

Cyberlearning and Future Learning Technologies (Cyberlearning)

PROGRAM SOLICITATION

NSF 14-526

REPLACES DOCUMENT(S):

NSF 11-587



National Science Foundation

Directorate for Computer & Information Science & Engineering

Directorate for Education & Human Resources

Directorate for Social, Behavioral & Economic Sciences

Directorate for Engineering

Letter of Intent Due Date(s) (*required*) (due by 5 p.m. proposer's local time):

May 12, 2014

Second Monday in May, Annually Thereafter

Letter of Intent: Integration (INT) Projects only

Full Proposal Deadline(s) (due by 5 p.m. proposer's local time):

March 19, 2014

Exploration Projects (EXPs)

March 24, 2014

Development and Implementation Projects (DIPs)

July 14, 2014

Second Monday in July, Annually Thereafter

Integration Projects (INTs)

December 19, 2014

Third Friday in December, Annually Thereafter

Exploration Projects (EXPs)

January 19, 2015

Third Monday in January, Annually Thereafter

Development and Implementation (DIPs)

Full Proposal Target Date(s):

March 28, 2014

Last Friday in March, Annually Thereafter

Capacity-Building Projects (CAPs)

July 25, 2014

Last Friday in July, Annually Thereafter

Capacity-Building Projects (CAPs)

December 01, 2014

First Monday in December, Annually Thereafter

Capacity-Building Projects (CAPs)

IMPORTANT INFORMATION AND REVISION NOTES

Revision Summary

This solicitation replaces [NSF 11-587](#). The solicitation has been revised in the following ways. Additional details about each can be found in the body of the solicitation.

New name: The new program name, *Cyberlearning and Future Learning Technologies*, reflects the program's aims: learning how to design and effectively use the learning technologies of the future (Future Learning Technologies) and understanding processes involved in learning when learners can have experiences that only technology allows (Cyberlearning).

Limit on number of proposals per PI or co-PI: An individual may participate as PI or co-PI in no more than a total of two EXP, DIP, and INT proposals in any fiscal year and may participate in at most 1 INT proposal as PI or co-PI.

Change of Full-Proposal Deadlines and Target Dates:

- **Exploration Projects (EXPs):** due late March, 2014 and mid-December, 2014 through 2016
- **Development and Implementation Projects (DIPs):** due late March, 2014 and mid-January, 2015 through 2017
- **Capacity-Building Projects (CAPs):** target dates are late March, late July, and early December each year through July, 2017

Proposal requirements: Every project should address three thrusts: Innovation, Advancing understanding of how people learn in technology-rich learning environments, and Promoting generalizability and transferability of the newly proposed technological genre. The proposed innovation should be a new type or configuration of learning technologies rather than a particular application or tool. It is expected that these three parts of every proposal will be interconnected. See Section II. Program Description.

Methodology: Proposers are encouraged to make use of the *Common Guidelines for Education Research and Development*, published jointly by the National Science Foundation and the Institute of Education Sciences in the U.S. Department of Education, in developing their research methodology. See Subsection "PROPOSAL REQUIREMENTS: Methodology" in Section II. Program Description.

Integration Projects: The largest projects, which were named "Integration and Deployment Projects (INDP)" in the past are now named "Integration Projects (INT)." Their purpose is to integrate several technologically-sophisticated efforts that have already shown promise, incorporate promising technologies and their uses into the lives of learners or organizations, or extend a promising innovation in ways that would allow it to be used by a larger population or variety of learners, and to answer foundational research questions related to learning that can only be answered in the context of an integration such as that proposed; these ARE NOT scale-up projects or effectiveness studies. See Subsection "PROPOSAL CATEGORIES" in Section II. Program Description.

Clarifications: The following clarifications have been made in the solicitation document.

- Descriptions of the Program Goals has been clarified and more succinctly described. See Section II. Program Description.
- Descriptions of the project categories have been clarified and more succinctly described. See Subsection "PROPOSAL REQUIREMENTS" in Section II. Program Description. For details about what is expected for each project type, see also the Subsection "PROPOSAL CATEGORIES" in Section II. Program Description.
- The expertise required on project teams and advisory boards has been spelled out in greater detail. See the subsection "PROPOSAL REQUIREMENTS: Project teams and advisory boards" in Section II. Program Description for general guidelines. For specific guidelines for each project type, see the Subsection "PROPOSAL CATEGORIES" in Section II. Program Description.
- The additional solicitation-specific review criteria have been revised. See the Subsection "Additional Solicitation Specific Review Criteria" in Section VI. NSF Proposal Processing and Review Procedures.
- Clarification of the role of diagrams and screen shots allowed in supplementary materials has been added. Proposers are *strongly encouraged* to include the five diagrams or screen shots in the supplementary materials to give readers a chance to understand how learners will experience the proposed technology. See the Subsection "Supplementary Documents" in Section V., Subsection A. Proposal Preparation Instructions.

Collaboration and Management Plan: A Collaboration and Management Plan is required in all proposals. It should detail how the collaborative team will interact to ensure that issues of learning, technology, and context are considered from the beginning. Collaboration and Management Plans may be up to 3 pages long and should be submitted as *Supplementary Documents*. For details, see Section V., Subsection A. Proposal Preparation Instructions.

Required Advisory Board: Each *Cyberlearning and Future Learning Technologies* project is required to have and make use of an advisory board with two types of advisors: participants who complement the expertise of the PIs and senior personnel and can provide advice about design, implementation, and analysis, and participants who have enough distance from the project to contribute to critical review. Advisory board reviews should be included in Annual and Final Reports.

Additional References: Additional references related to the solicitation are cited. See the Subsection "REFERENCES" in Section II. Project Description.

Any proposal submitted in response to this solicitation should be submitted in accordance with the revised NSF Proposal & Award Policies & Procedures Guide (PAPPG) ([NSF 15-1](#)), which is effective for proposals submitted, or due, on or after December 26, 2014. The PAPPG is consistent with, and, implements the new Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards (Uniform Guidance) (2 CFR § 200).

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

Cyberlearning and Future Learning Technologies

Synopsis of Program:

The purpose of the *Cyberlearning and Future Learning Technologies* program is to integrate opportunities offered by emerging technologies with advances in what is known about how people learn to advance three interconnected thrusts:

- **Innovation:** inventing and improving next-generation genres (types) of learning technologies, identifying new

means of using technology for fostering and assessing learning, and proposing new ways of integrating learning technologies with each other and into learning environments to foster and assess learning;

- **Advancing understanding of how people learn in technology-rich learning environments:** enhancing understanding of how people learn and how to better foster and assess learning, especially in technology-rich learning environments that offer new opportunities for learning and through data collection and computational modeling of learners and groups of learners that can be done only in such environments; and
- **Promoting broad use and transferability of new genres:** extracting lessons from experiences with these technologies that can inform design and use of new genres across disciplines, populations, and learning environments; advancing understanding of how to foster learning through effective use these new technologies and the environments they are integrated into.

The intention of this program is to advance technologies that specifically focus on the experiences of learners; innovations that simply focus on making teaching easier will not be funded. Proposals that focus on teachers or facilitators as learners are invited; the aim in these proposals should be to help teachers and facilitators learn to make the learning experiences of learners more effective.

Proposals are expected to address all three of the program's thrusts. Of particular interest are technological advances that (1) foster deep understanding of content coordinated with masterful learning of practices and skills; (2) draw in and encourage learning among populations not served well by current educational practices; and/or (3) provide new ways of assessing understanding, engagement, and capabilities of learners. It is expected that research funded by this program will shed light on how technology can enable new forms of educational practice. This program does not support proposals that aim simply to implement and evaluate a particular software application or technology in support of a specific course.

Awards will be made in three research categories, each focusing on a different stage of research and development: Exploration (EXP), Design and Implementation (DIP), and Integration (INT). The program will also support small Capacity-Building Projects (CAP), e.g., conferences, workshops, and partnership-building activities, and will continue to participate in NSF's Foundation-Wide programs: EAGER, RAPID, INSPIRE, and CAREER.

Cognizant Program Officer(s):

Please note that the following information is current at the time of publishing. See program website for any updates to the points of contact.

- Chris Hoadley, Program Officer, EHR/DRL and CISE/IIS, telephone: 703-292-7906, email: choadley@nsf.gov
- John Cherniavsky, Program Officer, EHR/DRL, telephone: 703-292-5136, email: jchernia@nsf.gov
- Tanya Korelsky, Program Officer, CISE/IIS, telephone: 703-292-8930, email: tkorelsk@nsf.gov
- Kevin Lee, telephone: (703) 292-4639, email: kelee@nsf.gov
- Robert Russell, telephone: (703) 292-2995, email: rrussel@nsf.gov
- Kamau Bobb, telephone: (703) 292-4291, email: kbobb@nsf.gov
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- Glenn Larsen, Program Officer, ENG/IIP/EFRI, telephone: 703-292-4607, email: glarsen@nsf.gov

Applicable Catalog of Federal Domestic Assistance (CFDA) Number(s):

- 47.041 --- Engineering
- 47.070 --- Computer and Information Science and Engineering
- 47.075 --- Social Behavioral and Economic Sciences
- 47.076 --- Education and Human Resources

Award Information

Anticipated Type of Award: Standard Grant or Continuing Grant

Estimated Number of Awards: 21 to 34 Contingent upon availability of funds, up to \$18 million will be available in FY 2014 to fund proposals submitted in response to this solicitation. The intention is to fund 9 to 12 EXPs, 5 to 8 DIPs, 1 to 2 INTs, and 6 to 12 CAPs during FY 2014 in addition to participating in NSF's EAGER, INSPIRE, CAREER, and other Foundation-Wide programs. Funding in later years will be contingent on availability of funds in those years.

