

NSF Directorate for Education & Human Resources

Advisory Committee Meeting, Spring 2016

Tuesday, April 19, 2016 – Wednesday, April 20, 2016

4201 Wilson Blvd. Arlington, VA – Stafford I Conference Room 375

I. Welcoming Remarks and Review of Key Points from Last Meeting

- The Advisory Committee (AC) chair Dr. Francisco Rodriguez (Chancellor, LA Community Colleges) welcomed members and introduced new members.
- The AC was reminded about the upcoming OER subcommittee meeting.
- The AC was reminded of the three pillars of EHR supported research from the report, [Strategic Re-envisioning for the Education Human Resources Directorate](#):
 - Research on learning and learning environments
 - Workforce development
 - Broadening participation

II. Introductions, Meeting Overview and EHR Updates

- Dr. Joan Ferrini-Mundy (Assistant Director, EHR, NSF) introduced the meeting theme: *Partnership between STEM and STEM Education Research*
- Feedback on any/all topics was invited via “yellowslips” to be collected throughout the day.
- Updates were provided on:
 - EHR FY17 budget request
 - EHR involvement in NSF-wide and inter-directorate activities
 - New efforts in broadening participation
 - Division activities

III. “STEM for All: A View from the White House”

- Dr. Jo Handelsman (Associate Director for Science, OSTP) provided keynote remarks focused on the challenge of retention and matriculation of students who are attracted to STEM
- 3 methods for addressing this challenge were introduced:
 - Increasing the use of active learning
 - Ensuring course access at the primary and secondary education levels
 - Changing the biased image of STEM in the media
- Examples of the benefits of active learning and Federal efforts to decrease the impact of implicit bias were provided.
- Her vision for the future STEM workforce would be:
 - demographically proportionate
 - have abundant workers w/ STEM training,
 - populated w/ critical STEM thinkers, and
 - also populated with non-STEM workers who understand the nature of science.

- Discussion followed, focused on best practices, scaling, and industry partnerships for the diversification of STEM.

IV. *STEM Education Research in the STEM Enterprise: Public Participation in STEM Research*

- Dr. Ellen McCallie (Program Director, EHR, NSF) provided a basic introduction to citizen science and crowdsourcing, the chief components of public participation in STEM research.
- Ms. Jenn Gustetic (Assistant Director for Open Innovation, OSTP) spoke about:
 - The economic value of citizen science
 - The two-way engagement that comes from open innovation
 - The citizenscience.gov catalog and toolkit
- Dr. Jay Benforado (Deputy Chief Innovation Officer, Office of Research and Development, EPA) provided remarks on the EPA adoption of citizen science.
 - EPA focus is on:
 - Engaging public with environmental problems
 - Highlighting the need for more granular data
 - Challenging regulatory programs
 - Challenges include:
 - Paperwork Reduction Act requirements
 - Need for data quality measures to be adopted early in citizen science projects
- Dr. Jennifer Couch (Branch Chief, NCI, NIH), spoke about public participation in STEM research from the National Institutes of Health perspective.
 - NIH focus is on grants to researchers for PPSR-related projects in biomedical research.
 - There are major challenges in sharing of personal health data.
 - NIH is interested in game development for crowdsourcing research in the biomedical space.
- Dr. Deborah Goodings (Division Director, ENG, NSF) and Dr. Ellen McCallie spoke about:
 - NSF agency wide investments in PPSR
 - The NSF Agency Priority Goal for PPSR
 - How citizen science was important in detecting the lead crisis in Flint, MI water
- AC member Dr. Lillian Wu (Program executive, IBM), provided:
 - Brief remarks on the partnership between Apple, IBM, and Parkinson's advocates to use Research Kit to collect and provide data that directly helps the providers and the scientists
 - A question to the AC, "can education researchers come up with ways to crowdsource research on education?"
- Discussion followed concerning:
 - Challenges to mutually beneficial PPSR
 - The value that PPSR can bring to science learning
 - The importance of including social and behavioral science when planning PPSR projects

V. Advisory Committee Discussion in preparation for meeting with NSF COO, Dr. Richard Buckius

- AC Members suggested questions in the following areas:

- Broadening participation
- Workforce development
- Methods for supporting change in complex systems
- Roles for EHR within the agency and goals of the leadership

