Applicants should select Proposal Type – 'Studentship Proposal' and then select the Scheme – 'Doctoral Training' and the Call – 'CDT July 2015'.
42. To use the Je-S system, the Research Organisation must be registered as a Je-S user. Full details are available on the Je-S website. Further information can also be obtained by contacting the Je-S Helpdesk by email at JeSHelp@rcuk.ac.uk, or by telephone on 01793 444164.
43. Applicants must ensure that their proposal is received by NERC by 16:00 on the closing date. They should leave enough time for their application to pass through

their organisation's Je-S submission route before this date. Any proposal that is received after the closing date, is incomplete, or does not meet NERC's eligibility criteria, will be returned to the applicant and will not be considered.

44. A single proposal should be submitted from the administrative lead partner for both the outline and full proposal application stages.

Assessment process

45. Both the outline and full proposals will be assessed by a peer review assessment panel, consisting of international experts, supplemented by member(s) of the NERC Training Advisory Group (TAG). The assessment process for both panels is provided below:

Outline proposals

46. Outline proposals will be assessed against two criteria: Research Excellence and Training Excellence. These criteria will be weighted equally.
47. Information concerning these two criteria and the scoring definitions is the same as those for Full Bid Proposals and can be found in *Annexes A & B*.
48. Applicants are **not** required to demonstrate any agreed or expected in-kind support or additional funding at the outline proposal stage.
49. Applicants will not be invited to present or provide an interview at the outline proposal stage of the application process.
50. Following the outline proposal assessment panel meeting, feedback will be provided on all proposals and applicants will be informed if they have been invited to submit full proposals.

Full proposals

51. The assessment criteria and scoring definitions to be used by the Panel are given in *Annexes A & B*. The full proposal assessment process includes an applicant presentation and interview at the assessment panel.
52. At the full proposal stage, any agreed or expected in-kind support or additional funding for supporting additional studentships within the CDT should be outlined.
53. Proposals will be assessed against four criteria: Research Excellence, Training Excellence, Multidisciplinary Training Environment and Partnership Operational Management. These criteria will be weighted as shown in Table 1.

Table 1: CDT Full Proposals Scoring System

CDT Assessment Criteria	Weighting	Score	Overall Excellence Score
1. Research Excellence	35%	/10	= 0.35 x Score
2. Training Excellence	35%	/10	= 0.35 x Score
3. Multidisciplinary Training Environment	15%	/10	= 0.15 x Score
4. Partnership Operational Management	15%	/10	= 0.15 x Score
Overall Grade Excellence Score	100%		/10

54. NERC will try to provide early notice of an invitation to attend, but applicants should note that the assessment panel meeting is currently scheduled for the week commencing 14 September 2015.

55. Following the assessment panel meeting, feedback for all proposals will be provided.

Reporting

56. There will be mandatory annual reporting requirements for the CDT in addition to the standard studentships information captured through the Je-S Studentship Details Portal (SDP). This information will be used by NERC to report on the success of our training investments to government and other partners. Information provided will also be used to provide assurance that the CDT is being managed appropriately and is progressing in accordance with its original funding proposal, the NERC Training Strategy and the aims and expectations outlined in this AO document. This additional reporting will take the form of an annual return. Indicative reporting headings include:

- i. Information regarding the student population – demographics, application information, etc.
- ii. Information regarding additional partner engagement, collaborations and co-funding
- iii. CASE partner engagement
- iv. Student Research outputs
- v. Cohort Specific Training Progress and Development updates
- vi. Information regarding supervisor training and professional development
- vii. Any structural and managerial changes that have occurred within the CDT.