Anticipated Funding Amount: \$18,000,000

Eligibility Information

Who May Submit Proposals:

The categories of proposers eligible to submit proposals to the National Science Foundation are identified in the Grant Proposal Guide, Chapter I, Section E.

Who May Serve as PI:

There are no restrictions or limits.

Limit on Number of Proposals per Organization:

There are no restrictions or limits.

Limit on Number of Proposals per PI or Co-PI: 2

An individual may participate as PI or Co-PI in **no more than a total of two (2)** EXP, DIP, and INT proposals in any fiscal year (October to September), of which **at most one (1)** may be in the Integration (INT) category. **These eligibility conditions will be strictly enforced in order to treat everyone fairly and consistently.** In the event that an individual exceeds this limit, proposals will be accepted based on earliest date and time of proposal submission. Proposals that exceed the limit will be returned without review. **No exceptions will be made.**

It is expected that PIs and co-PIs will participate in no more than one CAP at a time; prospective PIs should talk to a Program Officer for permission to participate in more than one CAP.

Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions

- **Letters of Intent:** Submission of Letters of Intent is required. Please see the full text of this solicitation for further information.
- **Preliminary Proposal Submission:** Not required
- **Full Proposals:**
 - Full Proposals submitted via FastLane: NSF Proposal and Award Policies and Procedures Guide, Part I: Grant Proposal Guide (GPG) Guidelines apply. The complete text of the GPG is available electronically on the NSF website at: http://www.nsf.gov/publications/pub_summ.jsp?ods_key=gpg.
 - Full Proposals submitted via Grants.gov: NSF Grants.gov Application Guide: A Guide for the Preparation and Submission of NSF Applications via Grants.gov Guidelines apply (Note: The NSF Grants.gov Application Guide is available on the Grants.gov website and on the NSF website at: http://www.nsf.gov/publications/pub_summ.jsp?ods_key=grantsgovguide)

B. Budgetary Information

- **Cost Sharing Requirements:** Inclusion of voluntary committed cost sharing is prohibited.
- **Indirect Cost (F&A) Limitations:** Not Applicable
- **Other Budgetary Limitations:** Not Applicable

C. Due Dates

- **Letter of Intent Due Date(s) (required)** (due by 5 p.m. proposer's local time):
 - May 12, 2014
 - Second Monday in May, Annually Thereafter
 - Letter of Intent: Integration (INT) Projects only
- **Full Proposal Deadline(s)** (due by 5 p.m. proposer's local time):
 - March 19, 2014
 - Exploration Projects (EXPs)
 - March 24, 2014
 - Development and Implementation Projects (DIPs)
 - July 14, 2014
 - Second Monday in July, Annually Thereafter
 - Integration Projects (INTs)
 - December 19, 2014
 - Third Friday in December, Annually Thereafter
 - Exploration Projects (EXPs)
 - January 19, 2015
 - Third Monday in January, Annually Thereafter
 - Development and Implementation (DIPs)
- **Full Proposal Target Date(s):**
 - March 28, 2014
 - Last Friday in March, Annually Thereafter
 - Capacity-Building Projects (CAPs)
 - July 25, 2014

Last Friday in July, Annually Thereafter

Capacity-Building Projects (CAPs)

December 01, 2014

First Monday in December, Annually Thereafter

Capacity-Building Projects (CAPs)

Proposal Review Information Criteria

Merit Review Criteria: National Science Board approved criteria. Additional merit review considerations apply. Please see the full text of this solicitation for further information.

Award Administration Information

Award Conditions: Additional award conditions apply. Please see the full text of this solicitation for further information.

Reporting Requirements: Standard NSF reporting requirements apply.

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I. INTRODUCTION

The purpose of the **Cyberlearning and Future Learning Technologies (Cyberlearning)** program is to integrate opportunities offered by emerging technologies with advances in what is known about how people learn to further design of the next generation of learning technologies and increase understanding of how people learn in technology-rich learning environments.

The program's purpose derives from a multi-part vision:

- New and emerging technologies have the potential to expand and transform learning opportunities, learning interests, and learning outcomes in all phases of life, making it possible for learning opportunities to be tailored to the interests, needs, and resources of individual learners and groups of learners. This includes populations who are not reached well by current educational resources (nationally and world-wide).
- The best technological genres and socio-technical systems designed for these purposes will be informed by what is known about how people learn, how to foster learning, and design and implementation of environments for productive learning.
- With these systems in place, the opportunity exists to make significant progress in formulating a cutting-edge understanding of learning that aims towards predictive computational models of individual and group learning in real-world learning environments.

The program has two goals: (1) to invent, explore, and learn to effectively use the new technologies that will address society's educational goals and (2) to advance understanding of how people learn and how to better foster learning in the context of the new kinds of learning experiences that technology makes possible.

To achieve these goals, NSF invites proposals that integrate advances in what is known about how people learn with the opportunities

offered by emerging technologies to address three interconnected thrusts:

- **Innovation:** inventing and improving next-generation genres (types) of learning technologies, identifying new means of using technology for fostering and assessing learning, and proposing new ways of integrating learning technologies with each other and incorporating them into learning environments to foster and assess learning;
- **Advancing understanding of how people learn in technology-rich learning environments:** enhancing understanding of how people learn and how to better foster and assess learning, especially in technology-rich learning environments that offer new opportunities for learning and through data collection and computational modeling of learners and groups of learners that can be done only in such environments; and
- **Promoting broad use and transferability of new genres:** extracting lessons from experiences with these technologies that can inform design and use of new genres across disciplines, populations, and learning environments; advancing understanding of how to foster learning through effective use of these new technologies and the environments they are incorporated into.

II. PROGRAM DESCRIPTION

The answers to several critical and timely questions that have arisen from previously-funded NSF projects and programs will enable new designs and uses of technology for fostering and assessing learning. Projects that help answer one or more of these sets of questions are encouraged:

- *What new technology and socio-technical models are needed to capitalize on the interests and leverage the cognitive, cultural, social, language and developmental resources of different learners and populations of learners so as to draw in learners who might not be reached without those innovations, and help all learners learn more deeply than they would otherwise? How and under what conditions, can these new models be effectively executed, and what makes them work? What can be learned about learning processes and influences on learning by examining the effects with and of these new technologies?*
- *What new technology and socio-technical models are needed to help learners develop new interests, deepen their understanding of complicated concepts and phenomena, and foster their learning of complex practices and skills? How and under what conditions can these new models be effectively executed, and what makes them work? What can be learned about learning processes and influences on learning by examining the effects with and of these new technologies?*
- *What new technology and socio-technical models are needed so that the big data generated by scientists and engineers can be made available and accessible to learners at all levels in ways that will engage them and help them learn? Under what conditions do these approaches work and why? What can be learned about learning processes and influences on learning by examining the effects with and of these new technologies?*
- *What new technology and socio-technical models for blended and on-line education are needed to foster deep understanding and masterful capabilities? How and under what conditions can these new models be effectively executed, and what makes them work? What can be learned about learning processes and influences on learning by examining the effects with and of these new technologies?*
- *What new models for educating will emerge from integrating learning technologies with each other or incorporating them into the lives of learners, communities, or organizations? What new technological models and platforms are needed to support such new models? Under what conditions do these new models work well and why? What can be learned about learning processes and influences on learning by examining the effects with and of these new technologies?*
- *What data need to be collected, how can they be collected, and how should the data be analyzed to assess, foster, and understand learning? How can such analysis and the models that come from these analyses be used to tailor learning experiences and to inform learners, educators and educational institutions? What can be learned about learning processes and influences on learning by examining the effects with and of these new technologies?*

The technological focus of the Cyberlearning program is on *design and exploration of new types, or "genres," of learning technologies* that can be used to achieve the ambitious goals referred to in the questions. A "technological genre," is a *type or category of learning technology or a new type of configuration of learning technologies rather than a particular application or tool.* The "socio-technical" systems of interest are the combination of social and technological infrastructures and environments that support learning and assessment. Other NSF programs (e.g., DRK-12, AISL) support design of resources, tools, and models for learning particular content and skills; the Cyberlearning program will fund projects that imagine the new types of technological resources, tools, and models that might be used to foster and assess learning as emerging technologies become more available and capable. Proposed new genres may be designed for formal or informal learning environments and may represent new technologies, new ways of using technology, or new types of socio-technical systems. **The resources, tools, and models developed as part of Cyberlearning projects should serve as exemplars from which more broadly applicable and transferable knowledge about design and use of learning technologies can be extracted.**

It is expected that research and development plans will draw on the most up-to-date scholarly literature on how people learn and the uses of technology to foster learning. "How people learn" refers to cognitive, neurobiological, behavioral, cultural, social, volitional, epistemological, developmental and other processes involved in individual learning, the processes by which communities increase their understanding and capabilities, and influences on those processes. "Fostering learning" refers to providing whatever help learners need to advance their understanding and capabilities. This might include helping learners better understand difficult concepts and become masterful at skills and helping learners recognize when that understanding and those skills are applicable and knowing how to use them, become interested in learning particular content and skills, become excited about learning, make connections between what they are learning and the world they live in, and identify what they are interested in. "Assessing learning" is also broadly defined, meaning interpretation of what learners understand, are capable of, and are feeling, among other things. Some assessment might be done automatically by technology, while other assessment will require technology and people to work together. Assessment might be done by computers along with teachers or mentors, or it might be done by computers along with learners themselves or groups of learners. The results of assessment are useful only to the extent that they are presented well to those who need to use those results, and designing new ways of helping teachers and learners interpret assessment results is included in the ambitious goals of this program.

