Funding Opportunities to Support Undergraduate STEM Education at the National Science Foundation

David R. Brown, Program Director
NSF Division of Undergraduate Education
Presentation Outline

• Locating Pertinent Information on NSF Programs
• A Glimpse at NSF Funding Rates
• Brief Overview of Specific Programs
• Recommended Resources
The NSF Division of Undergraduate Education

DUE Mission: *To promote excellence in undergraduate science, technology, engineering, and mathematics (STEM) education for all students.*
Navigating to the EHR Directorate

Research Areas
- Biological Sciences
- Computer & Information Science & Engineering
- Cyberinfrastructure
- Education and Human Resources
- Engineering
- Environmental Research & Education
- Geosciences
- Integrative Activities
- International Science & Engineering
- Mathematical & Physical Sciences
- Polar Programs
- Social, Behavioral & Economic Sciences

Funding & Awards
- FUNDING INFO
  - Search Funding Opportunities
  - Browse Funding Opportunities A-Z
  - Recent Funding Opportunities
  - How to Prepare a Funding Proposal
  - Grant Proposal Guide
  - Submit a Proposal to FastLane
- AWARD INFO
  - Managing Awards
  - Award & Administration Guide
  - Search Awards
  - Award Statistics (Budget Internet Info System)

Contact Us
- Staff Directory
- Organization List
- Visit NSF
- Work at NSF
- Do Business with NSF
- Press
- Inspector General Hotline
- How Do I...?

Learning Resources
- Film, TV, Exhibits & More!

News & Discoveries
- Recent News

2YC3 Webinar
January 17, 2014
EHR Home Page

Ensuring the health and vitality of our nation’s education

WIDER Dear Colleague Letter Issued
The Directorate for Education and Human Resources announces an opportunity to seek funding for Widening Implementation and Demonstration of Evidence-based Reforms.

Successful K-12 STEM Education Activities
"Successful K-12 STEM Education," a report produced by the National Research Council, and funded by NSF, is a response to a request from a member of Congress, Rep. Frank Wolf, to identify the characteristics of highly successful K-12 schools and programs in STEM. Information about activities associated with the report are available from Successful K-12 STEM Education.org.

Special Announcements
NSF Announces Science Across Virtual Institutes Initiative

Get EHR Updates by Email

2YC3 Webinar
January 17, 2014
A set of Frequently Asked Questions can be found [HERE](#).
Fiscal Year 2013 Funding Rates

Overall FY 2013 EHR Funding Rate: 18%

Overall FY 2013 MPS Funding Rate: 22%

2YC₃ Webinar
January 17, 2014
Select DUE Programs

• Advanced Technological Education (ATE) Program
• Improving Undergraduate STEM Education (IUSE) Program
• NSF Scholarships in STEM (S-STEM) Program
• EHR Core Research (ECR) Program

Select Programs Outside of DUE

• SBIR/STTR Phase IICC
• Research Experiences for Undergraduates (REU)
• Research Experiences for Teachers (RET)
SBIR/STTR Phase IICC

- Small business with an active NSF SBIR or STTR Phase II award applies for a *supplement* to collaborate with a community college research team.

- Supplement up to $40,000, with as least 75% of budget allocated to community college.

If you identify a small business with an *active* NSF Phase II SBIR or STTR award with a *minimum* of six months remaining and would like to explore a potential research collaboration contact Dr. Juan Figueroa at jfigueroa@nsf.gov.
Live Web Searches of NSF Awards Database and Gathering Information from the NSF Website
Resources for Proposal Preparation
Part I: Grant Proposal Guide (GPG) and Part II: Award & Administration Guide (AAG)
Common Guidelines for Education Research and Development

A Report from the Institute of Education Sciences, U.S. Department of Education
and the National Science Foundation