VI. *STEM Education Research in the STEM Enterprise: Cross-Directorate Collaborations around Big Data*

- Dr. Anthony E. Kelly (Sr. Advisor, EHR, NSF) provided introductory remarks on:
 - The early impact of big data on educational research and systems
 - Use of big data and internet of things (IoT) by Smart and Connected Communities (S&CC) projects to advance STEM education research
- NSF program officers for the Smart and Connected Communities (S&CC) solicitation provided an integrated perspective on this area from across the NSF Directorates.
- A NSF vision for S&CC was presented: *The effective integration of data sources, networked computing systems, and sensors with people, decision-making, and physical infrastructure to enable more livable workable and sustainable communities – regardless of place or scale.*
- The importance of public-private-academic partnerships in these efforts was stressed.
- Discussion with the AC and NSF directorate leadership followed that centered on :
 - Broadening participation and engaging national capacity through research and development partnerships that include bi-directional flow of information and ideas
 - Implications for big data and S&CC projects for research and improvement in STEM learning and learning environments

VII. *Highlights from Cross-Directorate Projects: A Poster Session*

- NSF program officers from EHR, CISE, MPS, and ENG highlighted projects from cross-cutting programs that have impact on STEM research and STEM education research.
- Presentations were provided by the following programs:
 - Cyberlearning and Future Learning Technologies (Cyberlearning)
 - National Science Foundation Research Traineeship (NRT)
 - IUSE / Professional Formation of Engineers: **RE**volutionizing engineering and computer science **D**epartments (RED)
 - Centers of Research Excellence in Science and Technology (CREST)
- Dr. Anne Austin provided a synthesis of the session in which she remarked on the integration of the projects across the three pillars of EHR funded research.

VIII. *Advisory Committee Meeting with Dr. Richard Buckius, NSF Chief Operating Officer*

- Dr. Francisco Rodriguez led the AC in a brief discussion of the events of the day.
- Discussion focused on the evolution of systems and learning methods to fit the needs of today's students and to reach beyond the traditional barriers of formal vs. informal settings
- The discussion that followed with Dr. Richard Buckius (COO, NSF) centered on major themes of concern within EHR and the STEM education research community including:

- The challenge of bringing the research discoveries to scale
- Foundation efforts towards diversity, changing demographics, and broadening participation
- Administrative burden, and data accessibility

IX. STEM Education Research in the STEM Enterprise: A Mutually Beneficial Relationship at NSF

- The Division on Graduate Education (DGE) presentation by Dr. Dean Evasius (Division Director, DGE, EHR, NSF) highlighted the following cross-directorate programs:
 - National Research Traineeships
 - Graduate Research Fellowships
 - CyberCorps Scholarships for Service
- The Division on Research on Learning in Formal and Informal Settings (DRL) presentation by Dr. Elizabeth VanderPutten (Deputy Division Director, DRL, EHR,NSF) highlighted cross-directorate collaborations in the following programs and initiatives:

<ul style="list-style-type: none"> ○ Cyberlearning and Future Learning Technology ○ STEM + Computing, ○ POLAR programs, ○ The BRAIN initiative 	<ul style="list-style-type: none"> ○ Science of Learning Centers ○ Big Data ○ Smart & Connected Communities ○ Innovations at the Nexus of Food, Energy and Water Systems (INFEWS)
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- The Division on Human Resource Development (HRD) presentation by Dr. Jesse DeAro (Program Director, HRD,EHR, NSF) focused on:
 - The cross-directorate nature of broadening participation in STEM
 - The HRD goal of expanding opportunities through partnership within and outside NSF
 - The following programs:
 - Tribal Colleges and Universities (TCUP)
 - HBCU-UP
 - CREST
 - ADVANCE
- The Division on Undergraduate Education (DUE) presentation by Dr. Susan Singer (Division Director, DUE, EHR, NSF) highlighted the cross-directorate collaboration in:
 - I-USE program
 - Research Voordination Networks (RCN)
 - I-Corps for Learning program
- AC member Dr. David Monk (Professor, Penn State University) provided brief remarks in which he:
 - Advised EHR on the need to maintain excellent strategic planning that takes into account the stakeholders and messy world in which each initiative takes place
 - Applauded the attention being given to metrics in the work by HRD
- AC member Dr. Okhee Lee (Professor, NYU) also provided brief remarks in which she counseled EHR to be intentional in planning cross-directorate activities and to consider the following questions when doing so:
 - What is goal/purpose of the collaboration?
 - Are goals intentional and explicit?
 - Is there an operating system for roles of different directorates?