Proposed technological innovations should focus primarily on the experiences of learners; innovations that simply focus on making teaching easier will not be funded. Proposals that focus on teachers or facilitators as learners are invited; the aim in these proposals should be to help teachers and facilitators learn to make the learning experiences of learners more effective.

Cyberlearning and Future Learning Technologies awards will be made in three categories, each focusing on a different stage of research and development: Exploration (EXP), Design and Implementation (DIP), and Integration (INT). Exploration (EXP) projects are for the purpose of exploring the feasibility of a proposed technological innovation. It is appropriate, in an EXP project, to try out new ideas, especially risky ones, and explore issues associated with fostering or assessing learning in the context of the proposed innovation. Design and Implementation (DIP) projects are for further ascertaining the potential of a new or emerging technological genre, developing guidelines for its use in support of learning, assessment, and/or engagement, and answering foundational research questions about learning processes and influences. Integration (INT) projects are for integrating or extending the use of one or more technologically-

sophisticated efforts that have already shown promise and answering foundational research questions related to learning that can only be answered in the context of an integration such as that proposed. The program will also support Capacity-Building Projects (CAPs), including conferences, workshops, and partnership-building activities that are aimed towards addressing important Cyberlearning issues. Note that Integration (INT) projects ARE NOT scale-up projects or effectiveness studies.

PROPOSAL REQUIREMENTS:

Every proposal is expected to address all three of the program's thrusts: innovation, advancing understanding of learning in technology-rich learning environments, and promoting generalizability and transferability of new technological genres. While the three thrusts are listed separately, it is important to note that they are highly interconnected, and *it is expected that these three parts of every proposal will be interconnected*. Technological innovations, for example, are expected to address some important societal challenge or take advantage of some forward-looking technology opportunity, be informed by what is known about how people learn, and be aimed at strengthening and improving our understanding of how learning happens or how to foster learning or encourage and sustain engagement. Similarly, research activities in support of advancing understanding of learning and promoting generalizability and transferability of new types of learning technologies may be highly interconnected.

While it is essential that proposed innovations have the potential to improve significantly on the *status quo*, proposals do not have to address any particular content, populations, or learning environments. There are no requirements for coverage of any particular content or skills, though support of learning in areas supported by NSF is encouraged. Learners may be of any age, and targeted learning environments may be formal or informal, traditional or non-traditional, collaborative or individual, or may combine or bridge several different types of learning venues.

In the following sections, general requirements for all proposals are presented, followed by sections that list specific requirements for proposals in each category. The *Other Information* subsection includes advice about incorporating suggestions from the joint NSF/Department of Education publication *Common Guidelines for Education Research and Development*. Section V. A, *Proposal Preparation Instructions*, includes more specific information about organizing proposals and what to include in each section.

The Three Interconnected Thrusts

1. Innovation

The proposed innovation may be *technological*, advancing some new or emerging genre (type) of learning technology or exploring new ways of using technologies for learning or assessment, or coherently integrating such technologies with each other; or it may be *socio-technical*, representing a new or emerging type of technologically-rich learning environment.

Proposed innovations should be informed by the substantial literatures on how people learn, how to foster deep learning, and the uses of extant technology in fostering learning. (Examples of such literature can be found in the citations listed in this solicitation.)

Proposed projects should produce a "minimally viable product" that will allow PIs to understand how to design and use the new type of innovation, answer research questions, and extract guidelines on scalability and transferability. See the PROPOSAL CATEGORIES subsection for details about the minimally-viable products expected for each proposal type.

Formative analyses and iterative refinement over the years of the proposed project should be aimed at making the innovation better able to achieve the proposed goals. Some of the data collected and analyzed during each iteration should produce evidence of the effectiveness of the innovation. No outside evaluator is required for carrying out formative analyses and iterative refinements. However, advisory boards should be used to help with critical review and analysis and to improve the quality of findings. The number of planned iterations should be commensurate with the complexity of what needs to be learned in moving the genre forward.

Note that incremental advances in existing technologies **will not** be funded through this program; rather, proposals must aim to lay the foundations for designing or refining new and emerging genres of learning technologies. As stated earlier, the intention of this program is to advance technologies that specifically focus on the experiences of learners. Innovations that *simply* focus on making teaching easier will not be funded, but projects that focus on helping teachers or facilitators learn to make learning more effective and engaging for the learners they work with are appropriate for this program.

2. Advancing understanding of how people learn in technology-rich learning environments

It is expected that each proposal will include an explicit set of foundational research questions that, when answered, will advance understanding of processes involved in learning (e.g. neurobiological, behavioral, cognitive, cultural, social, epistemological, and/or developmental) and/or how to foster or assess learning, along with a plan for answering or exploring the answers to these questions. *In general, these will be research questions that can only be answered in the context of use of the new type of technology or learning environment*. Questions may be about development of understanding or capabilities, processes involved in learning, influences on learning, how to foster learning, or how to assess learning. Note that these questions are distinct from evaluation questions. Foundational research questions should be explanatory, uncovering why, how, to what extent, or under what circumstances phenomena occur. Their answers should contribute new understandings that endure beyond the proposed implementation.

The required research component is different for each proposal category. See the PROPOSAL CATEGORIES subsection for details about the depth and breadth of research expected for each proposal type.

No particular methodologies are required for answering research questions; rather research methodology and data collection should be chosen to answer the important questions PIs are seeking to answer.

3. Promoting broad use and transferability of the new genre

Promoting broad use and transferability means extracting guiding principles that others can use to develop applications of the new type of technology or learning environment that can be used across different populations, disciplines, and learning environments, thereby allowing it to fulfill its transformative potential. *PIs are expected to view their new technology or learning environment as representative of a genre and to extract lessons from their experiences with the innovation that transcend the project itself and will be applicable in other circumstances*. See the PROPOSAL CATEGORIES subsection for details about what expectations for particular proposal types.

Methodology:

The National Science Foundation and the Institute of Education Sciences in the U.S. Department of Education have released a collaborative publication, *Common Guidelines for Education Research and Development*. The *Guidelines* describe six types of research studies that can generate evidence about how to increase student learning. Research types include those that generate the most fundamental understandings related to education and learning; examinations of associations between variables; iterative design and

testing of strategies or interventions; and assessments of the impact of a fully-developed intervention on an education outcome. For each research type, there is a description of the purpose and the expected empirical and/or theoretical justifications, types of project outcomes, and quality of evidence.

The *Guidelines* publication can be found on the NSF website with the number NSF 13-126 http://www.nsf.gov/pubs/2013/nsf13126/nsf13126.pdf?WT.mc_id=USNSF_124. A set of FAQs regarding the *Guidelines* are available with the number NSF 13-127 <http://www.nsf.gov/pubs/2013/nsf13127/nsf13127.pdf>. Grant proposal writers and PIs are encouraged to familiarize themselves with both documents and use the information therein to help in the preparation of their Cyberlearning proposals. Although the guidelines do not map directly onto the categories of Cyberlearning proposals, they may perhaps be helpful in framing the methodological logic of the proposed project.

Different types of Cyberlearning projects have different requirements for summative evaluation. In general, summative evaluations should not be done until a technology and the way it is used in the environment have been refined sufficiently to be confident that the technology will be used as expected. Summative evaluations are not required for EXP projects. Some summative evaluation should be done for DIP projects, but whether the summative evaluation includes a comparison will depend on the stage of the project. Significant summative evaluations should be planned for INT projects.

Project teams and advisory boards:

It is expected that all proposal teams will include appropriate interdisciplinary expertise. The project team (including PIs, senior personnel and supporting investigators, post-docs, advisory-board members, and others) should be appropriate for addressing proposed technical and research goals. Expertise in any area may exist in a single person or set of people working together, in PIs or among advisory board members.

Advisory boards are required and should include two types of advisors, some who complement the expertise of PIs and senior personnel and provide advice about design, implementation, and analysis; and some who have enough distance from the project to contribute to critical review.

Each project team should include expertise in how people learn and the targeted content, technology learners, and practices of educating in the targeted learning environment. It is especially important that each team have at least one key participant who is expert at design of learning experiences or several key participants whose complementary expertise supports sophisticated design of learning experiences.

It is essential that the voices of all team members be clearly apparent in the proposal. Teams that are not yet working together sufficiently to address all of the requirements of an EXP, DIP, or INT proposal should consider proposing a Capacity-Building Project (CAP) instead. More details about the different types of projects are included below. Also included is detail about the extent of interdisciplinary participation needed in each project type.

Every Cyberlearning proposal requires a Collaboration and Management Plan, included as a *Supplementary Document*. The plan may be up to 3 pages long and should be used to articulate the roles of all team members, why the proposed team is an appropriate one, the expertise each team member brings, how the team will work together, and how the integrated contributions of the members of each proposal team are greater than the sum of the contributions of each individual member of the team. *Proposal Preparation Instructions* in Section V.A has more detail on the specific requirements of Collaboration and Management Plans.