August 2013

Contents

Tables .......................................................................................................................... 3
Preface ....................................................................................................................... 4
Members of the Joint Committee .............................................................................. 6
Introduction ............................................................................................................... 7
  A Cross-Agency Project ......................................................................................... 8
  Types of Research .................................................................................................. 8
  Knowledge Generation and the Complex Connections among Research Types .... 10
  Introduction to Tables ........................................................................................... 11
Conclusion ............................................................................................................... 24
References Consulted by the Joint Committee .......................................................... 25
Appendix A: Illustrative Research Projects Funded by the Department of Education or the National Science Foundation ................................................................. 27
  Examples of Research Types ................................................................................. 27
  Research Type: Foundational Research ............................................................... 27
  Research Type: Early-Stage or Exploratory Research .......................................... 29
  Research Type: Design and Development ............................................................ 31
  Crossing the Boundaries of Design and Development and Early Efficacy Research ................................................................. 33
  Research Type: Efficacy Study ............................................................................. 35
  Research Type: Effectiveness Study .................................................................... 39
  Research Type: Scale-up Study ............................................................................ 41
Appendix B: Common Guidelines, by Research Type ............................................... 43
PCAST Report: “Engage to Excel”

2012

Five overarching recommendations to reach goal:

1. Catalyze widespread adoption of empirically validated teaching practices;

2. Advocate and provide support for replacing standard laboratory courses with discovery-based courses;

3. Launch a national experiment in postsecondary mathematics education to address the math preparation gap;

4. Encourage partnerships among stakeholders to diversify pathways to STEM careers; and

5. Create a Presidential Council on STEM Education to provide strategic leadership for transformative and sustainable change in STEM undergraduate education.
Priority STEM Education Investment Areas:
1. Improve STEM Instruction.
2. Increase and sustain youth and public engagement in STEM.
3. Enhance the STEM experience of undergraduates.
4. Better serve groups historically underrepresented in STEM.
5. Design graduate education for tomorrow’s STEM workforce.
Student-centered learning strategies can enhance learning more than traditional lectures. Examples of effective, research-based approaches are making lectures more interactive, having students work in groups, and incorporating authentic problems and activities.

Students have incorrect understandings about fundamental concepts -- particularly phenomena that are not directly observable, such as those that involve very large or very small scales of time and space. DBER has identified instructional techniques that may help, like using “bridging analogies” that link students’ correct understandings and the situation about which they harbor a misconception.

Students are challenged by important aspects of the domain that can seem easy or obvious to experts. For instance, in problem solving students tend to focus on the superficial aspects of a problem rather than its deep structure. These challenges pose serious impediments to learning in science and engineering, especially if instructors are not aware of them. Several strategies appear to improve problem-solving skills, such as providing support and prompts -- known as “scaffolding” -- as students work their way through problems.
A Focus on Community Colleges

2012

CONTENTS

PLANNING COMMITTEE ON EVOLVING RELATIONSHIPS AND DYNAMICS BETWEEN TWO- AND FOUR-YEAR COLLEGES AND UNIVERSITIES .................................................. v
ACKNOWLEDGEMENTS ............................................................................. vi
CONTENTS ................................................................................................... vii

Chapter 1: Introduction ........................................................................... 1
Chapter 2: Expanding Minority Participation in Undergraduate STEM Education ................................................................. 9
Chapter 3: The Loss of Students from STEM Majors ................................. 15
Chapter 4: Outreach, Recruitment, and Mentoring .................................. 19
Chapter 5: The Two-Year Curriculum in Mathematics ............................ 23
Chapter 6: Transfer from Community Colleges to Four-Year Institutions ........................................................................... 27
Chapter 7: General Discussion ................................................................. 33
References ............................................................................................... 41

Appendix A: Convocation Agenda ............................................................ 44
Appendix B: Brief Biographies of Committee Members and Staff ............ 48
Appendix C: Brief Biographies of Presenters and Panelists ....................... 52
Appendix D: Commissioned Paper by Becky Packard .............................. 58
Appendix E: Commissioned Paper by Debra Bragg ................................. 80
Appendix F: Commissioned Paper by Alicia Dowd ................................. 102

2Yc3 Webinar
January 17, 2014
Thank you!