- What lessons are learned from collaborations?
- What legacy activities will be necessary to maintain scaling, sustainability and ownership?
- Discussion followed, centered on what the EHR role should be in enabling the implementation process for education research.

X. *STEM Education Research in the STEM Enterprise: Engaging Broader Participation in STEM through NSF INCLUDES*

- The co-lead of the INCLUDES initiative, Dr. Mario Rotea (Division Director, ENG, NSF) provided background on INCLUDES and the role envisioned for INCLUDES alliances.
- Dr. Tasha Inniss (Program Director, EHR, NSF) moderated a panel of AC members who are College and University leaders to discuss what approaches in and between institutions have the most potential to address major challenges to broadening participation that require collaboration across sectors.
- Challenges introduced by the panel included:
 - Growth in STEM learning cannot come at the expense of non-STEM disciplines.
 - The impact of the economic divide on resources for education cannot be ignored.
 - Broadening participation must be seen as an asset rather than a liability.
 - To get to the root of some of the STEM attrition, we need to start in the school systems.
- Discussions by the AC examined the role that NSF should play in building and/or enabling the alliances, as well as the strategic purpose of alliances.
- The AC stressed the importance of the cultural aspect of science.

XI. *Committee of Visitors Report Updates*

CyberCorps® Scholarship for Service (SFS) program

- Dr. Victor Piotrowski (Program Director, EHR, NSF) presented an update on The CyberCorps® Scholarship for Service (SFS) program.
- This program includes the involvement of the White House Office of Science and Technology Policy, the intelligence communities, and other science agencies through joint program GenCyber.
- SFS is designed to promote cybersecurity education and workforce development through scholarship and instructional capacity building.
 - Funds are split 80/20 between scholarship programs and capacity building.
 - Scholarship program participants have a 93% placement rate in the federal government.
 - The program includes long-term monitoring of student career progression.
 - The merit review process includes reviewers from federal agencies and industry in addition to academics.
- SFS is increasing efforts in diversity of discipline and serving traditionally underrepresented groups.
- Future activities include:
 - Increasing engagement with community colleges
 - Development of an institutional designation as a Center of Excellence in Cyber Defense
 - A new AP course, and a new accreditation in Cyber Sciences

- Discussion with AC members included the value of metric collection and student tracking, international diversity, veteran engagement, and the role of salary limitations on government retention of SFS-trained experts.

Division on Research on Learning in Formal and Informal Settings (DRL)

- Dr. Elizabeth VanderPutten (Deputy Division Director, EHR, NSF) & Dr. Julie Johnson (Program Director, EHR, NSF) presented an update on activities in DRL since the last COV
- The recent DRL COV covered the following programs: ISE/AISL, DRK-12, ITEST, PRIME, MSP-STEM-C Partnerships, and REAL/REESE/GSE/RDE.
- This COV made recommendations for:
 - Division strategy
 - Management towards continuous improvement
 - Clarification of the intent and interpretation of broader impacts
- DRL efforts to examine the interconnectedness of the programs and clarify the types of research investments were described.
- Improvements in evaluation efforts was also included.
- Actions taken to define broader impacts were remarked on.
- The AC discussed the importance of creating opportunities for engagement of under-represented groups at the program level and how NSF can continue to support promising research after the program that initiated it has expired.

Future COV Reports

- Dr. Corby Horvis (Program Director, EHR, NSF) provided a primer on the COV report process.
- Fall 2016 COVs are expected to be for the following division and programs:
 - HRD
 - EHR Core Research (ECR)
 - I-USE

XII. Wrap-Up and Adjournment of Full Committee

- Dr. Francisco Rodriguez asked the AC membership to provide final thoughts and feedback to EHR. Response included:
 - Desire to continue the conversation on connecting education and research in the future
 - Belief that education researchers who have the abilities to harness the power of big data are needed
 - Strong emphasis on importance of broadening participation
- The next meeting was set for November 30 to December 1, 2016 and the Spring 2016 meeting was adjourned.