PROPOSAL CATEGORIES

As stated above, *Cyberlearning and Future Learning Technologies* awards will be made in three research categories, each focusing on a different stage of research and development: Exploration (EXP), Design and Implementation (DIP), and Integration (INT). The Cyberlearning program will also support Capacity-Building Projects (CAPs). The table below summarizes the purposes and prerequisites of each project category. Some detail about each type was summarized above; a fuller set of requirements for each type can be found below the table.

Project Type	Due Dates	Budget and Duration	Characteristics and Requirements
Exploration (EXP)	late March, 2014, mid-December, 2014 through 2016	\$550,000 over 2 to 3 years; \$750,000 in extraordinary circumstances; a program officer must be asked	Purpose: to explore the feasibility of a technological innovation, to try out new ideas, especially risky ones, and to explore issues associated with learning in the context of the proposed innovation Prerequisites: team with a shared vision that takes into account what is known about how people learn, learning in the targeted domain, use of technology for such learning, and challenges to technology use
Development and Implementation (DIP)	mid-March, 2014 and mid-January, 2015 through 2017	\$1,350,000 over 3 to 4 years	Purpose: to ascertain the potential of a new or emerging technological genre, develop guidelines for its use in support of assessment, learning, and/or engagement, and answer foundational research questions about learning. Prerequisites: same as EXP plus completed work equivalent to one or more Cyberlearning EXP projects
Integration (INT)	July 15, 2014 and mid-July in 2015, 2016, and 2017, with Letters of Intent due in early May of each year	\$2,500,000 over 4 to 5 years	Purpose: to coherently integrate several emerging and/or developed technologies that have already shown promise, incorporate promising technologies and technology-enabled practices into the lives of learners or organizations, or extend a promising innovation in ways that would allow it to be used by a larger population or variety of learners, and answer foundational research questions related to learning that can only be answered in the context of an integration such as that proposed; <i>these are not scale-up projects or effectiveness studies.</i> Prerequisites: same as DIP plus completed work equivalent to two or more Cyberlearning DIP projects
Capacity Building (CAP)	early in December and middle of March and July of each year	varies	Purpose: partnership or team building, expanding and strengthening the cyberlearning community, strengthening ties between cyberlearning communities, moving new ideas to the fore, enhancing capabilities and/or vision of the cyberlearning community; might include, e.g., conferences, workshops, or short courses

Exploration Projects (EXP projects) explore the proof-of-concept or feasibility of a novel or innovative technology and use of such

technology for assessment or to promote learning; EXP projects are particularly suited to trying out new ideas, especially risky ones.

- *Prerequisites:* team with a shared vision that takes into account what is known about how people learn, learning in the targeted domain, use of the technology for such learning, and what is already known about effective use of the particular technologies being proposed, and challenges to technology effectiveness.
- *Innovation:* For EXP projects, the “minimally viable product” should be sufficient for exploring the feasibility of the new genre and identifying challenges to its effective use. EXP projects should include two or more cycles of iterative refinement and focus, at a minimum, on the usability of the technology, the ways learners are (effectively or not effectively) using it for learning or assessment, pathways towards engaging learners in sustained use, and challenges to effective use.
- *Advancing understanding of learning in technology-rich learning environments:* EXP projects should aim to *shed light* on the answers to foundational questions related to learning, learning with technology, linking learning and assessment, and/or learning in technology-rich environments or point the way towards focused fundamental research questions that can be addressed in the context of the proposed new genre.
- *Promoting broad use and transferability of the new genre:* EXP projects should focus on the affordances (opportunities offered) of the proposed innovation for fostering learning or automating assessment and challenges or barriers to its effective use. It is important to study the use of the innovation *in situ*, i.e., to get close to the learners and their interactions with the technology, in order to address these issues. Guidelines for effective design or use may or may not be extracted from EXP studies.
- *Methodology:* It is **not** expected that Exploration projects will include summative evaluations or comparative studies.
- *Project team:* Project teams should include, at a minimum, the expertise needed to successfully carry out the design and iterative refinement of the technology, identification of affordances and challenges to effective use of the new technology, and research that will shed light on answers to proposed research questions. The advisory board may also include people whose expertise will be needed in later phases of research and development.
- *Duration and funding:* 2 to 3 years and up to a total of \$550,000. With appropriate justification, some EXP projects may be funded for up to \$750,000. **Proposers should receive permission from a program officer before submitting a budget larger than \$550,000.**

Design and Implementation Projects (DIP projects) are for ascertaining the potential of a new or emerging genre, developing guidelines for its use in support of assessment, learning, and/or engagement, and answering foundational research questions about learning. These projects might advance understanding about how to more broadly or productively use a new or emerging genre that holds promise or how to coherently integrate several genres to create a new one. DIP research and development should be carried out in learners’ everyday environments, e.g., schools, homes, museums, parks, and the workplace.

- *Prerequisites:* Work equivalent to one or more *Cyberlearning* EXP projects should already be completed prior to applying for a DIP. The proposal should make clear the results of such previous efforts and how they inform the current proposal.
- *Innovation:* For DIP projects, the “minimally viable product” should allow defining the new genre and learning how to use it well, including incorporation into real-world learning environments, how to engage learners and sustain engagement, and adaptability possibilities and constraints. This means their designs should take into account real-world opportunities and constraints in the targeted learning environment, including the people and resources that might be available, and any needs for sustaining engagement over long periods of time. DIP projects should include three or more cycles of iterative refinement, with formative analyses focusing, at a minimum, on the usability of the technology, its effects on learning and/or engagement, and effective ways of incorporating use of the technology into activities in the learning environment, including good practices for fostering learning and means of engaging learners in the innovation’s sustained and effective use. Throughout the project’s duration, facilitation of learning and technology use should be done by those who would naturally be the facilitators in the chosen learning environment (e.g., teachers, mentors, parents, peers).
- *Advancing understanding of learning in technology-rich learning environments:* DIP projects should aim to answer foundational questions related to learning, learning with technology, linking learning and assessment, and/or learning in technology-rich environments that can be answered only in the context of the proposed new genre.
- *Promoting broad use and transferability of the new genre:* Data collection and analysis should be aimed towards uncovering guidelines or principles for effective design and/or use of the new or emerging genre, with attention given to identifying the range of applicability of those guidelines or principles. Analysis might also focus on identifying issues that will need to be addressed for sustainability and applicability to other populations, disciplines, or learning environments.
- *Methodology:* Summative analyses should be planned commensurate with the stage of development of the project; in some cases, a comparative analysis would make sense, and in other cases, it would be too early.
- *Project team:* In addition to the partners required for an EXP project, the team might include representatives of stakeholder groups to help the team plan towards broader use and/or organizations that will help with technology transfer in later phases of the project. The team should also include teachers and/or mentors who would normally take on leadership responsibilities in targeted environments. These teams must include, as primary participants in the project, one or more people who together bring expertise in designing learning experiences that result in deep understanding and masterful capabilities.
- *Duration and funding:* 3 to 4 years and up to a total of \$1,350,000.

Integration Projects (INT Projects) are for building on research and development that has already shown the promise of some new or emerging genre or set of technologies for fostering learning or advancing our understanding of learning. The new genres invented in INT projects might coherently integrate several emerging and/or developed technologies that hold promise, aim toward incorporating promising technologies or technology-enabled practices into the lives of learners or organizations, or extend a promising innovation in ways that allow it to be used by a larger variety of learner populations. Research and development should be carried out in the everyday environments in which people spend their lives. **INT projects ARE NOT scale-up projects or effectiveness studies.**

- *Prerequisites:* Work equivalent to two or more *Cyberlearning* DIP projects should be completed prior to applying for an INT. The proposal should make clear the results of such previous efforts and how they inform the current proposal.
- *Innovations:* The “minimally viable product” in INT projects should be aimed at issues important to designing and effectively using the new integrative genre. It is not expected that a product ready for dissemination will result from INT projects, however, as the work in these projects is on integration and not on developing individual pieces of the integrative genre, it is expected that at the end of an INT project, technology will be ready for technology transfer. Designs should take into account the broad range of issues important to successful learning and incorporation into learning environments, including what is known about processes involved in learning, how to engage and sustain engagement among learners, characteristics of targeted learner populations and targeted learning environments, and the preparation of those who will introduce and take on leadership responsibilities in fostering learning with the technology (e.g., teachers and mentors). INT projects should include multiple cycles of iterative refinement, as appropriate to the project, and formative analyses should focus on usability, learning, effective use, and sustained use. As with DIP projects, throughout the project’s duration, facilitation of technology use should be done by those who would naturally be the facilitators in the chosen learning environment (e.g., teachers, mentors, parents, peers).
- *Advancing understanding of learning in technology-rich learning environments:* INTs will address **a variety of foundational research questions** related to learning, learning with technology, linking learning and assessment, and/or learning in technology-rich environments **that can be addressed only in the context of an integration such as that proposed.** In general, the research questions to be addressed in INT projects will aim towards understanding some learning ecosystem or set of learning ecosystems, the development expected in those environments, and/or influences on achieving deep understanding or masterful capabilities in the integrative context of the new type of learning ecosystem.
- *Promoting generalizability and transferability of the new genre:* Data collection and analysis should be aimed as in DIP projects,

and in addition, toward identifying challenges or barriers to productive integration or incorporation into learning environments, and questions that must be answered or issues that must be addressed for successful scale-up, adaptability, sustainability, and/or long-term efficacy.