Timetable

57. Overview of the competition timetable:

- 4 March 2015: Outline proposals call open
- 16 April 2015: Closing date for outline proposals

- 26 May 2015: Full proposal call open
- 30 July 2015: Closing date for full proposals
- w/c 14 September 2015: Assessment Panel meeting and interview
- October 2015: Decision communicated to applicants
- Autumn 2016: First CDT studentships commence

58. For further information please contact the Studentships and Training Awards Group (stag@nerc.ac.uk).

Annex A: Full Proposal Assessment Criteria

The assessment criteria that will be used to assess proposals are:

Assessment Criteria	Key aspects for an outstanding CDT	Factors and Evidence that might be discussed
1. Research excellence (35%)	<p>The training and training environment must include scientifically excellent and original research within NERC's remit and specifically within the remit of the call.</p> <p>Critical mass of relevant researchers/teams/projects to allow students to be supported effectively and sufficiently exposed to excellent research and researchers.</p>	<p>Number of active NERC-funded research projects and PIs at host RO's in the remit of the call.</p> <p>REF 2014 profiles (where relevant). Standing in the appropriate academic community – national, international etc.</p> <p>Standing in the appropriate academic community – national, international etc.</p> <p>Institutional commitment to research excellence the remit of the call.</p> <p>Amount of NERC and Research Council research income in appropriate research areas.</p>
2. Training excellence (35%)	<p>Students are part of an active community and managed as a cohort.</p> <p>Excellent scientific training and transferable/professional skills development opportunities.</p> <p>Challenging and relevant projects.</p> <p>Timely access to world-class facilities, direct experience of cutting-edge techniques, technologies and up to date methodologies.</p> <p>End user engagement: Students will gain value from interaction with end-users in industry, government and civil</p>	<p>Students have access to, and are encouraged, by peer to peer learning and support.</p> <p>Mechanisms for supervision and monitoring of both student and supervisor.</p> <p>Integration of students into the relevant teams/projects/departments/schools.</p> <p>How generalist and specialist development needs of individual students will be identified and delivered.</p> <p>The personal/ professional/ career learning and development that students will receive.</p> <p>The collaborative opportunities, which may include internships, industrial placements, overseas studies, and co-</p>

	<p>society) and leave equipped with skills applicable to the environment sector: skills for policy-makers and regulators; industry and business; and NGOs and charities.</p> <p>Excellent training and support for supervisors.</p>	<p>supervisory arrangements if appropriate.</p> <p>Completion rates, publication and first destination data for students hosted within CDT institutions.</p> <p>Employability.</p> <p>Mechanisms to ensure the development of independent researchers and world- leading scientists.</p> <p>Leveraged funding and in-kind support for the CDT.</p>
<p>3. Multidisciplinary Training Environments (15%)</p>	<p>Training is embedded in multidisciplinary training environments.</p>	<p>How students will be made aware of the context of their research and how it relates to other areas.</p> <p>Supervisory or wider advisory team engagement in research outside the relevant discipline(s).</p> <p>Ability to expose students to different disciplines via, for example:</p> <ul style="list-style-type: none"> i. Establishing cohorts beyond the NERC funded students by using the CDT as a magnet/nucleus for research and training activities and investment; ii. Placing students within multidisciplinary research teams; iii. Giving students the opportunity to attend transferrable skills training programmes at which students from different disciplines come together; iv. Offering rotations across different disciplines within the first few months of training, where appropriate; v. Networking opportunities including multi-discipline student conferences or poster competitions; vi. Seminars open to students across

		different disciplines.
4. Partnership Operational Management (15%)	<p>Robust and transparent governance arrangements.</p> <p>Mechanism for planning, managing and monitoring training.</p> <p>Mechanism for managing partnerships between or within organisations.</p> <p>Mechanism for aligning and agreeing ways of working and sharing resources between different organisations (including non- academic partners).</p>	<p>Systems and processes for assessing the suitability of supervisors and projects.</p> <p>Competitive mechanisms for awarding studentships within the CDT.</p> <p>Excellent students - processes for student recruitment, induction, progression, monitoring and submission.</p> <p>Arrangements for returning accurate and timely data on studentships to NERC.</p> <p>Mechanisms for improving and maintaining submission rates.</p> <p>Establishing cohorts beyond the NERC funded students by using the CDT as a magnet/nucleus for research and training activities.</p> <p>Robust quality-assurance procedures and structures.</p> <p>Development and demonstration of Success Stories.</p> <p>Arrangements in place for management of data generated by studentship projects.</p> <p>Plans for engaging with end-users.</p>

