Funding Opportunities at The National Science Foundation (NSF) Related to Education at Scale

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CISE/IIS and EHR/DRL
Who Are We?

• The National Science Foundation is an independent federal agency created by Congress in 1950 "to promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense…“

• Part of the executive branch

• Very important – controlled/managed by the executive branch and congress

• We make funding recommendations based on merit review by peers.

• We have many programs, each has its own mission, solicitation, and program officers.
Two Directorates Fund the Majority of Research and Development related to Education at Scale

• CISE – Computer and Information Science and Engineering
  – Cyberlearning and Future Learning Technologies
  – Also CS ed efforts, CHS, Big Data

• EHR – Education and Human Resources
  – DUE – IUSE
  – DRL – REAL, ECR, DRK-12

• ENG -- Engineering
  – Engineering Education and SBIR

• SBE -- Social, Behavioral, and Environmental Sciences
Computer and Information Science and Engineering

Expanding the frontiers of computing
Technology promises to revolutionize learning.

- New and emerging technologies can expand and transform learning opportunities, learning interests, and learning outcomes throughout people’s lives.
- Technologies have a built-in capacity for the collection of data related to learning; these data present an enormous opportunity to increase our understanding of learning.
- NSF has the scope, the interest and the resources to advance our fundamental understanding of how people learn with technology, for the benefit of all.
Cyberlearning and Future Learning Technologies
(CFLT or Cyberlearning)

• New and emerging technologies can expand and transform learning opportunities, learning interests, and learning outcomes throughout people’s lives.

• The best of these will be informed by research on how people learn, how to foster learning, how to assess learning, and how to design experiences for learners/learning.

• Technologies have a built-in capacity for the collection of data related to learning; these data present an enormous opportunity to increase our understanding of learning.
A Cross-Directorate Effort

- CISE – Computer and Information Science and Engineering
- EHR – Education and Human Resources
- ENG – Engineering
- SBE – Social, Behavioral, and Economic Sciences

Achieving the goals of the program requires expertise from across these many different areas
Cyberlearning Program Scope

- About the future of learning technologies (5, 10, 15 yrs out), the learning made possible by new technological genres, and the potential to really make a difference

- Populations, disciplines, and contexts for learning
  - any (not just STEM, not just formal)

- Technologies and interactions with them
  - any – hardware, software, combo, interactions with them, their integration into environments, must aim beyond state of the art

- Informed by the scholarly literature on learning and how people learn
  - Processes, representations, conditions, and influences associated with learning and fostering learning
  - Cognitive, neurobiological, behavioral, cultural, social, volitional, epistemological, developmental, affective, and other perspectives
  - Individual and collective learning
Every project needs 3 integrated parts

1. A proposed innovation that anticipates a new genre, is iteratively refined during the project
   – Informed by what is known about mental and other processes involved in learning, how to foster learning, how to assess learning, and/or how to design for learning
   – Informed by and pushes forward the technological state of the art

2. Research advancing understanding of how people learn (that requires the technology innovation)

3. Research promoting broad use and transferability

All focused by an important purpose and to be carried out by a team with appropriate expertise.

The two kinds of research are done in the context of iterative refinement of the innovation
## Cyberlearning Proposal Types

<table>
<thead>
<tr>
<th>Proposal Type</th>
<th>Award Limit and Duration</th>
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<tbody>
<tr>
<td>EXP: Exploration</td>
<td>$550,000* and 2-3 years</td>
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<tr>
<td>-- due March 19 in FY14</td>
<td>*$750,000 with permission when</td>
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<tr>
<td>-- due in December in FY15 and beyond</td>
<td>technology purchase or development requires significant expenditure</td>
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<tr>
<td>DIP: Development and Implementation</td>
<td>$1,350,000 and 3-4 years</td>
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<td>-- due March 26 in FY14</td>
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<tr>
<td>-- due in January in FY15 and beyond</td>
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<tr>
<td>INT: Integration</td>
<td>$2.5m and 4-5 years</td>
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<tr>
<td>-- due mid-July (July 14(^{th}) in FY 14)</td>
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<td>-- require a letter of intent, due mid-May (May 12 in FY14)</td>
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<tr>
<td>CAP: Capacity Building</td>
<td>$50k and 1 year for partnerships, $100k and 2 years for conferences, workshops, short courses</td>
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For more information

• There was an informational webinar last month.
• It is archived at the CIRCL Center Website at circlcenter.org/events/nsf-cyberlearning-solicitation-webinar/
• Send email: jkolodne@nsf.gov
Two Relevant Divisions in EHR
(Education and Human Development)

• Division of Undergraduate Education (DUE)
  – IUSE Program (Successor to TUES)

• Division of Research on Learning (DRL)
  – REAL (used to be REESE)
  – EHR Core Research (ECR)
  – A bit of possibility in DRK-12 (K-12 education)
Improving Undergraduate STEM Education Program (IUSE)  
NSF 14-7513  
http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=504976924  
(FY14 only; plans for FY15 are under development)
IUSE

• Supports the improvement of the undergraduate STEM education enterprise through funding the following:
  – Projects that build on fundamental research in undergraduate STEM education and prior R&D
  – Research on design, development, and widespread implementation of effective STEM learning/teaching knowledge and practice
  – Foundational research on student learning
iUSE Projects (cont.)

