Improving Undergraduate STEM Education: Pathways into Geoscience (IUSE: GEOPATHS)

Program Solicitation NSF 16-584

Webinar Briefing
Thursday - August 11, 2016
2 pm EST

Logistics

- **Questions:**
  - **We will not be taking questions over the phone.**
  - **If you want to ask a question during/after the presentation use the Q&A function (*not the chat function*).**
  - **Questions will be addressed at the end of the webinar.**
- **All participants are automatically muted.**
- **WebEx issues:**
  - **U.S. and Canada Toll-Free 1-866-229-3239**

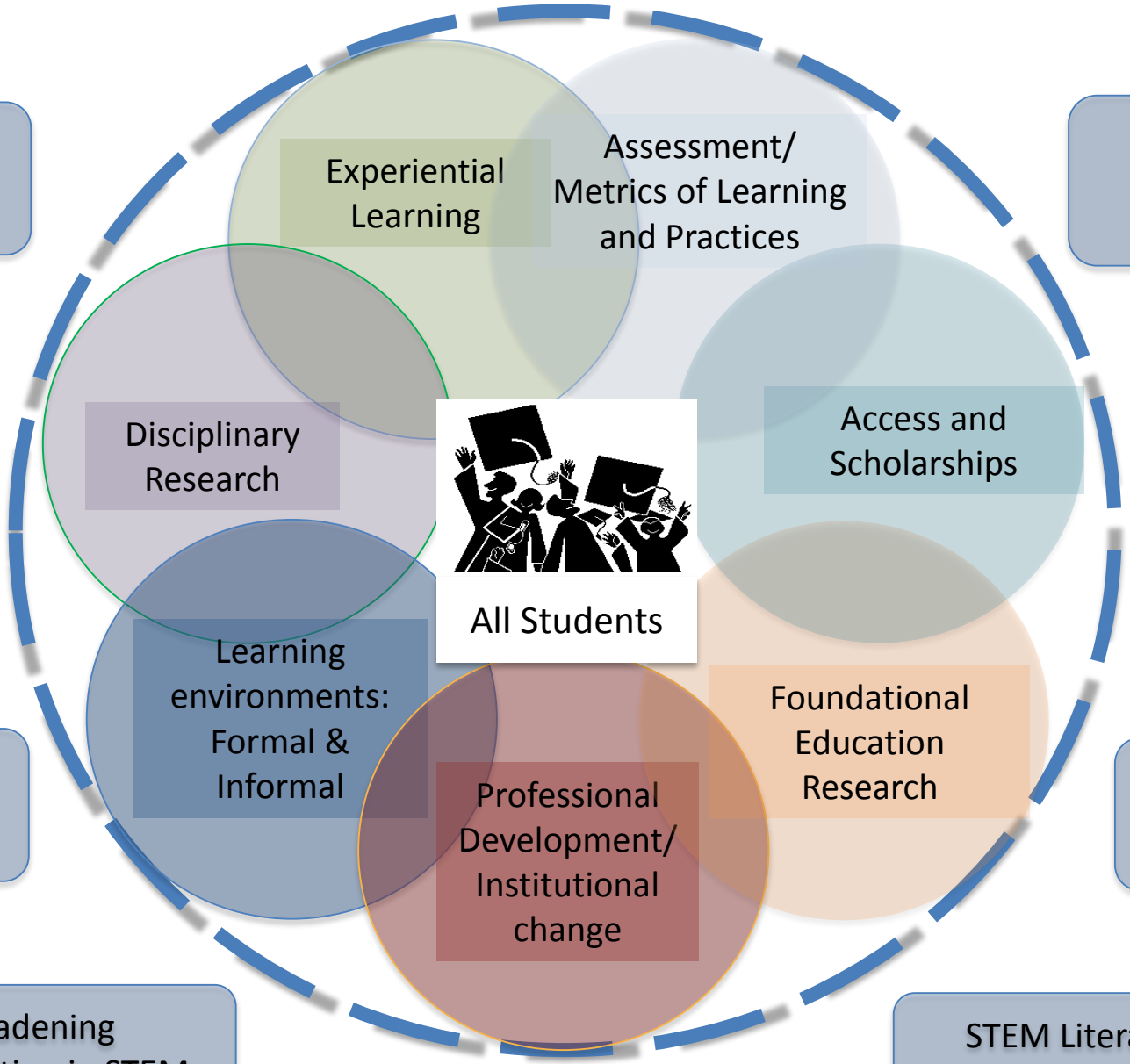
Outline

- General Context
  - Origins & goals of NSF's IUSE initiative
- IUSE: GEOPATHS program
  - Program goals
  - EXTRA & IMPACT tracks
- Preparing IUSE: GEOPATHS proposals

