



Technical Description of Climate Change Research Programme (CCRP)

Call for Fellowships

May 2009



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Section B: Description of research fellowships

<i>Code</i>	<i>Fellowship Topic</i>
<i>CCRP 2009 F1</i>	Land use and Agricultural Emissions of Greenhouse Gases
<i>CCRP 2009 F2</i>	Development of Climate Observation Systems
<i>CCRP 2009 F3</i>	Advancing actions on Adaptation and Mitigation
<i>CCRP 2009 F4</i>	Research Support for Mace Head: Instrumentation, Data Systems and Analysis
<i>CCRP 2009 F5</i>	Ensemble study of storm surge and extremes
<i>CCRP 2009 F6</i>	Modelling Trans-boundary Air Quality
<i>CCRP 2009 F7</i>	Climate Solutions through Technology

Section A

1 Introduction

Ireland's response to climate change is described in the National Climate Change Strategy (NCCS) published in 2007 (www.environ.ie). The NCCS highlights a number of objectives for climate change research. The Environmental Protection Agency's Climate Change Research Programme, (CCRP) is developing and progressing research to achieve these objectives. The CCRP also addresses priority research issues for Ireland in trans-boundary air pollution and development of advanced observation and data management systems.

The EPA through the CCRP is acting to coordinate research activities with related research being developed by other state agencies and government departments. The aim is to support the development of policy response and actions through the provision of integrated scientific analyses of these issues, and options to address these, for example analysis of potentials to reduce greenhouse gas emissions and options and identification of pathways for achievement of these potentials.

The scientific analysis and information produced by the CCRP programme and related activities is expected to be specifically relevant to the challenges faced by Ireland. It should also contribute to understanding of these issues at EU and wider international levels.

Background

Climate Change is the most challenging environmental issue facing the world today. Unchecked climate change will, in the longer term, undermine social systems and economic development. These issues have been elucidated by the Intergovernmental Panel on Climate Change (IPCC) in its fourth Assessment Report (AR4) published in 2007. International actions on climate change are advanced under the UNFCCC which is expected to agree major reductions in GHG emissions in the near future.

2 Programme Structure

The CCRP is organised around four thematic areas and a cross-cutting element. The thematic areas are:

- Theme 1 Greenhouse gas emissions, sinks and mitigation
- Theme 2 Impacts and Adaptation
- Theme 3 Socio-economics and Technologies
- Theme 4 Air quality and trans boundary air pollution

Cross cutting issues include observation systems and data management.

The aims of each of the four themes are summarised as follows:

Theme 1: GHG Emissions and Mitigation

The aim is to further improve research in this area and to provide an integrated analysis of GHG emissions and sinks as well as analyses of mitigation potentials. This will also provide decision support for future policy development on GHG emissions and sinks.

Theme 2: Impacts and Adaptation

The aim is to improve analysis and understanding of climate change impacts and inform the adaptation planning process. Work in this area also aims to address observation gaps in relation to understanding the impacts and rate of climate change.

Theme 3: Socio-economic analysis and Technologies

The aim is to develop socio-economic analysis of mitigation options to reduce GHG emissions as well as analysis of advanced and emerging technologies (e.g. Carbon Capture and Storage), to address climate change.

Theme 4: Trans-boundary Air Pollution

The aim of research in this area is to develop necessary research in this area, improve co-ordination of activities and improve national engagement with groups and bodies working in this area at UNECE and EU levels.

Cross Cutting research

Cross cutting research addresses questions that have direct input to climate, air quality or other atmospheric issues. There is a particular focus on development of observation systems, data management and integrated modelling.

3 Call for CCRP Research Fellowships

This call is open to suitably qualified and experienced candidates interested in pursuing the research fellowships detailed in Section B of this document. Suitably qualified individuals should complete an official application form which addresses the specific research areas. Where possible the potential host-university/research institution and supervisor should also be identified in their application. If a suitable host institute cannot be identified at the time of application then please enter “to be confirmed” on the application form.

Applications from individuals or host institutions/groups will be accepted for CCRP 2009 Fellowship on exploring climate solutions only. These proposals must identify an active research area with which they will engage and develop climate solutions.

