U.S. – Ireland R&D Partnership
MEMORANDUM OF UNDERSTANDING

A Memorandum of Understanding (MOU) regarding National Science Foundation (NSF), Science Foundation Ireland (SFI), and Invest Northern Ireland (Invest NI)/Department for Employment and Learning (DEL) joint funding activity for research and education in the areas of science and engineering.

Statement of Intent and Scope of this Document

This MOU outlines how NSF, SFI, and Invest NI/DEL (Participants) plan to conduct joint funding of research and education, particularly in the areas of nanoscale science and engineering, sensors and sensor networks, telecommunications, and energy and sustainability. This document describes plans for the preparation, receipt, and review of proposals, as well as the administrative processes in which the four agencies will cooperate in the monitoring and funding of successful proposals. This MOU is not intended to create binding obligations under either domestic or international law and is subject to the availability of appropriated funds. This MOU supersedes the Memorandum of Understanding signed by the Participants on December 20, 2013.

Authorities

NSF is acting pursuant to the National Science Foundation Act of 1950 as amended, 42 USC 1861 *et seq.*

In July 2003, SFI was established on a statutory basis under the Industrial Development (Science Foundation Ireland) Act, 2003. The formal definition of SFI's legal remit is detailed within the following Acts of Government (2003 and Amendment 2013) and Statutory Instrument (2008): http://www.irishstatutebook.ie/2003/en/act/pub/0030/index.html (particularly Section 7) http://www.irishstatutebook.ie/2008/en/si/0134.html (addition of Energy) http://www.irishstatutebook.ie/pdf/2013/en.act.2013.0036.pdf.

Invest Northern Ireland was established in 2002 under the Industrial Development Act (Northern Ireland) 2002. More information can be found on the HMSO website: http://www.hmso.gov.uk/legislation/northernireland/nisr/yeargroups/2000-2003/2002/2002ania/aos/c1.htm.

The Department for Employment and Learning (formerly known as the Department of Higher and Further Education, Training and Employment) is one of 11 Northern Ireland Departments established in 1999 by the Departments (Northern Ireland) Order 1999 to exercise functions conferred on it by that Order (Schedule 2 and Schedule 3), the Northern Ireland Act 1998 and other legislation. Further information can be found

at www.delni.gov.uk. (A twelfth Department – the Department of Justice – was subsequently established by the Department of Justice Act (Northern Ireland) 2010).

These authorizations for the four Participants together with the internal policies and procedures of each, define the authority of these Participants to establish and manage programs in the research fields referenced in this MOU.

Synopsis of Program

In order to foster an increase in collaborative relationships, the Participants plan to collaborate to support research and education in the areas of nanoscale science and engineering, sensors and sensor networks, telecommunications, and energy and sustainability through competitive awards via existing (core) programs in the case of NSF and SFI, and, in the case of Invest NI/DEL, via these Participants' R & D funding mechanisms. The Participants also plan to collaborate to support Center-to-Center collaborations in these fields.

United States

Participating NSF Directorates and Offices include:
Biological Sciences (BIO)
Computer & Information Sciences & Engineering (CISE).
Engineering (ENG)
Geosciences (GEO)
Mathematical & Physical Sciences (MPS)
Social, Behavioral & Economic Sciences (SBE)
Education & Human Resources (EHR)
Office of International & Integrative Activities (OIIA)

Ireland

Participating SFI Directorates include:
Information, Communications & Emergent Technologies Directorate
LifeSciences Directorate

Northern Ireland

Participating Invest NI Directorates include:
Innovation, Research and Technology Division

Participating DEL Directorates include:
Higher Education Division

Proposal & Award Process

The Participants intend to manage this process through their relevant funding programs/mechanisms. Information concerning this program will be placed on each Participant's website, giving the background to the U.S.-Ireland R&D Partnership and details on how proposals will be considered.

Proposal Preparation & Submission to NSF

Tri-jurisdictional, integrated proposals to NSF should be submitted to those programs funding research and education in the areas of nanoscale science and engineering (Attachment A), sensors and sensor networks (Attachment B), telecommunications (Attachment C), and energy and sustainability (Attachment D) or to the Office of International and Integrative Activities (Attachment E).

Proposers should submit their proposals in conformance with the guidelines specified in the NSF Grant Proposal Guide (GPG) http://www.nsf.gov/publications/pub_summ.jsp?ods_key=gpg or the NSF Grants.gov Application Guide http://www.nsf.gov/publications/pub_summ.jsp?ods_key=grantsgovguide.

All proposals should be submitted to NSF via use of the NSF FastLane System or Grants.gov.