- **Methodology:** Summative analyses should be planned for INT projects.
- **Project team:** INT projects are expected to be wide-reaching enough that they require highly-interdisciplinary and highly-collaborative teams from across organizations, including the types of collaborators listed above and also collaborators who can advise about scale-up, adaptability, technology transfer, and/or sustainability issues. The team should include collaborators who can provide guidance in helping teachers or other facilitators learn to incorporate the technology into learning activities. This will require, for many projects, partnerships with school systems, private-sector companies, non-profit organizations or other potential stakeholder groups.
- **Duration and funding:** 4 to 5 years and up to \$2,500,000 total.

Capacity-Building Projects (CAPs) may be submitted as proposals or as supplements to funded projects. These projects are for the purpose of partnership or team building, expanding the cyberlearning community and strengthening the capabilities of its new members, strengthening the ties between the several different cyberlearning communities, moving new ideas to the fore, and enhancing capabilities and/or vision of the cyberlearning community. CAP proposals will be considered throughout the year, with target dates in December, March, and July. **Proposers should contact a program officer before submitting CAP proposals.** CAPs may take any of several forms, including but not limited to the following:

- **Partnership-building activities:** the proposed project should support the development of partnerships or teams needed to develop a long-term *Cyberlearning and Future Learning Technologies* agenda. The projects will be funded for up to 1 year and \$50,000 total costs.
- **Conferences, workshops, and short courses:** Budgets should support capacity building for some sector of the cyberlearning research community and are expected to be consistent with the duration of the event and the number of participants, but the cost will normally not exceed a total of \$100,000 for up to two years. Proposed events should be well focused and related to the goals of the program. See NSF's Grant Proposal Guide (http://www.nsf.gov/pubs/policydocs/papguide/nsf13001/gpg_index.jsp) for additional information about conference and workshop proposals. **All conference, workshop, and short-course proposals should provide for an evaluation of the impact of the event to be conducted at least 12 months after the conference is completed.**

EAGER, RAPID, INSPIRE, and CAREER proposals may also be submitted to the Cyberlearning program. Instructions for each of these types of proposals can be found in NSF's *Grant Proposal Guide*. Submissions to the Cyberlearning program should be consistent with the program mission laid out in this document.

COOPERATION WITH THE CYBERLEARNING RESOURCE CENTER

The CIRCL center (Center for Innovative Research in Cyberlearning; circlcenter.org/) provides capacity-building aid to NSF's cyberlearning-related programs. CIRCL helps PIs collaborate to synthesize findings across NSF's cyberlearning portfolio, fosters national awareness of research contributions from NSF's cyberlearning portfolio, and helps build NSF's cyberlearning community through summits, envisioning and synthesis meetings, research-to-practice meetings, special interest meetings, and matchmaking facilitation. All *Cyberlearning and Future Learning Technologies* projects are required to share their findings with CIRCL, to participate in at least some of the meetings and in synthesis activities, and to be responsive to requests for information from other cyberlearning PIs and from CIRCL.

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III. AWARD INFORMATION

Anticipated Type of Award: Continuing Grant or Standard Grant

Estimated Number of Awards: 21 to 34 Contingent upon availability of funds, up to \$18 million will be available in FY 2014 to fund proposals submitted in response to this solicitation. The intention is to fund 9 to 12 EXPs, 5 to 8 DIPs, 1 to 2 INTs, and 6 to 12 CAPs during FY 2014 in addition to participating in NSF's EAGER, INSPIRE, CAREER, and other Foundation-Wide programs. Funding in later years will be contingent on availability of funds in those years.

Anticipated Funding Amount: \$18,000,000

Estimated program budget, number of awards and average award size/duration are subject to the availability of funds.

IV. ELIGIBILITY INFORMATION

Who May Submit Proposals:

The categories of proposers eligible to submit proposals to the National Science Foundation are identified in the Grant Proposal Guide, Chapter I, Section E.

Who May Serve as PI:

There are no restrictions or limits.

Limit on Number of Proposals per Organization:

There are no restrictions or limits.

Limit on Number of Proposals per PI or Co-PI: 2

An individual may participate as PI or Co-PI in **no more than a total of two (2)** EXP, DIP, and INT proposals in any fiscal year (October to September), of which **at most one (1)** may be in the Integration (INT) category. **These eligibility conditions will be strictly enforced in order to treat everyone fairly and consistently.** In the event that an individual exceeds this limit, proposals will be accepted based on earliest date and time of proposal submission. Proposals that exceed the limit will be returned without review. **No exceptions will be made.**

It is expected that PIs and co-PIs will participate in no more than one CAP at a time; prospective PIs should talk to a Program Officer for permission to participate in more than one CAP.

V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions

Letters of Intent (required):

Submission of Letters of Intent is required for Integration Projects (INTs) ONLY.

Letter of Intent Preparation Instructions:

When submitting a Letter of Intent through FastLane in response to this Program Solicitation please note the conditions outlined below:

- Sponsored Projects Office (SPO) Submission is not required when submitting Letters of Intent
- Submission of multiple Letters of Intent is not allowed

Full Proposal Preparation Instructions: Proposers may opt to submit proposals in response to this Program Solicitation via Grants.gov or via the NSF FastLane system.

- Full proposals submitted via FastLane: Proposals submitted in response to this program solicitation should be prepared and submitted in accordance with the general guidelines contained in the NSF Grant Proposal Guide (GPG). The complete text of the GPG is available electronically on the NSF website at: http://www.nsf.gov/publications/pub_summ.jsp?ods_key=gpg. Paper copies of the GPG may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from nsfpubs@nsf.gov. Proposers are reminded to identify this program solicitation number in the program solicitation block on the NSF Cover Sheet For Proposal to the National Science Foundation. Compliance with this requirement is critical to determining the relevant proposal processing guidelines. Failure to submit this information may delay processing.
- Full proposals submitted via Grants.gov: Proposals submitted in response to this program solicitation via Grants.gov should be prepared and submitted in accordance with the NSF Grants.gov Application Guide: A Guide for the Preparation and Submission of NSF Applications via Grants.gov. The complete text of the NSF Grants.gov Application Guide is available on the Grants.gov website and on the NSF website at: (http://www.nsf.gov/publications/pub_summ.jsp?ods_key=grantsgovguide). To obtain copies of the Application Guide and Application Forms Package, click on the Apply tab on the Grants.gov site, then click on the Apply Step 1: Download a Grant Application Package and Application Instructions link and enter the funding opportunity number, (the program solicitation number without the NSF prefix) and press the Download Package button. Paper copies of the Grants.gov Application Guide also may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from nsfpubs@nsf.gov.

In determining which method to utilize in the electronic preparation and submission of the proposal, please note the following:

Collaborative Proposals. All collaborative proposals submitted as separate submissions from multiple organizations must be submitted via the NSF FastLane system. Chapter II, Section D.5 of the Grant Proposal Guide provides additional information on collaborative proposals.

See Chapter II.C.2 of the [GPG](#) for guidance on the required sections of a full research proposal submitted to NSF. Please note that the proposal preparation instructions provided in this program solicitation may deviate from the GPG instructions.

The following information SUPPLEMENTS (does not replace) the guidelines provided in the NSF Grant Proposal Guide (GPG) and the NSF Grants.gov Application Guide.

Proposal Titles: Proposal titles must begin with an acronym that indicates the category in which the proposal is being submitted, as follows:

EXP - Exploration Projects

DIP - Design and Implementation Projects

INT - Integration Projects

CAP - Capacity Building Projects

The acronym should be followed with a colon then the title of the proposed project. If you submit a proposal as one in a set of collaborative proposals, the title of your proposal should begin with the acronym that indicates the project category, followed by a colon, then "Collaborative Research" followed by a colon, and then the project title. For example, if you are submitting an Exploration Project, the title of each collaborative proposal would be "EXP: Collaborative Research: Project Title."

Project Summary: The Project Summary consists of an overview, a statement on the intellectual merit of the proposed activity, and a statement on the broader impacts of the proposed activity. Proposals that do not contain the Project Summary, including an overview and separate statements on intellectual merit and broader impacts will not be accepted by FastLane or will be returned without review.

Project Description: Project Descriptions should include the following:

1. *Vision and Goals.* (For EXP, DIP, and INT proposals, describe all of the following. For CAP proposals, include the following as appropriate.)

The proposal should clearly state the societal need or opportunity, its importance, along with investigators' big-picture vision of addressing that need through the proposed project. The vision should be justified by the relevant theories or learning and technological possibilities on which it is based. The proposal should present an overview of the proposed innovation and its role in the proposed vision, along with the research questions that will be addressed in the context of the proposed innovation and the issues of generalizability and transferability that will be addressed.

2. *The Innovation.* (for EXP, DIP, INT, and partnership-building CAP proposals)

Proposals should describe and justify the new or emerging technological genre or type of socio-technical system, describe the representative implementation that will be developed, and justify its appropriateness as a representative of the genre that will be generalizable to other implementations and serve as a venue for answering foundational research questions.

Proposals should make clear the initial proposed design of their innovation, the theories, literature, prior work, and practical issues that inform its design, how it will be integrated into the learning environment, the expected experience of learners and learning outcomes, and the means by which learning is expected to happen. Up to five extra screen shots or graphics are allowed in the supplementary materials to make the imagined experiences of learners clear to readers; PIs are encouraged to include such screen shots and to refer to those screen shots in the proposal text.