4 Project reporting and funding

The research fellowships awarded under the CCRP are typically for up to 3 years duration. Funding will cover salary (plus PRSI and pension contributions¹), consumables, travel and subsistence and overheads. For details in relation to the eligibility of these costs, please refer to the [Guide for Applicants](http://www.epa.ie/researchandeducation/research/docs/) <http://www.epa.ie/researchandeducation/research/docs/>.

Fellowship salaries are linked to the qualifications and experience. The [Irish Universities Association \(IUA\)](http://www.iua.ie/iua-activities/research.html) <http://www.iua.ie/iua-activities/research.html> Post-Doctorate Researchers salary scale may provide indicative levels.

All research fellowships must comply with the reporting requirements as stated in the [Terms and Conditions for support of Grant Awards](http://www.epa.ie/researchandeducation/research/docs/). (<http://www.epa.ie/researchandeducation/research/docs/>). Fellowships will not be awarded to applicants who are currently in breach of reporting requirements in relation to technical and financial progress.

5 Indicative Timeframe

An indicative timeframe for this call is shown below.

Friday 15th May 2009	Announcement of funding opportunity.
Thursday 18th June 2009	Closing date for submission of applications.
End of July 2009	Completion of evaluation process.

¹ It should be noted that employers pension contributions will only be eligible when relevant documentation is provided supporting the payment of these contributions to an appropriate pension scheme in the name of the individual concerned. Costs such as sick pay, redundancy pay, maternity pay and other similar social costs that may or may not arise in the grant period are specifically identified as ineligible under the current CCRP funding guidelines.

6 Further Information

Information on current research projects being supported by the CCRP programme is available on the EPA website (www.epa.ie) and in the document called Summary Description of CCRP Grant Awards 2007. Enquiries on the CCRP Research Fellowship Call 2009 should be addressed to: climateresearch@epa.ie

7 Freedom of Information Act, 1997

Please note that Information supplied to the Environmental Protection Agency may be disclosed in response to a request under the Freedom of Information Act, 1997 and Freedom of Information (Amendment) Act, 2003. Should you wish that any of the information supplied by you in this application should not be disclosed because of its sensitivity, you should, when providing the information, identify the same and specify the reasons for its sensitivity. The Environmental Protection Agency will consult with applicants about this information before making a decision on any Freedom of Information request received.

8 How to apply

Complete the official application form and submit it for evaluation ahead of the specified deadline. Insure that all areas of the form are addressed and that the proposal is in line with the specification provided. Additional material may be submitted if deemed to add to information already provided. **Application Forms** are available to download on the 'Environmental Research' pages of the EPA website at www.epa.ie.

Applications must be submitted to the EPA on or before Thursday 18th June 2009 not later than 5pm using the available form. Incomplete and/or late applications will not be considered.

Applications should include one paper copy (signed by the appropriate college authority) and one electronic copy (preferably on CD ROM or other standard storage medium).

Receipt of application will be confirmed by e-mail to the applicants after the submission deadline has passed.

Completed applications should **only** be sent to:

Mr. Ger Hussey,
Research Fellowship Scheme 2009,
Climate Change Research Programme,
EPA Regional Inspectorate Dublin,
McCumiskey House,
Richview,
Clonskeagh Rd.,
Dublin 14.

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CCRP 2009 F1: Land Use and Agricultural Emissions of Greenhouse gases

This fellowship will focus on a number of aspects of Agriculture and Land Use, Land Use Change and Forestry (LULUCF). This includes integration of research outputs/analysis to enhance LULUCF reporting under the UNFCCC and its Kyoto Protocol. The fellowship should also address areas of soil process modelling and nitrous oxide (N₂O) emissions.

Background

Reporting of greenhouse gas (GHG) emissions and sinks related to Land Use and Land Use Change and Forestry in Ireland is currently based on IPCC Good Practice Guidelines. It is at a Tier 1 level for most activities in this sector, with the exception of forestry. Current data used to assess land-use change are collected for other uses and have limitations for reporting purposes. For example, annual agricultural statistics do not fully represent the underlying dynamic of land use change. The EPA and others have invested in research on GHG emissions and underlying processes in Irish grasslands, arable land and peatlands. This work, and work at a wider European level have demonstrated a continuing potential for carbon sequestration to soils, which may be responsive to management practices but may also be impacted by meteorological conditions. Further work to integrate these analyses in support of reporting and assessment of mitigation option is required.

