



ANNUAL REPORT FOR AWARD # 0958155

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Contact Information for Project

PI Information:

Franklin W. Olin College

Workshop: Developing a National Network of Grand Challenge Scholars Programs

Participant Individuals:

Senior personnel(s) : William M Reichert; Martha Absher; Louise Yates; Kay C Dee; Mark H Somerville; Jonathan D Stolk; Robert Martello; Debbie Chachra; Jessica Townsend; Steve Gold; Sanjoy Mahajan; Steven Schiffman; Borjana Mikic

Participants' Detail

Partner Organizations:

Duke University: Collaborative Research

William 'Monty' Reichert and Martha Absher of Duke University are implicit co-PIs on this project.

University of Southern California: Collaborative Research

Louise Yates of USC is an implicit co-PI on this project.

Other collaborators:

This is a workshop grant and there is a long list of workshop participants.

The April workshop on the Grand Challenge Scholars Program (including an evening program bridging from the previous day's regional Grand Challenge Summit) attracted about ninety participants from forty colleges and universities, including the majority of those who had signed up for the GCSP in the prior year. A follow-on summer faculty development institute included

eight GCSP registrants from four GCSP schools.

Workshop attendees:

First Name	Last Name	Company Title
Asad	Abidi	University of California, Los Angeles Professor
Martha	Absher	Duke University Assistant Dean, Education and Outreach Programs, School of Engineering
Joe	Astroth	Autodesk Vice President of Learning & Education
Jeffrey	Atkinson	Franklin W. Olin College of Engineering Student
AMINE	BENSAID	Fondation RMA Watanya Futuris Project Principal
H.Kim	Bottomly	Wellesley College President
Lori	Breslow	Massachusetts Institute of Technology Director TLL
Nancy	Brown	Autodesk AEC Education Solutions Specialist
Keith	Buffinton	Bucknell University Dean of Engineering
Lisa	Bullard	North Carolina State University Director of Undergraduate Studies, Teaching Associate Professor
Jenna	Carpenter	Louisiana Tech University Professor
Franco	Cerrina	Boston University Chair of the Electrical and Computer Engineering Dept
Debbie	Chachra	Franklin W. Olin College of Engineering Assistant Professor of Materials Science
Eng Soon	Chan	National University of Singapore Dean, School Engineerin
Li-Te	Cheng	IBM Research Scientist
S. Hossein	Cheraghi	Western New England College Dean-School of Engineer
Ellen	Chisa	Franklin W. Olin College of Engineering Student
Jim	Collofello	Arizona State University Associate Dean and Professor
Patrick	Crago	Case Western Reserve University Associate Dean of Engineering
Tim	Cross	Columbia University Senior Director for Strategy, The Center for Technology, Innovation and Community Engagement
Brian	Cunningham	University of Arizona Lecture
Lew	Edgers	Tufts University Associate Dean, School of Engineering
Nosa	Egiebor	Tuskegee University Professor & Samuel Massie Chair
EZZOUBEIR	ERRHAIMINI	FinanceCom Investment Director
Dianne	Fodell	IBM IBM Innovation and University Relations
Roobik	Gharabagi	Saint Louis university Associate Professor, Chair
Dave	Goldberg	Univeristy of Illinois at Urbana Champaign Co-Director, iFoundry
Barry	Griffin	BA Griffin Associates, Inc VP
W.Eric	Grimson	Massachusetts Institute of Technology Department Head of Electrical Engineering and Computer Science
Linda	Grisham	Massachusetts Bay Community College Dean, Science,Tech, Engineering & Math Division
Selcuk	Guceri	Drexel University Professor and Dean of the College of Engineerin
Ron	Guerriero	Franklin W. Olin College of Engineering Director of Business Development
E. Vagos	Hadjimichael	Fairfield University Dean, School of Engineering
Trevor	Harding	California Polytechnic State University San Luis Obispo Chair, Materials Engineering
Daniel	Hastings	Massachusetts Institute of Technology Dean for Undergraduate Education
Arthur	Heinricher	Worcester Polytechnic Institute Dean of Undergraduate Studies
Mustaque	Hossain	Kansas State University Professor
Laurence	Jacobs	Georgia Institute of Technology Associate Dean for Academic Affairs
Sharon	Jones	Lafayette College Professor, Civil and Environmental Engineering / Engineering Studies
Ananya	Kejriwal	Franklin W. Olin College of Engineering Student
Sue	Kemnitzner	National Science Foundation Deputy Division Director, Engin