The plan for iterative refinement should be described, including the data that will be collected and analyzed in support of formative evaluation. Proposals should make clear how iterative refinements will be focused, the literature that informs that focus, and the ways the results from formative analyses will feed back into refinements of the innovation. The methodology for assessing effectiveness of the innovation (design, measures, data collection and analysis) should be described and justified. Measurement may be qualitative or quantitative, as appropriate to the targeted outcome goals and maturity of the innovation.

3. *Advancing understanding of learning in technology-rich learning environments.* (for EXP, DIP, INT, and partnership-building CAP proposals)

This section should include appropriate references to the literature, the foundational research questions, and a comprehensive research plan to answer them, including detailed articulation of the research design, measures, data collection, and analysis methods. It is important to distinguish between what is already known and what will be added to the literature.

4. *Promoting generalizability and transferability of the new genre.* (for EXP, DIP, INT, and partnership-building CAP proposals)

Proposals should identify (i) the practical issues that must be addressed in designing this new genre and what makes the proposed implementation ideal for addressing those issues, and conversely, where it falls short in achieving those goals and (ii) the lessons or types of lessons PIs expect to be able to extract from the iterative development of the innovation and the experiences of learners interacting with it. The importance of addressing the generalizability and transferability issues and plan to address those issues should be provided, justified by appropriate references to the literature on learning with technology. The plan should include detailed description of the data to be collected during iterations in technology development and how those data will be analyzed to extract lessons or guidelines that will be useful to others aiming to use or extend the genre.

5. *Prior Support*

Only prior support directly related to the proposed activities should be included. This section may be placed wherever it best fits the narrative of the Project Description.

6. *Summative evaluation*

Include your discussion of summative evaluation (if a summative evaluation will be done), wherever it best fits the narrative of the Project Description. The summative evaluation plan should be differentiated from the proposed foundational research on learning in technology-rich learning environments.

7. *Broader Impacts*

Per the GPG, the Project Description must contain, as a separate section within the narrative, a discussion of the broader impacts of the proposed activities. This section may be included wherever it best fits the narrative of the Project Description.

8. Dissemination

The proposal should include a creative communication strategy for reaching the set of audiences who will need to learn about the project's findings, including, where appropriate, scholars, practitioners, entrepreneurs, policy makers, and public audiences. While the potential results of the proposed research are expected to be of sufficient significance to merit peer-reviewed and broader publication, approaches that reach broader audiences are strongly encouraged. Proposals should identify the key elements of a communication plan, e.g., target audiences and identification of the channels/media/technologies appropriate for reaching specific audiences.

Special Information/Supplementary Documents: *The following supplementary documents are required* and should be uploaded into the Supplementary Documents Section. **No other supplementary materials are allowed.**

- *List of Project Personnel and Partner Institutions (Note - In collaborative proposals, only the lead institution should provide this information):* Provide current, accurate information for **all personnel and institutions involved in the project**. NSF staff will use this information in the merit review process to manage conflicts of interest. The list should include all PIs, Co-PIs, Senior Personnel, paid/unpaid Consultants or Collaborators, Sub awardees, Postdocs, and project-level advisory committee members. This list should be numbered, in alphabetical order by last name, and include for each entry (in this order) Full name, Organization(s), and Role in the project, with each item separated by a semi-colon. Each person listed should start a new numbered line. For example:
 1. Mary Adams; XYZ University; PI
 2. John Brown; University of PQR; Senior Personnel
 3. Jane Green; XYZ University; Postdoc
 4. Bob Jones; ABC Inc.; Paid Consultant
 5. Tim White; ZZZ University; Subawardee
- *Letters of commitment from participating personnel and institution (no other letters are allowed)*
- *Diagrams and/or screen shots (for EXP, DIP, and INT proposals):* Up to five (5) diagrams or screen shots that will help readers grasp the envisioned experiences of learners interacting with the proposed technological innovation. Short captions that name the diagram or screen shot and point to its essential elements are allowed; **additional textual material is not allowed with the diagrams.**
- *Collaboration and Management Plan:* A Collaboration and Management Plan is required for all *Cyberlearning and Future Learning Technologies* proposals. Proposals missing a Collaboration and Management Plan will be returned without review. Up to 3 pages are allowed for this plan. The plan should include all of the following:
 1. the collaborators, their expertise, and the specific roles of each in the proposed project; including specifics about how expertise required for the project is distributed across the team;
 2. how the project will be managed across all the investigators, institutions, and/or disciplines and across the active personnel and the advisory board;
 3. specific coordination mechanisms that will enable cross-investigator, cross-institution, and/or cross-discipline scientific integration (e.g., yearly workshops, graduate student exchange, project meetings at conferences, use of videoconferencing resources or social media technologies, software repositories, etc.); and
 4. references to budget line items that support collaboration and coordination mechanisms.
- *Postdoctoral Researcher Mentoring Plan:* Proposals that include funding to support postdoctoral researchers must include a Postdoctoral Researcher Mentoring Plan as a supplementary document. See Chapter II.C.2.j of the GPG for further information about the implementation of this requirement. Per the GPG, proposals that require this plan and do not include it will be returned without review.
- *Data Management Plan:* All proposals must include a data-management plan or assert the absence of the need for such a plan. A data-management plan specifies the procedures you will use for keeping, storing, and sharing **data** with other researchers. Data Management Plans should also include the method for making the data anonymous. FastLane will not permit submission of a proposal that is missing a Data Management Plan. The Data Management Plan will be reviewed as part of the intellectual merit or broader impacts of the proposal, or both, as appropriate. See Chapter II.C.2.j of the GPG for further information about the implementation of this requirement.

B. Budgetary Information

Cost Sharing: Inclusion of voluntary committed cost sharing is prohibited.

C. Due Dates

- **Letter of Intent Due Date(s) (required)** (due by 5 p.m. proposer's local time):
 - May 12, 2014
 - Second Monday in May, Annually Thereafter
 - Letter of Intent: Integration (INT) Projects only
- **Full Proposal Deadline(s)** (due by 5 p.m. proposer's local time):
 - March 19, 2014
 - Exploration Projects (EXPs)
 - March 24, 2014
 - Development and Implementation Projects (DIPs)
 - July 14, 2014

Second Monday in July, Annually Thereafter

Integration Projects (INTs)

December 19, 2014

Third Friday in December, Annually Thereafter

Exploration Projects (EXPs)

January 19, 2015

Third Monday in January, Annually Thereafter

Development and Implementation (DIPs)

- **Full Proposal Target Date(s):**

March 28, 2014

Last Friday in March, Annually Thereafter

Capacity-Building Projects (CAPs)

July 25, 2014

Last Friday in July, Annually Thereafter

Capacity-Building Projects (CAPs)

December 01, 2014

First Monday in December, Annually Thereafter

Capacity-Building Projects (CAPs)

D. FastLane/Grants.gov Requirements

For Proposals Submitted Via FastLane:

To prepare and submit a proposal via FastLane, see detailed technical instructions available at: <https://www.fastlane.nsf.gov/a1/newstan.htm>. For FastLane user support, call the FastLane Help Desk at 1-800-673-6188 or e-mail fastlane@nsf.gov. The FastLane Help Desk answers general technical questions related to the use of the FastLane system. Specific questions related to this program solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this funding opportunity.

For Proposals Submitted Via Grants.gov:

Before using Grants.gov for the first time, each organization must register to create an institutional profile. Once registered, the applicant's organization can then apply for any federal grant on the Grants.gov website. Comprehensive information about using Grants.gov is available on the Grants.gov Applicant Resources webpage: <http://www.grants.gov/web/grants/applicants.html>. In addition, the NSF Grants.gov Application Guide (see link in Section V.A) provides instructions regarding the technical preparation of proposals via Grants.gov. For Grants.gov user support, contact the Grants.gov Contact Center at 1-800-518-4726 or by email: support@grants.gov. The Grants.gov Contact Center answers general technical questions related to the use of Grants.gov. Specific questions related to this program solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this solicitation.

Submitting the Proposal: Once all documents have been completed, the Authorized Organizational Representative (AOR) must submit the application to Grants.gov and verify the desired funding opportunity and agency to which the application is submitted. The AOR must then sign and submit the application to Grants.gov. The completed application will be transferred to the NSF FastLane system for further processing.

Proposers that submitted via FastLane are strongly encouraged to use FastLane to verify the status of their submission to NSF. For proposers that submitted via Grants.gov, until an application has been received and validated by NSF, the Authorized Organizational Representative may check the status of an application on Grants.gov. After proposers have received an e-mail notification from NSF, Research.gov should be used to check the status of an application.

VI. NSF PROPOSAL PROCESSING AND REVIEW PROCEDURES

Proposals received by NSF are assigned to the appropriate NSF program for acknowledgement and, if they meet NSF requirements, for review. All proposals are carefully reviewed by a scientist, engineer, or educator serving as an NSF Program Officer, and usually by three to ten other persons outside NSF either as *ad hoc* reviewers, panelists, or both, who are experts in the particular fields represented by the proposal. These reviewers are selected by Program Officers charged with oversight of the review process. Proposers are invited to suggest names of persons they believe are especially well qualified to review the proposal and/or persons they would prefer not review the proposal. These suggestions may serve as one source in the reviewer selection process at the Program Officer's discretion. Submission of such names, however, is optional. Care is taken to ensure that reviewers have no conflicts of interest with the proposal. In addition, Program Officers may obtain comments from site visits before recommending final action on proposals. Senior NSF staff further review recommendations for awards. A flowchart that depicts the entire NSF proposal and award process (and associated timeline) is included in the GPG as [Exhibit III-1](#).