Current LULUCF methodology

There are opportunities to improve methodologies used in reporting GHG emissions and sinks in the LULUCF sector. These include:

- Application of country specific GHG exchange rates from research.
- Addressing the spatial extent and variety of management practices currently in Irish land systems.
- Developing a more sophisticated methodology for tracking land use change, particularly within agriculture.
- Developing more robust estimates of urban expansion and other human developments.
- Improve inclusion of recent, higher resolution data and spatial analyses.

Objectives

The objective of the fellowship is to address the following issues:

- Transfer research findings into the LULUCF inventory methodology following “best practice” IPCC guidelines for improving estimates.
- Develop Tier 2 and 3 approaches to key activities within LULUCF.
- Improve the representation of processes which impact on GHG exchange, include farming practices and meteorology.
- Address issues related to emissions and sinks of carbon from Irish soils due to land use and land management.

Profile and application

Applicants are expected to hold a PhD or equivalent experience in a relevant research field and have good knowledge of GHG exchange processes and LULUCF issues, GIS, model development and inventory methods. Applicants should complete the CCRP Fellowship application form and include other relevant information with the application.

CCRP 2009 F2: Development of Climate Observation Systems

This fellowship will focus on the implementation of a comprehensive observations programme of essential climate variables and ongoing analysis of the associated data to enhance understanding of climate change in Ireland.

Background

Through the Global Climate Observing System (GCOS) secretariat, the UNFCCC have provided support and guidance on issues related to development of systematic observations. The GCOS secretariat published an implementation plan in 2004. As part of this plan GCOS identified a minimum set of Essential Climate Variables (ECVs) for the atmosphere, ocean and terrestrial environments that require regular, long-term observation. In 2008 the EPA published a review of Ireland's progress in implementing the plan, entitled "Climate Change - Implementation of the Global Climate Observing System in Ireland". A follow-up study identified additional observational systems required to meet national objectives and policy needs. These include:

- A need for regular analysis and reporting of status, trends and projections of the ECVs and the need to tailor this reporting to meet the needs of policy and decision makers.
- The utility of remotely sensed measurements to fill the gaps, both spatially and temporally, needs to be explored to fill the gaps in the current network.
- To develop and establish an online climate data portal to facilitate access to all relevant observational metadata and data. In the first instance a scoping study that addresses technical, data and institutional issues with regard to data accessibility should be carried out.

Objectives

The fellowship should address and advance work in this areas through:

- A review of implementation of GCOS requirements
- Advance development of systems for provision of access to climate relevant data
- Assess and utilise data from remote sensing in provision of analysis of climate change
- Report on the status of Ireland climate in the context of global climate change

Profile and application

Applicants are expected to hold a PhD or equivalent experience in a relevant research field and should have a good knowledge of instrumentation systems, climatology, data analysis and report writing. Applicants should complete the CCRP Fellowship application form and include other relevant information with the application.

CCRP 2009 F3: Advancing actions on Adaptation and Mitigation

This fellowship will focus on development of international actions to address climate change through the UNFCCC Bali Action Plan and its outcomes. The fellowship will also provide assessment of, and recommendations on, the degree to which climate change issues could be further integrated into existing policy areas in Ireland.

Background

The global response to climate change will embrace actions across the spectrum of developed and developing countries. Climate change will impact on developed and developing countries and requires a global response. However, developing countries, particularly Least Developed Countries, have limited capacity to respond to these challenges.

Advanced developing countries, having rapidly increasing greenhouse gas emissions, are expected to take actions to address these emissions while achieving development objectives. The UN Framework Convention on Climate Change (UNFCCC) aims to enable complementary actions on mitigation and adaptation on climate change in developed and developing countries.