• Projects should be evidence based and/or evidence generating

• As with any NSF proposal, you will need to address the intellectual merit and broader impacts of your idea.

• You might find the Common Guidelines for Education Research and Development (NSF 13-126) a useful resource

• FY14 was the time to try to get funding for those projects you have in mind that never quite fit one of the “boxes” (actually proposals were due in February; look out for next year’s opportunities)

• If you are submitting something about Computer Science Education, please put Computer Science or Computing in your title!! This will help us make sure your proposal is put into the correct panel!!
IDEAS Labs

• In FY14, NSF is also accepting proposals for developing “IDEAS Labs” in biology, engineering, and geosciences education

• Not known yet whether there will be Ideas Labs in FY15 or what areas they will be in if they happen

• For more information, talk to or send email to Jane Prey: jprey@nsf.gov
DRL: Division of Research on Learning in Formal and Informal Environments

REAL: Research on Education and Learning

ECR: EHR Core Research
REAL

• The Research on Education and Learning (REAL) program
  – Supports advances in research on STEM learning and education
  – Focuses on foundational knowledge
  – Improvements in STEM learning
  – Learning contexts, both formal and informal
  – Childhood through adulthood
  – All groups
  – From the earliest developmental stages of life through participation in the workforce
  – Increasing public understanding of science and engineering.
REAL  (continued)

• REAL research areas:
  – Research on human learning in STEM
  – Research on learning in STEM learning environments
  – Broadening participation research
    • Research in Disabilities Education (RDE)
    • Research on Gender in Science and Engineering (GSE)

• Special emphases in FY14 on
  – Research on advancing the assessment of STEM learning and 21st century STEM skills
  – research on STEM learning for undergraduates
  – Research on use and impact of technology in STEM learning

• FY15 emphases have not been announced yet
REAL (continued)

What is distinctive about REAL is the emphasis placed on the accumulation of robust evidence to inform efforts to

– Understand
– build theory to explain, and
– suggest interventions (and innovations)

In the context of addressing persistent challenges in STEM interest, education, learning, and participation.
Eligible proposal types

• Early stage research
  – Maximum total award size of $500,000
  – Maximum duration of 3 years

• Middle stage research
  – Maximum total award size of $1,500,000
  – Maximum duration of 3 years

• Later stage research
  – Maximum total award size of $2,500,000
  – Maximum duration of 3 years
Eligible proposal types (continued)

• Fostering Interdisciplinary Research in Education (FIRE)
  – Maximum award size $500,000
  – Maximum duration 3 years

• Syntheses
  – Maximum award size $300,000
  – Maximum duration 2 years

• Conference and Workshop Proposals
  – Typical costs are $25,000 - $75,000
  – See GPG Section II.D
ECR: EHR Core Research

Supports projects that help synthesize, build and/or expand research foundations in STEM learning, STEM learning environments, workforce development, and broadening participation in STEM.
ECR (cont.)

• Goals
  – advance the improvement of STEM learning in general,
  – address specific challenges of great importance.

• Two types of proposals
  – **Core Research Proposals** (maximum 5 years, $1.5 million) that propose to study a foundational research question/issue designed to inform the transformation of STEM learning and education and
  – **Capacity Building Proposals** (maximum 3 years, $300,000) intended to support groundwork necessary for advancing research within the four core areas.

Talk to a DRL Program Officer involved in both programs to decide which is right for you
DRK-12

• For projects that address STEM education in K-12 formal education.

• Should be aimed towards producing
  – a resource, model, or tool and
  – advancing understanding of learning, fostering learning, and/or assessing STEM learning in school.
Which Program?

- Design/advance new technological genre AND advance theory related to learning – Cyberlearning
- Focus on designing for undergraduate STEM and advancing practice – IUSE and its successor
- Focus on designing for K-12 and advancing practice – DRK-12
- Focus on design to foster learning in a discipline – IUSE or DRK-12
- Understanding ins and outs of particular ways of doing things -- REAL, ECR, IUSE, or DRK-12
- Advancing theory – REAL or ECR
- New interaction technology, not specific to learning – CHS
- Product your small business aims to make money on -- SBIR

TALK TO APPROPRIATE PROGRAM OFFICERS
A Final Bit of Advice

• Make sure you are building on what is already known about learning processes, fostering learning, assessing learning, and/or designing learning experiences.
• Make your primary goal to address an important set of issues; technology as the way to do that
• Assemble a team with all the needed expertise!!!
• Involve learning scientists in design of your innovation and its use, not simply used as evaluators and methodology people
• Make design and refinement a first-class piece of your research and development plan (become familiar with Design-Based Research and Design-Based Implementation Research)
QUESTIONS?

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