Proposals should include the full project descriptions for all three jurisdictions, and must include three budgets, the full NSF budget and two additional half-page budgets for Ireland and Northern Ireland. The project descriptions and budget pages for the Ireland and Northern Ireland jurisdictions should be included in the Supplementary Documents section of the proposal. The names of the corresponding Program Managers from Ireland and Northern Ireland should be provided in the respective budget justification and will be used as a contact reference by the NSF Program Officer.

Submission of Proposals from Ireland and Northern Ireland

Outline/Summary Proposals

SFI and Invest NI/DEL applicants should submit draft outline/summary proposals and budget requests to SFI and to Invest NI/DEL 6 weeks in advance of the applicable NSF submission deadline in order to check eligibility. SFI applicants are subject to SFI eligibility criteria. Note that any applicants who have been awarded a Planning Grant from SFI or Invest NI, and have submitted their post-planning grant award reports to their respective funding organizations, are not required to submit a draft proposal, but should contact the relevant SFI or Invest NI Program Officer to discuss their budget request in advance of full submission.

Full Proposals

Proposers should simultaneously submit identical copies of full proposals to SFI and Invest NI/DEL.

Eligible proposers for funding from SFI should submit the proposal with a standard cover sheet signed and stamped by the relevant VP for Research/Dean of Research along with an appendix outlining the Ireland proposer's budget requested (on a standard SFI budget template) and provide justification for the funding requested. The appendix should be no longer than 3 pages in total.

Proposers for funding from Invest NI/DEL should submit the proposal with an Invest NI/DEL cover sheet signed and stamped by the relevant Pro Vice Chancellor for Research and the Dean/Head of School. Both SFI and Invest NI/DEL will require scanned copies of original signatures.

Principal Investigators (PIs)

Each proposal should have a minimum of one Principal Investigator from each jurisdiction. Proposals submitted to NSF should be submitted by the U.S. PIs' home institution. PIs from Ireland and Northern Ireland will be identified as Senior Personnel in the proposal submitted to NSF.

Review Process

Proposals received at NSF will be evaluated in accordance with the standard NSF merit review criteria of intellectual merit and broader impacts of the proposed effort and additional review criteria as appropriate. In addition, reviewers will be asked to assess the international collaboration in terms of mutual benefits, true intellectual collaboration among the international partners, benefits to be realized from the expertise and specialized skills, facilities, sites and/or resources of the international counterparts, and active research engagement of students and early-career researchers, where such individuals are engaged in the project.

The review will be conducted using the NSF merit review process, including conflict of interests and confidentiality policies. The process may include use of *ad hoc* mail reviewers, as needed, in combination with review panelists who meet, discuss the proposals, and make recommendations to NSF. Review procedures also may include provision for summary rankings by the panel.

The NSF will review documents for each proposal -- written reviews, panel summaries, if any, panel rankings, if any, and relevant portions of the Site Visit Reports (for proposed Center-to-Center collaborations) and will share this information (without reviewer identities) with the Program Directors in SFI and Invest NI/DEL for the purpose of coordinating funding of research. Both SFI and Invest NI/DEL will keep these shared documents confidential to the maximum extent possible by law. If SFI or Invest NI/DEL receive requests from outside parties for any documents that have been shared by NSF, they

will notify NSF prior to making any disclosure. SFI and Invest NI/DEL further understand that they will disclose these shared documents internally only on a "need to know" basis.

Consideration of requests for funding of the Ireland and Northern Ireland elements of each proposal will be dependent upon receipt by SFI and Invest NI/DEL of confirmation by NSF of that organization's agreement to fund the U.S. element of each proposal and a positive assessment by NSF of the technical merits of the entire project across all three jurisdictions. Applicants from Ireland and Northern Ireland should note that SFI and Invest NI/DEL reserve the right to adjust budgets where they deem this to be appropriate.

Award Process

Proposals selected for potential funding by each Participant will be considered in line with each Participant's respective policies and practices. The form of award instrument shall be at the option of Participant. **No funds will be transferred between the Participants. There will be no cross-Participant co-funding of individual awards.** The issuance and administration of awards will be carried out by the relevant funding organization. Each award will contain an acknowledgement of this joint NSF/SFI/Invest NI/DEL initiative.

Funding for the Northern Ireland elements of NSF-approved proposals will be conditional upon acceptance by the relevant University of a Letter of Offer issued by DEL.

Post-award Process

Co-investigators should submit identical annual written progress reports to their relevant Program Managers or Program Officers in each of the four Participants. Co-investigators must use the project report format identified in the NSF Research.gov System for this purpose.

Any comments or concerns on the part of any one of the Participants with respect to the progress reported will be mutually shared.

Decisions on discontinuation of funding will be made jointly by agreement among the four Participants.