Understanding of these developments and links between these issues and other policy areas is required to enable Ireland to achieve broader policy objectives. This is particularly the case for climate change, sustainable development and development assistance. This is anticipated to include actions on adaptation and mitigation e.g. Frameworks for Adaptation, Nationally Appropriate Mitigation Actions, (NAMAs).

Objectives

The fellowship should involve engagement with actions being developed under the UNFCCC and aim to

- Develop analyses of the emerging UNFCCC structures and processes and assess their implications
- Provide updates, briefings and recommendations for development of international climate change policy in areas of interest for Ireland.
- Identify means to enhance climate policy integration and improve policy coherence, within the context of multi-level governance.
- Support the development and implementation of national actions on climate change including those on mitigation and adaptation

Profile and application

Applicants are expected to hold a PhD or equivalent experience in a relevant area and knowledge of UNFCCC processes, the Kyoto Protocol and the work of the IPCC and in particular with, international funding mechanisms, the carbon market and work on adaptation. Applicants should complete the CCRP Fellowship application form and include other relevant information with the application.

CCRP 2009 F4: Research Support for Mace Head: Instrumentation, Data Systems & Analysis

This fellowship will focus on providing research support for Mace Head in order to further develop research into issues of national and regional interest, which are ongoing at the site.

Background

The Mace Head atmospheric research station is a World Meteorological Organisation/ Global Atmospheric Watch (WMO/GAW) site. It is recognised internationally for long-term observational activities. These include observations of aerosols, which commenced in 1958 and of greenhouse and other gases since 1987. The site has excellent facilities and is supported by the National University of Ireland, Galway and in part by the Environmental Protection Agency and by Met Éireann. It has also attracted significant international funding through the EU Framework programmes and from other international sources as well as shorter-term research projects and measurement campaigns.

A review of GAW sites in Ireland headed by the World Meteorological Organisation found that Mace Head was of unique importance but lacked institutional support. It recommended that steps should be taken to address the lack of support. In order to respond to this and to further develop research into issues of national and regional interest, applications for a researcher to work at Mace Head are requested.

Objectives

It is anticipated that the fellowship would address the following topics:

- Operational support for instrumentation located at Mace Head
- Provide assessment of hemispheric transport of pollutants through analysis of data for Mace Head
- Develop and support systems and tools for reporting of data from Mace Head to relevant national and international bodies
- Support on-going research programmes and projects at Mace Head as agreed between the EPA and NUIG
- Publish or contribute to papers and reports on work carried out at Mace Head
- Develop systems and tools for data collection and for reporting to national and international bodies and archives

Profile and application

Applicants are expected to have a higher degree (PhD) in physics, engineering or a linked discipline or equivalent experience and be familiar with instrumentation, data collection, management and analysis. Applicants should complete the CCRP Fellowship application form. Other additional relevant material may be included with the application.

CCRP 2009 F5: Impact of Climate change on Weather Extremes using an Ensemble approach

This fellowship will focus on advancing analyses of weather extreme based on numerical analysis and modelling

Background

Extreme weather events are expected to increase in frequency as the climate continues to warm. However, there is still a good deal of uncertainty in future predictions due to the rarity of such events and the reliability of the model simulations. The proposed project will use an ensemble approach, with datasets provided by the C4I, ENSEMBLES and EC-EARTH projects, to investigate the impacts of climate change on weather extremes. The work will focus on the Irish climate.

Project details

A wide range of downscaled GCM datasets, produced by C4I and the ENSEMBLES projects, are available for this project. New global simulations will also be produced by Met Éireann as part of the EC-EARTH project and these will be dynamically downscaled to extend the pool of ensemble members.

Initial work will involve a comprehensive statistical analysis of the existing datasets. As the EC-EARTH simulations become available the researcher will dynamically downscale a selection of these for further investigation using the Met Éireann regional climate model. Downscaling with a meso-scale model (WRF or the HIRLAM HARMONIE model, if available) will also be used on short simulation runs. The impacts of extreme precipitation will also be examined in the context of river flooding, building on existing research work carried out under the C4I project.

Objectives:

- Provide guidance, in a statistical context, on the expected influence of climate change in the coming decades on weather extremes in Ireland.
- Examine the impacts of future precipitation on river flooding.