A comprehensive description of the Foundation's merit review process is available on the NSF website at: http://nsf.gov/bfa/dias/policy/merit_review/.

Proposers should also be aware of core strategies that are essential to the fulfillment of NSF's mission, as articulated in [Investing in Science, Engineering, and Education for the Nation's Future: NSF Strategic Plan for 2014-2018](#). These strategies are integrated in the program planning and implementation process, of which proposal review is one part. NSF's mission is particularly well-implemented through the integration of research and education and broadening participation in NSF programs, projects, and activities.

One of the strategic objectives in support of NSF's mission is to foster integration of research and education through the programs, projects, and activities it supports at academic and research institutions. These institutions must recruit, train, and prepare a diverse STEM workforce to advance the frontiers of science and participate in the U.S. technology-based economy. NSF's contribution to the national innovation ecosystem is to provide cutting-edge research under the guidance of the Nation's most creative scientists and engineers. NSF also supports development of a strong science, technology, engineering, and mathematics (STEM) workforce by investing in building the knowledge that informs improvements in STEM teaching and learning.

NSF's mission calls for the broadening of opportunities and expanding participation of groups, institutions, and geographic regions that are underrepresented in STEM disciplines, which is essential to the health and vitality of science and engineering. NSF is committed to this principle of diversity and deems it central to the programs, projects, and activities it considers and supports.

A. Merit Review Principles and Criteria

The National Science Foundation strives to invest in a robust and diverse portfolio of projects that creates new knowledge and enables breakthroughs in understanding across all areas of science and engineering research and education. To identify which projects to support, NSF relies on a merit review process that incorporates consideration of both the technical aspects of a proposed project and its potential to contribute more broadly to advancing NSF's mission "to promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense; and for other purposes." NSF makes every effort to conduct a fair, competitive, transparent merit review process for the selection of projects.

1. Merit Review Principles

These principles are to be given due diligence by PIs and organizations when preparing proposals and managing projects, by reviewers when reading and evaluating proposals, and by NSF program staff when determining whether or not to recommend proposals for funding and while overseeing awards. Given that NSF is the primary federal agency charged with nurturing and supporting excellence in basic research and education, the following three principles apply:

- All NSF projects should be of the highest quality and have the potential to advance, if not transform, the frontiers of knowledge.
- NSF projects, in the aggregate, should contribute more broadly to achieving societal goals. These "Broader Impacts" may be accomplished through the research itself, through activities that are directly related to specific research projects, or through activities that are supported by, but are complementary to, the project. The project activities may be based on previously established and/or innovative methods and approaches, but in either case must be well justified.
- Meaningful assessment and evaluation of NSF funded projects should be based on appropriate metrics, keeping in mind the likely correlation between the effect of broader impacts and the resources provided to implement projects. If the size of the activity is limited, evaluation of that activity in isolation is not likely to be meaningful. Thus, assessing the effectiveness of these activities may best be done at a higher, more aggregated, level than the individual project.

With respect to the third principle, even if assessment of Broader Impacts outcomes for particular projects is done at an aggregated level, PIs are expected to be accountable for carrying out the activities described in the funded project. Thus, individual projects should include clearly stated goals, specific descriptions of the activities that the PI intends to do, and a plan in place to document the outputs of those activities.

These three merit review principles provide the basis for the merit review criteria, as well as a context within which the users of the criteria can better understand their intent.

2. Merit Review Criteria

All NSF proposals are evaluated through use of the two National Science Board approved merit review criteria. In some instances, however, NSF will employ additional criteria as required to highlight the specific objectives of certain programs and activities.

The two merit review criteria are listed below. **Both** criteria are to be given **full consideration** during the review and decision-making processes; each criterion is necessary but neither, by itself, is sufficient. Therefore, proposers must fully address both criteria. ([GPG Chapter II.C.2.d.i](#) contains additional information for use by proposers in development of the Project Description section of the proposal.) Reviewers are strongly encouraged to review the criteria, including [GPG Chapter II.C.2.d.i](#), prior to the review of a proposal.

When evaluating NSF proposals, reviewers will be asked to consider what the proposers want to do, why they want to do it, how they plan to do it, how they will know if they succeed, and what benefits could accrue if the project is successful. These issues apply both to the technical aspects of the proposal and the way in which the project may make broader contributions. To that end, reviewers will be asked to evaluate all proposals against two criteria:

- **Intellectual Merit:** The Intellectual Merit criterion encompasses the potential to advance knowledge; and
- **Broader Impacts:** The Broader Impacts criterion encompasses the potential to benefit society and contribute to the achievement of specific, desired societal outcomes.

The following elements should be considered in the review for both criteria:

1. What is the potential for the proposed activity to
 - a. Advance knowledge and understanding within its own field or across different fields (Intellectual Merit); and
 - b. Benefit society or advance desired societal outcomes (Broader Impacts)?
2. To what extent do the proposed activities suggest and explore creative, original, or potentially transformative concepts?
3. Is the plan for carrying out the proposed activities well-reasoned, well-organized, and based on a sound rationale? Does the plan incorporate a mechanism to assess success?
4. How well qualified is the individual, team, or organization to conduct the proposed activities?
5. Are there adequate resources available to the PI (either at the home organization or through collaborations) to carry out the proposed activities?

Broader impacts may be accomplished through the research itself, through the activities that are directly related to specific research projects, or through activities that are supported by, but are complementary to, the project. NSF values the advancement of scientific knowledge and activities that contribute to achievement of societally relevant outcomes. Such outcomes include, but are not limited to: full participation of women, persons with disabilities, and underrepresented minorities in science, technology, engineering, and

mathematics (STEM); improved STEM education and educator development at any level; increased public scientific literacy and public engagement with science and technology; improved well-being of individuals in society; development of a diverse, globally competitive STEM workforce; increased partnerships between academia, industry, and others; improved national security; increased economic competitiveness of the United States; and enhanced infrastructure for research and education.

Proposers are reminded that reviewers will also be asked to review the Data Management Plan and the Postdoctoral Researcher Mentoring Plan, as appropriate.

Additional Solicitation Specific Review Criteria

All proposals will be evaluated according to the following additional criteria:

- The proposed technological innovation, the research questions to be addressed, and the plans for research and development will **all** be evaluated for intellectual merit and potential broader impacts.
- The degree to which the Collaboration and Management Plan adequately demonstrates that participating investigators and advisors will work synergistically to accomplish the program objectives.
- The extent to which the project scope justifies the level of investment requested.

B. Review and Selection Process

Proposals submitted in response to this program solicitation will be reviewed by Ad hoc Review and/or Panel Review.

Reviewers will be asked to evaluate proposals using two National Science Board approved merit review criteria and, if applicable, additional program specific criteria. A summary rating and accompanying narrative will be completed and submitted by each reviewer. The Program Officer assigned to manage the proposal's review will consider the advice of reviewers and will formulate a recommendation.

After scientific, technical and programmatic review and consideration of appropriate factors, the NSF Program Officer recommends to the cognizant Division Director whether the proposal should be declined or recommended for award. NSF strives to be able to tell applicants whether their proposals have been declined or recommended for funding within six months. Large or particularly complex proposals or proposals from new awardees may require additional review and processing time. The time interval begins on the deadline or target date, or receipt date, whichever is later. The interval ends when the Division Director acts upon the Program Officer's recommendation.

After programmatic approval has been obtained, the proposals recommended for funding will be forwarded to the Division of Grants and Agreements for review of business, financial, and policy implications. After an administrative review has occurred, Grants and Agreements Officers perform the processing and issuance of a grant or other agreement. Proposers are cautioned that only a Grants and Agreements Officer may make commitments, obligations or awards on behalf of NSF or authorize the expenditure of funds. No commitment on the part of NSF should be inferred from technical or budgetary discussions with a NSF Program Officer. A Principal Investigator or organization that makes financial or personnel commitments in the absence of a grant or cooperative agreement signed by the NSF Grants and Agreements Officer does so at their own risk.

Once an award or declination decision has been made, Principal Investigators are provided feedback about their proposals. In all cases, reviews are treated as confidential documents. Verbatim copies of reviews, excluding the names of the reviewers or any reviewer-identifying information, are sent to the Principal Investigator/Project Director by the Program Officer. In addition, the proposer will receive an explanation of the decision to award or decline funding.

VII. AWARD ADMINISTRATION INFORMATION

A. Notification of the Award

Notification of the award is made to *the submitting organization* by a Grants Officer in the Division of Grants and Agreements. Organizations whose proposals are declined will be advised as promptly as possible by the cognizant NSF Program administering the program. Verbatim copies of reviews, not including the identity of the reviewer, will be provided automatically to the Principal Investigator. (See Section VI.B. for additional information on the review process).

B. Award Conditions

An NSF award consists of: (1) the award notice, which includes any special provisions applicable to the award and any numbered amendments thereto; (2) the budget, which indicates the amounts, by categories of expense, on which NSF has based its support (or otherwise communicates any specific approvals or disapprovals of proposed expenditures); (3) the proposal referenced in the award notice; (4) the applicable award conditions, such as Grant General Conditions (GC-1)*; or Research Terms and Conditions* and (5) any announcement or other NSF issuance that may be incorporated by reference in the award notice. Cooperative agreements also are administered in accordance with NSF Cooperative Agreement Financial and Administrative Terms and Conditions (CA-FATC) and the applicable Programmatic Terms and Conditions. NSF awards are electronically signed by an NSF Grants and Agreements Officer and transmitted electronically to the organization via e-mail.