SFI and Invest NI/DEL reserve the right to assess the progress of any project they support, at any time of their choosing, during the lifetime of awards made under the auspices of the U.S.-Ireland R & D Partnership.

Approval, Modifications, Duration, and Discontinuation

Activities contemplated under this MOU are expected to continue for three years from the date activities commence under this MOU, unless discontinued earlier by the Participants.

A. National Nanotechnology Initiative, FY 2014 – FY 2015

For fiscal year 2014, the National Science Foundation budget request for the National Nanotechnology Initiative (NNI) is approximately $400 million. All participating research and education directorates and the Office of International & Integrative Activities (OIIA) accept proposals with an international component following a competitive selection process. NSF grants generally support only expenses made by the U.S. universities for research and education, for U.S. participants in international interactions such as workshops, and for research visits abroad by U.S. students and faculty.

The participating directorates and offices are: Biological Sciences (BIO), Computer and Information Sciences and Engineering (CISE), Engineering (ENG), Geosciences (GEO), Mathematical and Physical Sciences (MPS), Social, Behavioral and Economic Sciences (SBE), Education and Human Resources (EHR), and Office of International & Integrative Activities (OIIA).

General information about NNI-specific programs can be found on www.nsf.gov/nano, on NSF's core programs on http://www.nsf.gov/funding/azindex.jsp, and on OIIA international programs on http://www.nsf.gov/dir/index.jsp?org=IIA.

NSF supports nanoscale science and engineering in FY 2014 and beyond through various programs. The following program directors may provide further information:

BIO: Alan Tessier, atessier@nsf.gov
CISE: Sankar Basu, sabasu@nsf.gov
ENG: Mihail Roco, mcroco@nsf.gov
GEO: Enriqueta Barrara, ebarrera@nsf.gov
MPS: Tom Rieker, trieker@nsf.gov
SBE: Frederick Kronz, fkronz@nsf.gov
EHR: Alphonse DeSena, adesena@nsf.gov
OIIA: Graham Harrison, gharriso@nsf.gov

International supplements: Awards made in previous fiscal years for individual investigators, groups, centers, and user facilities can be supplemented by the programs. The NSF award database can be accessed from www.nsf.gov/nano .

B. Sensors and Wireless Sensor Networks, FY 2014 – FY 2015

The participating directorates and offices are: Biological Sciences (BIO), Computer and Information Sciences and Engineering (CISE), Engineering (ENG), Geosciences (GEO), Mathematical and Physical Sciences (MPS), Social, Behavioral and Economic Sciences (SBE), Education and Human Resources (EHR), and Office of International & Integrative Activities (OIIA).

NSF grants generally support only expenses made by the U.S. universities for research and education, for U.S. participants in international interactions such as workshops, and for research visits abroad by U.S. students and faculty.

General information on NSF's core programs can be found at http://www.nsf.gov/funding/azindex.jsp, and on OIIA International programs at http://www.nsf.gov/dir/index.jsp?org=IIA.

NSF supports sensor and wireless sensor network research and education in FY 2014 and beyond through various programs. The following program directors may provide further information:

BIO:	Elizabeth Blood, eblood@nsf.gov
CISE:	Thyaga Nandgopal, tnandago@nsf.gov
ENG:	Jordan Berg, jberg@nsf.gov
	Bruce Hamilton, bhamilto@nsf.gov
	Massimo Ruzzene, mruzzene@nsf.gov
	Zhi Tian, ztian@nsf.gov
GEO:	Alexandra Isern, aisern@nsf.gov
SBE:	Robert O'Connor, roconnor@nsf.gov
OIIA:	Graham Harrison, gharriso@nsf.gov

International supplements: Awards made in previous fiscal years for individual investigators, groups, centers, and user facilities can be supplemented by the programs. The NSF award database can be accessed from www.nsf.gov.

C. Telecommunications Research, FY 2014 - FY 2015

The National Science Foundation supports a variety of programs directed towards telecommunications research and education. Areas of interest include: wireless devices, components, and networks; optics and photonics devices and networks; sensor devices and networks; signal processing; network architecture design, modeling and simulation; security; packaging, thermal management and energy; enhancing access to the radio spectrum, and future internet technology. Participating directorates and offices are Engineering (ENG), Computer and Information Sciences and Engineering, (CISE), and Office of International & Integrative Activities (OIIA). Participating directorates and offices accept proposals with an international component following a competitive selection process. NSF grants generally support only expenses made by the U.S. universities for research and education, for U.S. participants in international interactions such as workshops, and for research visits abroad by U.S. students and faculty.