Profile and applications:

Applicants are expected to have a higher degree (PhD) in meteorology, climatology, oceanography mathematics, physics, computing or engineering or a linked discipline or equivalent experience. Good computer skills, particularly in high-performance computing, are also required. Applicants should complete the CCRP Fellowship application form. Other additional relevant material may be included with the application.

CCRP 2009 F6: Modelling Trans-boundary Air Quality

This fellowship will focus on provision of improved analysis of trans-boundary pollution on air quality in Ireland and assessment of associated impacts of this transport

Background

Climate change and air quality are linked in a number of ways: changing temperatures will alter the emission of particulate matter precursors and the production of particulate matter; changing cloud fields will alter atmospheric oxidation pathways and consequently ozone fields; changes to precipitation patterns will alter the distribution, dispersion, and transport of pollutants. In addition, changes in synoptic scale meteorological patterns will alter the frequency of occurrence and location of blocking high-pressure systems, which lead to significant detrimental air quality events. With the European Commission's new **Thematic Strategy for Air Pollution in Europe**, which follows from the **Clean Air For Europe, CAFE**, initiative, lower air quality thresholds may be introduced. In this context, it is essential that Ireland is capable of producing assessments of the probability of exceeding these thresholds due to climate change patterns in order to be able to mitigate against them. Of particular importance is the issue of trans-boundary pollution, both on the European scale and on the hemispheric scale. The current level of trans-boundary air pollution, and how this is likely to change with future climate change is of significant importance in terms of policy development.

Goals and Objectives

- To develop the capability of Air Quality Predictions in Ireland
- To quantify trans-boundary (European scale and hemispheric scale) in Ireland.
- To quantify the impact of future climate change on Air Quality in Ireland and Europe.
- To provide an informed assessment of future air quality trends to underpin policy development

Aspect of the work may include

- Set up Air Quality Model
- Evaluate performance of model versus other air quality products.
- Quantify annual trans-boundary import and export of air pollution fields.
- Perform initial (test bed) operational air quality forecasts linking into the GEMS/MACC Integrating Forecasting System.

Profile and applications

Applicants are expected to have a higher degree (PhD) in meteorology, climatology, mathematics, atmospheric physics or chemistry, computing or engineering or have equivalent experience and be familiar with computer modelling, data management and analysis. Applicants complete the CCRP Fellowship application form and submit any additional information with this form

CCRP 2009 F7: Climate Solutions through Technology

The development and deployment of new technologies is essential to achieve greenhouse gas mitigation targets and to avoid dangerous climate change. Technological development also provides opportunities for economic growth. These fellowships will promote the use of technologies to advance climate solutions.

Background

The Irish government via the Higher Education Authority and Science Foundation Ireland and others, have directed research funds towards key strategic high performance areas of research for Ireland. This has led to the development of significant high quality research capacity.

This investment may also provide climate solutions that have the potential to support achievement of low carbon/GHG economy or systems that can advance other climate goals e.g. in adaptation or information provision. Areas such as nanotechnology, biotechnology, ICT and food technology are considered to have potential in the area of climate change solutions. These need to be more fully explored and assessed in relation to practical application to address the challenges of climate change. The aim of these fellowships is to enable such exploration.

Objectives

The fellowship will be integrated with active research groups working in high performance areas. The objectives of the fellowship should include one or more of the following objectives

- To identify innovative applications based on existing research to achieve reductions in greenhouse gas emissions
- Assess life cycle emissions from the identified technology under research and any possibilities for improvement
- Indicate how principles, materials or techniques, developed under the technology research project, could be applied in practice to achieve greenhouse gas emission reduction.
- Advance understanding of systems and tools to reduce emissions of GHGs
- Develop information or analysis systems to support actions on climate change including forecasting and warning systems

Profile and application

Applicants should complete the CCRP Fellowship application form and provide and relevant additional information.

- Projects: Applications are accepted from co-ordinators of existing technology research projects who would engage an additional team member under this fellowship. Applicants should provide details of the existing technology research programme and their recruitment plan for the fellow.

- Individuals: Applications are accepted from candidates with a pre-arranged link to an existing technology research project. Applicants should have a PhD or equivalent experience.