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

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GSA - September 2016
Outline

IUSE - General Context

Origins & goals of IUSE

IUSE: GEOPATHS

Program goals

EXTRA & IMPACT tracks

Highlights

EXTRA

IMPACT
IUSE is NSF Wide (2014)

- NSTC CoSTEM

- IUSE

- PCAST Rec’s

- NSF Undergrad
NSTC’s 2013 Strategic Plan

Goal 3

Enhance STEM Experiences of Undergraduate Students: *Graduate one million additional students with degrees in STEM fields over the next 10 years*
IUSE is NSF Wide (2014)

IUSE

NSTC CoSTEM

PCAST Rec’s

NSF Undergrad
PCAST Recommendations...

– 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
IUSE is NSF Wide (2014)

IUSE

NSTC CoSTEM

PCAST Rec’s

NSF Undergrad
IUSE Design Team Building Blocks: Scope of the Portfolio

- **STEM Workforce Development**
- **Advancing Science**
- **STEM-related Workforce Development**
- **Broadening Participation in STEM**
- **Building Capacity in Higher Education**
- **Life Long Learning**
- **Improving K-12**
- **STEM Literate Populace**

**Core Areas**

- **Experiential Learning**
- **Assessment/ Metrics of Learning and Practices**
- **Access and Scholarships**
- **Foundational Education Research**
- **Disciplinary Research**
- **Learning environments: Formal & Informal**
- **Professional Development/ Institutional change**

**Central Focus**

- **All Students**
IUSE Pillars: Long-Term Goals

- Improve STEM Learning & Learning Environments
- Broaden Participation & Institutional Capacity for STEM Learning
- Build the STEM Professional Workforce for Tomorrow
IUSE Initiatve Milestones

2014
- IUSE Framework

2015
- $100M
- EHR, ENG, GEO & BIO

2016
- $100M
- EHR, ENG, GEO & BIO
- IUSE PI Meeting
Student Learning; Institutional Transformation

Preparing Future Engineers (PFE)

RCN - Undergraduate Biology Education (UBE)

GEOPATHS
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Increase the number and diversity of students

Prepare students for any geoscience career

Build on & contribute to the evidence base
IUSE: GEOPATHS Solicitation

• NSF 16-584 program solicitation (FY17)
  – LOIs were due 8/16/16
  – Proposals are due 10/11/16
• Budget: Average total funding range $300K - $350K
• ~ 20 awards
• Project duration: Up to 3 years
• Two funding tracks
  – GEOPATHS-EXTRA
  – GEOPATHS-IMPACT
GEOPATHS EXTRA

- Engage & Retain
- "GEO Facilities"
- # > 6
- Curriculum Scaffolding
- Sustained or Catalytic

experience
GEOPATHS IMPACT

- Transition Support
- Retention
- "GEO Facilities"
- Sustainable Mechanisms
- Institutional Collabs
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 Proposal and Award Policies and Procedures Guide (PAPPG) can collaborate as “non-lead”

• GEOPATHS-EXTRA track has additional limits:
  – Lead institution cannot be a very high research activity university (R1), as defined in Carnegie Classifications.
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2015 GEOPATH Awards
FY15 EXTRA: Recruiting and Retaining Non-geoscience Minority STEM Majors for the Geoscience Workforce – PI = R. Blake
GOALS

- create a geoscience workforce pathway for non-geoscience minority STEM majors
- develop geoscience career-aligned collaboration via mentoring
FY 15 **IMPACT**: Improving Geoscience Education Pathways through Engaging Scientific and Career Experiences

PI = K Savage
GOALS

• Improve transfer rate from CCRI to URI
• Increase # and diversity of geo grads
• Enhance student training
• Contribute to evidence base

ACTIVITIES

• GEO 200 course
• Joint field trips
• Cohort building efforts
• Creation of formal mentoring
• Sharing of internal and external research opp.
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
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- 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)
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 does not like to use its funds to support training in GIS/GPS or remote sensing methods unless students are also getting significant exposure to scientific content relevant to the geosciences (e.g., using these tools to investigate geoscience research questions)
Eligibility Limitations

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• 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 very high research activity university, 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