The IUSE Initiative

- **NSF-wide initiative started in FY 2014**
- **Informed by NSTC Committee on STEM Education (CoSTEM) 5-year strategic framework for federal agencies**
- **Responded to PCAST recommendations on STEM education to**
  - **Identify & broaden implementation of evidence-based practices/establish architecture to document resulting outcomes**
  - **Improve 2-yr to 4-yr transitions**
  - **Foster university-industry-federal partnerships to provide authentic experiences**
  - **Address failure rates in mathematics**
- **Designed to address priority investment areas in the NSF undergraduate portfolio**

IUSE Design Team Building Blocks: Scope of the Portfolio



STEM Workforce Development

Building Capacity in Higher Education

Advancing Science

Life Long Learning

STEM-related Workforce Development

Improving K-12

Broadening Participation in STEM

STEM Literate Populace

3 Pillars: Long-Term Goals

- **Improve STEM Learning & Learning Environments**
  - **Improve the knowledge base for defining, identifying, and innovating effective undergraduate STEM education teaching and learning for all NSF-supported disciplines, and foster widespread use of evidence-based resources and pedagogies in undergraduate STEM education practice.**
- **Broaden Participation & Institutional Capacity for STEM Learning**
  - **Increase the number and diversity of undergraduate students recruited and retained in STEM education and career pathways through improving the evidence base for successful strategies to broaden participation and inclusion with an emphasis on implementation of research results.**
- **Build the STEM Professional Workforce for Tomorrow**
  - **Improve the preparation of undergraduate students so they can succeed as productive members and STEM thinkers in the future workforce, regardless of career path, and be engaged in society as trusted sources of evidence-based thinking.**

IUSE Initiative Milestones

- **FY 2014**
  - EHR only directorate participating
  - IUSE program description (PD 7513) issued
    - Consolidation of TUES, STEP and WIDER programs
  - 3 Ideas Labs on specific issues convened
    - GEO, ENG, and BIO topics
  - NSF-wide IUSE conceptual framework developed
- **FY 2015, 2016 & 2017**
  - EHR, ENG, GEO & BIO directorates participating
  - ~$100 million portfolio
  - 3 IUSE-related program solicitations active
- **FY 2016**
  - IUSE PI meeting in DC

IUSE Funding Opportunities

- **IUSE: EHR**
  - **EHR Directorate solicitation NSF 15-585**
  - **Two tracks:**
    - **Engaged Student Learning;**
    - **Institutional & *Community* Transformation**
  - **Three tiers of research funding:**
    - **Exploratory**
    - **Design & Development**
    - **Impact**
  - **Dear Colleague Letter NSF 16-109 (*Change Makers*)**
    - **Community-based (service) learning**
- **IUSE/PFE: Revolutionizing Engineering Departments (RED)**
  - **ENG Directorate solicitation NSF 16-??**
- **RCN: UBE**
  - **BIO Directorate track in solicitation NSF 15-527**
- ***IUSE: GEOPATHS***
  - **GEO Directorate solicitation NSF 16-584**

IUSE: GEOPATHS Program Goals

- **Increase the number and diversity of students**
  - **pursuing degrees and careers in the geosciences**
- **Prepare students for any geoscience career**
  - **considering ALL pathways available to them in the geosciences, including teaching**
- **Build on & contribute to the evidence base**
  - **for effective student engagement, learning, and retention in STEM**

IUSE: GEOPATHS Solicitation

- **NSF 16-584 program solicitation (FY17)**

  [https://www.nsf.gov/pubs/2016/nsf16584/nsf16584.pdf]