General information on NSF's core programs can be found at http://www.nsf.gov/funding/azindex.jsp, and on OIA programs at http://www.nsf.gov/dir/index.jsp?org=IIA.

NSF supports telecommunications research and education in FY 2014 and beyond through various programs. The following program directors may provide further information:

ENG: Zhi Tian, ztian@nsf.gov
CISE: Thyaga Nandagopal, tnandago@nsf.gov
MPS: Tomas Gergely, tgergely@nsf.gov
OIIA: Graham Harrison, gharriso@nsf.gov

International supplements: Awards made in previous fiscal years for individual investigators, groups, centers, and user facilities can be supplemented by the programs. The NSF award database can be accessed from www.nsf.gov.

D. Energy and Sustainability, FY 2014 – FY 2015

The National Science Foundation supports fundamental research and education that underpins the development of innovative solutions to pressing problems in sustainability, especially research on sustainable and renewable energy technologies. This includes conceptual, theoretical, empirical, and computational research needed to further develop the basic science, engineering, education, and policy knowledge base, as well as address the coupled problems of sustainability - dealing directly with the energy-economy-environment dilemma - at both the individual factor and systems level. NSF's unique mandate to support all areas of science, engineering and science education allows it to fund research that will tackle complex system level problems of sustainability. Also included is research to investigate the fundamental role that social, economic, and political systems play in creating and addressing major issues in sustainability.

All participating research and education directorates and International Science and Engineering accept proposals with an international component following a competitive selection process. NSF grants generally support only expenses made by the U.S. universities for research and education, for U.S. participants in international interactions such as workshops, and for research visits abroad by U.S. students and faculty.

The participating directorates and offices are: Biological Sciences (BIO), Computer and Information Sciences and Engineering (CISE), Engineering (ENG), Geosciences (GEO), Mathematical and Physical Sciences (MPS), Social, Behavioral and Economic Sciences (SBE), Education and Human Resources (EHR), and Office of International & Integrative Activities (OIIA).

General information about Energy and Sustainability specific programs can be found on http://www.nsf.gov/sees, on NSF's core programs on http://www.nsf.gov/funding/azindex.jsp, and on OIIA International programs on http://www.nsf.gov/dir/index.jsp?org=IIA.

NSF supports energy and sustainability in FY 2014 and beyond through various programs. The following program directors may provide further information:

BIO: Linda Deegan, ldeegan@nsf.gov
CISE: Krishna Kant, kkant@nsf.gov
ENG: Bruce Hamilton, bhamilto@nsf.gov
GEO: Eve Gruntfest, egruntfe@nsf.gov
MPS: Kathy Covert, kcovert@nsf.gov
SBE: Kelley Crews, kcrews@nsf.gov
EHR: Alphonse DeSena, adensena@nsf.gov
OIIA: Graham Harrison, gharriso@nsf.gov

International supplements: Awards made in previous fiscal years for individual investigators, groups, centers, and user facilities can be supplemented by the programs. The NSF award database can be accessed from www.nsf.gov.

E. International Science and Engineering (OIIA/ISE)

NSF's International Science and Engineering (ISE) Section serves as NSF's focal point for international science and engineering activities. ISE supports – either through its own programs or working with the other NSF directorates and offices – innovative awards and supplements that promote research excellence through new international collaboration and that develop the next generation of globally engaged scientists and engineers. ISE funds international research and education activities in all NSF-supported disciplines involving any region of the world. Researchers interested in international collaboration should consult both disciplinary and OISE program officers. The ISE Home Page is: http://www.nsf.gov/od/iia/ise/index.jsp .

NSF grants generally support only expenses made by the U.S. universities for research and education, for U.S. participants in international interactions such as workshops, and for research visits abroad by U.S. students and faculty.

Relevant OISE programs in FY 2014 include:

Catalyzing New International Collaborations (CNIC) (NSF 12/573): http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=12815

- CNIC awards support international planning visits that are intended to result in submission of a full research proposal to NSF.

International Research Experiences for Students (NSF 12-551): http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=12831

- Enable faculty at US institutions to organize international research experiences for US undergraduate and graduate students. (Proposal Deadline: August 20 and Annually Thereafter.)

It is expected that this MOU may be modified only by written agreement of the Participants.

It is also expected that the Participants can discontinue their activities under this MOU with 90 days advance written notice of termination by either Participant, or sooner by mutual written consent of the Participants.

Date activities commence: 29th day of September, 2014.

Pramod Khargonekar
Assistant Director, Directorate for Engineering, National Science Foundation

Mark Ferguson
Director General, Science Foundation Ireland

Carol Keery
Director of Innovation, Research and Technology, Invest Northern Ireland

pp **Nuala Kerr**
Director of Higher Education, Department for Employment and Learning