Annex B: Overall Excellence Score Definitions

Score	Usual Indicators
Excellent quality proposal	
10	The proposal is outstanding and represents world-leading standards. Highest priority for funding.
9	The proposal is excellent and represents world-class standards. Very high priority for funding.
8	The proposal is very good and contains aspects of excellence. High priority for funding.
Good quality proposal	
7	The proposal is good and is internationally competitive. Should be funded if possible.
6	The proposal is good and on the borderline between nationally and internationally competitive. Potentially fundable.
5	The proposal is good and has some merit but is not at the leading edge. It is suitable for funding in principle but in a competitive context is not a priority.
Potentially useful proposal	
4	The proposal is good and has some merit, but has a number of weaknesses. Not recommended for funding.
3	The proposal is satisfactory. It would provide something useful, but fails to provide reasonable evidence and justification for funding. Not recommended for funding.
Unacceptable proposal	
2	The proposal is weak, and has only a few strengths. Not suitable for funding.
1	The proposal is unsatisfactory and is unlikely to train students successfully. Not suitable for funding.
0	For special cases, e.g. flawed in approach, subject to serious difficulties, does not address operational risks, sufficiently un-clearly written so it cannot be properly assessed, or outside of NERC remit.



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Centre for Doctoral Training OUTLINE PROPOSAL

Administrative Lead Partner (This is the organisation that will receive the funding for the CDT from NERC, and will be the main point of contact between the two bodies.).

Organisation		Internal Research Organisation Reference	
Division or Department			

Lead Applicant (The individual should be from the Administrative Lead Partner and be the administrative lead/head of the CDT).

Name	Organisation	Division or Department	CDT Role	Email

Hosting Partner (Please only include HEI or Research Organisation partners that will be acting as hosts for CDT students. Other partners should be mentioned within the Case for Support as appropriate).

Name	Organisation	Division or Department	Email

Title [up to 150 characters]



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Centre for Doctoral Training – Outline Proposal Case for Support

Please justify and evidence your proposal using the following headings:

- Research Excellence
- Training Excellence

This Case for Support must be completed on standard A4 sized paper, in single-spaced typescript of minimum font size 11 point, Arial font, with margins of at least 2cm. Applicants should note that the assessment panel will not consider reference to other sources, e.g. websites, if these are included within the text.

This Case for Support section must NOT exceed 4 sides of A4.



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Centre for Doctoral Training FULL PROPOSAL

Administrative Lead Partner (This is the organisation that will receive the funding for the CDT from NERC, and will be the main point of contact between the two bodies.).

Organisation		Internal Research Organisation Reference	
Division or Department			

Lead Applicant (The individual should be from the Administrative Lead Partner and be the administrative lead/head of the CDT).

Name	Organisation	Division or Department	CDT Role	Email

Hosting Partner (Please only include HEI or Research Organisation partners that will be acting as hosts for CDT students).

Name	Organisation	Division or Department	Email

Title [up to 150 characters]

CDT Summary [maximum 4000 characters with spaces]

Please provide a summary of the proposed training in terms appropriate for a general audience, including details on what will make your training offer unique and what its impact will be.



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Centre for Doctoral Training – Full Proposal Case for Support

Please justify and evidence your proposal using the following headings:

- Research Excellence
- Training Excellence
- Multidisciplinary Training Environment
- Partnership Operational Management.

This Case for Support must be completed on standard A4 sized paper, in single-spaced typescript of minimum font size 11 point, Arial font, with margins of at least 2cm. Applicants should note that the assessment panel will not consider reference to other sources, e.g. websites, if these are included within the text.

This Case for Support section must NOT exceed 14 sides of A4.