  - **LOI due (8/16/16) - required;**
  - **Full proposals due (10/11/16)**

- **Two funding tracks**
  - ***GEOPATHS-EXTRA***
  - ***GEOPATHS-IMPACT***

- **Anticipated funding: $6,000,000**
- **Budget: Average funding of $300,000 to $350,000**
- **Approximately 20 awards**
- **Project duration: Up to 3 years**

GEOPATHS-EXTRA Track

- Engaging & retaining students in the geosciences through extra-curricular experiences and training
- Focus on cohorts of 6 or more individual students
- Sustained or catalytic experiences that:
  - Develop expertise in geoscience
  - Enhance professional skills
  - Increase access to professional networks
  - Deepen interest/knowledge of geoscience career pathways
- Proposals should describe how extra-curricular activities scaffold to the undergraduate curriculum
- Leveraging of GEO-supported facilities is encouraged

GEOPATHS-IMPACT Track

- Supporting transitions of undergraduates at critical junctures to encourage recruitment and retention in the geoscience pipeline
- Focus on institutional partnerships and collaborations, especially with 2-year colleges and minority-serving institutions
- Creating sustainable mechanisms to support:
  - High school to college transitions
  - 2-year to 4-year college transitions
  - 4-year to graduate school/career transitions
- Leveraging of GEO-supported facilities is encouraged

Eligibility Limitations

- **Lead institution must be a U.S. accredited university or 2-year or 4-year college (and same as in LOI)**
- **All eligible organizations identified in NSF Grant Proposal Guide (GPG) can collaborate as "non-lead"**
- ***GEOPATHS-EXTRA* track has additional limits:**
  - **Lead institution cannot be a highest research activity university (R1), as defined in Carnegie Classifications**
- **Organization limits: only 1 proposal per competition as sole-submitting or lead institution; no limit as non-lead**
- **PI limits: only 1 proposal per competition if from the sole or lead institution; no limit as non-lead participant**

Proposal Preparation (Mechanics)

- **Follow the GPG 16-1 & NSF 16-584 formatting instructions!**
- **Proposal Title MUST indicate the track using this format:**

  GP: EXTRA…rest of title or GP: IMPACT…rest of title
- **Letters of commitment from partners should be included in the Supporting Documents section.**

Proposal Preparation (Content)

Project Description should discuss:

- goals, objectives, and metrics of success
- roles & responsibilities of project personnel
- how activities scaffold to curriculum (EXTRA)
- demographics and numbers of students impacted by the project
- diversity & preparation/supervision of mentors
- metrics & evaluation strategies
- plans for sustainability post-NSF funding

Review Criteria

- **Intellectual Merit & Broader Impacts**
- **Additional Review Criteria:**
  - **Participant recruitment process is sound**
  - **Project team expertise is relevant**
  - **Builds on education research evidence base**
  - **Faculty/mentors are prepared for their role**
  - **Evaluation plan will demonstrate impact**

Caveats

- **IUSE: GEOPATHS proposals should not duplicate activities that can be achieved through:**
  - **IUSE: EHR program**
  - **Research Experiences for Undergraduates (REU) Sites or Supplements program**
  - **Advanced Technological Education (ATE) program**
  - **Tribal Colleges and Universities Program (TCUP)** ***PArtnerships for GEoscience (PAGE)*** **track**

Caveat about Geospatial Methods

- **GIS/GPS and remote sensing are common tools used within the geosciences professional community, but…**
- **NSF has a separate Geography program in the SBE directorate, so GEO funds are used to support a minimal amount of training in GIS/GPS/remote sensing, focusing on efforts that are intrinsically tied to scientific content related to the geosciences (e.g., using these tools to investigate geoscience research questions)**

If you still have questions…..

Send email to geopaths@nsf.gov or contact one of the following program officers:

- **Brandon Jones (GEO/OAD) - mbjones@nsf.gov**
- **Manda Adams (GEO/AGS) - amadams@nsf.gov**
- **Lina Patino (GEO/EAR) - lpatino@nsf.gov**
- **Lisa Rom (GEO/OCE & GEO/PLR) - elrom@nsf.gov**
- **Marilyn Suiter (EHR/HRD) - msuiter@nsf.gov**
- **Keith Sverdrup (EHR/DUE) - ksverdru@nsf.gov**

For more information about the IUSE: EHR program, contact:

- **Keith Sverdrup (ksverdru@nsf.gov)**