*These documents may be accessed electronically on NSF's Website at http://www.nsf.gov/awards/managing/award_conditions.jsp?org=NSF. Paper copies may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from nsfpubs@nsf.gov.

More comprehensive information on NSF Award Conditions and other important information on the administration of NSF awards is contained in the *NSF Award & Administration Guide (AAG)* Chapter II, available electronically on the NSF Website at http://www.nsf.gov/publications/pub_summ.jsp?ods_key=aag.

Special Award Conditions:

Each *Cyberlearning and Future Learning Technologies* project is required to have and make use of an advisory board with two types of advisors: participants who complement the expertise of the PIs and senior personnel and can provide advice about design, implementation, and analysis, and participants who have enough distance from the project to contribute to critical review. Advisory board

reviews should be included in Annual and Final Reports.

The CIRCL Center (Center for Innovative Research in Cyberlearning; circlcenter.org) provides capacity-building aid to NSF's cyberlearning-related programs. All *Cyberlearning and Future Learning Technologies* projects are required to share their findings with CIRCL, to participate in at least some of the meetings and synthesis activities organized by CIRCL, and to be responsive to requests for information from CIRCL and other cyberlearning PIs.

C. Reporting Requirements

For all multi-year grants (including both standard and continuing grants), the Principal Investigator must submit an annual project report to the cognizant Program Officer at least 90 days prior to the end of the current budget period. (Some programs or awards require submission of more frequent project reports). Within 90 days following expiration of a grant, the PI also is required to submit a final project report, and a project outcomes report for the general public.

Failure to provide the required annual or final project reports, or the project outcomes report, will delay NSF review and processing of any future funding increments as well as any pending proposals for all identified PIs and co-PIs on a given award. PIs should examine the formats of the required reports in advance to assure availability of required data.

PIs are required to use NSF's electronic project-reporting system, available through Research.gov, for preparation and submission of annual and final project reports. Such reports provide information on accomplishments, project participants (individual and organizational), publications, and other specific products and impacts of the project. Submission of the report via Research.gov constitutes certification by the PI that the contents of the report are accurate and complete. The project outcomes report also must be prepared and submitted using Research.gov. This report serves as a brief summary, prepared specifically for the public, of the nature and outcomes of the project. This report will be posted on the NSF website exactly as it is submitted by the PI.

More comprehensive information on NSF Reporting Requirements and other important information on the administration of NSF awards is contained in the *NSF Award & Administration Guide (AAG)* Chapter II, available electronically on the NSF Website at http://www.nsf.gov/publications/pub_summ.jsp?ods_key=aag.

VIII. AGENCY CONTACTS

Please note that the program contact information is current at the time of publishing. See program website for any updates to the points of contact.

General inquiries regarding this program should be made to:

- Chris Hoadley, Program Officer, EHR/DRL and CISE/IIS, telephone: 703-292-7906, email: choadley@nsf.gov
- John Cherniavsky, Program Officer, EHR/DRL, telephone: 703-292-5136, email: jchernia@nsf.gov
- Tanya Korelsky, Program Officer, CISE/IIS, telephone: 703-292-8930, email: tkorelsk@nsf.gov
- Kevin Lee, telephone: (703) 292-4639, email: kelee@nsf.gov
- Robert Russell, telephone: (703) 292-2995, email: rrussel@nsf.gov
- Kamau Bobb, telephone: (703) 292-4291, email: kbobb@nsf.gov
- H. T. Martin, telephone: (703) 292-7016, email: htmartin@nsf.gov
- Elliot Douglas, telephone: (703) 292-7051, email: edouglas@nsf.gov
- Maria Zemankova, telephone: (703) 292-7348, email: mzemanko@nsf.gov
- Sushil K. Prasad, telephone: (703) 292-5059, email: sprasad@nsf.gov
- Soo-Siang Lim, Program Officer, SBE/SLC, telephone: 703-292-8740, email: slim@nsf.gov
- Glenn Larsen, Program Officer, ENG/IIP/EFRI, telephone: 703-292-4607, email: glarsen@nsf.gov

For questions related to the use of FastLane, contact:

- FastLane Help Desk, telephone: 1-800-673-6188; e-mail: fastlane@nsf.gov.

For questions relating to Grants.gov contact:

- Grants.gov Contact Center: If the Authorized Organizational Representatives (AOR) has not received a confirmation message from Grants.gov within 48 hours of submission of application, please contact via telephone: 1-800-518-4726; e-mail: support@grants.gov.

IX. OTHER INFORMATION

The NSF website provides the most comprehensive source of information on NSF Directorates (including contact information), programs and funding opportunities. Use of this website by potential proposers is strongly encouraged. In addition, "NSF Update" is an information-delivery system designed to keep potential proposers and other interested parties apprised of new NSF funding opportunities and publications, important changes in proposal and award policies and procedures, and upcoming NSF [Grants Conferences](#). Subscribers are informed through e-mail or the user's Web browser each time new publications are issued that match their identified interests. "NSF Update" also is available on [NSF's website](#).

Grants.gov provides an additional electronic capability to search for Federal government-wide grant opportunities. NSF funding opportunities may be accessed via this mechanism. Further information on Grants.gov may be obtained at <http://www.grants.gov>.

ABOUT THE NATIONAL SCIENCE FOUNDATION

The National Science Foundation (NSF) is an independent Federal agency created by the National Science Foundation Act of 1950, as amended (42 USC 1861-75). The Act states the purpose of the NSF is "to promote the progress of science; [and] to advance the national health, prosperity, and welfare by supporting research and education in all fields of science and engineering."

NSF funds research and education in most fields of science and engineering. It does this through grants and cooperative agreements to more than 2,000 colleges, universities, K-12 school systems, businesses, informal science organizations and other research organizations throughout the US. The Foundation accounts for about one-fourth of Federal support to academic institutions for basic research.

NSF receives approximately 55,000 proposals each year for research, education and training projects, of which approximately 11,000 are funded. In addition, the Foundation receives several thousand applications for graduate and postdoctoral fellowships. The agency operates no laboratories itself but does support National Research Centers, user facilities, certain oceanographic vessels and Arctic and Antarctic research stations. The Foundation also supports cooperative research between universities and industry, US participation in international scientific and engineering efforts, and educational activities at every academic level.

Facilitation Awards for Scientists and Engineers with Disabilities provide funding for special assistance or equipment to enable persons with disabilities to work on NSF-supported projects. See Grant Proposal Guide Chapter II, Section D.2 for instructions regarding preparation of these types of proposals.

The National Science Foundation has Telephonic Device for the Deaf (TDD) and Federal Information Relay Service (FIRS) capabilities that enable individuals with hearing impairments to communicate with the Foundation about NSF programs, employment or general information. TDD may be accessed at (703) 292-5090 and (800) 281-8749, FIRS at (800) 877-8339.

The National Science Foundation Information Center may be reached at (703) 292-5111.

The National Science Foundation promotes and advances scientific progress in the United States by competitively awarding grants and cooperative agreements for research and education in the sciences, mathematics, and engineering.

To get the latest information about program deadlines, to download copies of NSF publications, and to access abstracts of awards, visit the NSF Website at <http://www.nsf.gov>

- **Location:** 4201 Wilson Blvd. Arlington, VA 22230
- **For General Information** (NSF Information Center): (703) 292-5111
- **TDD (for the hearing-impaired):** (703) 292-5090
- **To Order Publications or Forms:**
 - Send an e-mail to: nsfpubs@nsf.gov
 - or telephone: (703) 292-7827
- **To Locate NSF Employees:** (703) 292-5111

PRIVACY ACT AND PUBLIC BURDEN STATEMENTS

The information requested on proposal forms and project reports is solicited under the authority of the National Science Foundation Act of 1950, as amended. The information on proposal forms will be used in connection with the selection of qualified proposals; and project reports submitted by awardees will be used for program evaluation and reporting within the Executive Branch and to Congress. The information requested may be disclosed to qualified reviewers and staff assistants as part of the proposal review process; to proposer institutions/grantees to provide or obtain data regarding the proposal review process, award decisions, or the administration of awards; to government contractors, experts, volunteers and researchers and educators as necessary to complete assigned work; to other government agencies or other entities needing information regarding applicants or nominees as part of a joint application review process, or in order to coordinate programs or policy; and to another Federal agency, court, or party in a court or Federal administrative proceeding if the government is a party. Information about Principal Investigators may be added to the Reviewer file and used to select potential candidates to serve as peer reviewers or advisory committee members. See Systems of Records, *NSF-50*, "Principal Investigator/Proposal File and Associated Records," 69 Federal Register 26410 (May 12, 2004), and *NSF-51*, "Reviewer/Proposal File and Associated Records," 69 Federal Register 26410 (May 12, 2004). Submission of the information is voluntary. Failure to provide full and complete information, however, may reduce the possibility of receiving an award.

An agency may not conduct or sponsor, and a person is not required to respond to, an information collection unless it displays a valid Office of Management and Budget (OMB) control number. The OMB control number for this collection is 3145-0058. Public reporting burden for this collection of information is estimated to average 120 hours per response, including the time for reviewing instructions. Send comments regarding the burden estimate and any other aspect of this collection of information, including suggestions for reducing this burden, to:

Suzanne H. Plimpton