Joanne Kossuth Franklin W. Olin College of Engineering VP Operations
 Sarah Kuhn University of Massachusetts, Lowell Professor
 Sanjeev Kumar Southern Illinois University Carbondale Professor and Chair,
 Civil Engineering
 Seh-Chun Lim National University of Singapore Professor
 Kenneth Lutchen Boston University Dean, College of Engineering; Professor
 of Biomedical Engineering
 Art MacCarley California Polytechnic State University San Luis Obispo
 Professor, Dept. Chair - EE
 Jose Macedo California Polytechnic State University San Luis Obispo Associate
 Professor
 Jaime McCandless Franklin W. Olin College of Engineering student
 Ann McKenna National Science Foundation Program Director
 DeeDee Meldrum Arizona State University Professor and Dean of the Fulton
 School of Engineering
 Murray Metcalfe University of Toronto Professor, Globalization
 Rick Miller Franklin W. Olin College of Engineering President
 Marco Morales Franklin W. Olin College of Engineering Student
 Jacqueline Mozrall Rochester Institute of Technology Department Head and
 Professor
 Stan Napper Louisiana Tech University Dean of Engineering and Science
 Jessica Newlin Bucknell University Visiting Assistant Professor
 John Orr Worcester Polytechnic Institute Provost
 Roger Parsons University of Tennessee Professor
 Robert Peck University of Massachusetts, Dartmouth Dean, College of Engineering
 Allyson Peerman Advanced Micro Devices VP, Public Affairs
 Thomas Peterson National Science Foundation Assistant Director, Directorate
 for Engineering
 Andy Pethan Franklin W. Olin College of Engineering student
 Ser-Tong Quek National University of Singapore Professor
 K RAVINDRA SAINT LOUIS UNIVERSITY ASSOC DEAN
 Chris Rogers Tufts University Director of the Center for Engineering Educatio
 and Outreach
 Stephen Schiffman Franklin W. Olin College of Engineering Interim Vice
 President for Academic Affairs and Dean of Faculty
 Steven Schreiner The College of New Jersey Dean, School of Engineering
 Alec Scranton University of Iowa Professor & Associate Dean of Academic
 Programs
 Subrata Sengupta University of Michigan-Dearborn Dean, College of Engineering
 and Computer Science
 Risa Sherman Cause Consulting Consultant
 Thomas Siller Colorado State University Associate Dean for Academic and
 Student Affairs
 Kevin Simon Franklin W. Olin College of Engineering Student
 Mark Somerville Franklin W. Olin College of Engineering Associate Dean
 for Academic Programs and Curricular Innovation
 S. S. Sriharan Naval Postgraduate School Dean of Engineering & Applied
 Sciences
 Lynn Stein Franklin W. Olin College of Engineering Director, Initiative
 for Innovation in Engineering Education
 Cathy Summa Wellesley College Director of the Science Center
 Subra Suresh Massachusetts Institute of Technology Dean, School of Engineering
 John Ting University of Massachusetts, Lowell Dean, College of Engineering
 Mike Toole Bucknell University Associate Professor of Civil Engineering
 Zulma Toro-Ramos Wichita State University Dean of Engineering
 Cherrice Traver Union College Dean of Engineering
 Yannis Tsvivas Columbia University Professor
 Darrel Untereker Medtronic Vice President
 Ignatios Vakalis California Polytechnic State University San Luis Obispo
 Prof./Chair, Department of Computer Science
 JOHN WOOLSCHALGER SAINT LOUIS UNIVERSITY CHAIR, CIVIL ENGINEERING

Lilian Wu IBM Program Executive, University Relations and Innovation
 Louise Yates University of Southern California Associate Dean
 Yevgeniya Zastavker Franklin W. Olin College of Engineering Associate
 Professor of Physics
 Steven Zhang Franklin W. Olin College of Engineering student

Summer Institute GCSP registrants:

Last Name	First name	Academic Title	Administrative Title	Institution
Apelian Diran	Professor	WPI		
Heinricher	Arthur	Dean of Undergraduate Studies	WPI	
Crittenden	Kelly	Associate Professor		Louisiana Tech University
Woolschlager	John	Associate Professor	Chair of Civil Engineering	Saint Louis University
Gharabagi	Roobik	Associate Professor		St. Louis University
Hart Megan	Assistant Professor			St. Louis University
Whitman Lawrence	Associate Professor		Director of Engineering Education	Wichita State University
Corley Melvin	Professor	Director of Mechanical & Civil Engineering		Louisia Tech University

Project Activities and Findings

Activities and findings:

Research and Education Activities:

This workshop grant supports the development of a national network of Grand Challenge Scholars Programs. The grant itself supports education of participant faculty members regarding the needs and opportunities related to the NAE Grand Challenges and the details of the Grand Challenge Scholars Program.

We held a day-long workshop in April 2010 with approximately 90 participants from over 40 colleges and universities. The workshop goals were to empower and prepare participants to implement Grand Challenge Scholars Programs on their home campuses. A dinner bridging from the regional Grand Challenge Summit on the Educational Imperatives of the Grand Challenges featured a keynote talk by MIT's Dean Subra Suresh. The morning program consisted of presentations and interactive discussions; the afternoon included a facilitated working session so that attendees could leave with plans of action to pursue the next steps towards GCSP establishment. Pre- and post-workshop evaluations were conducted by Prof. KC Dee of Rose Hulman Institute of Technology.

Unexpended funds from this grant were used to support 8 GCSP registrants in a follow-up program during the week-long Summer Institute (Meeting the Needs of the 21st Century: Designing for Student Engagement). Through a series of interconnected activities ranging from reading groups to hands-on design sessions, presentations by experts and peer consultations, Institute participants explored the needs of today's student body, curricular practices that engage and empower students, and effective strategies for overcoming structural and cultural obstacles to change.

Findings:**Workshop:**

- * After the workshop, members of the target group were less concerned about all but one of the listed potential obstacles or difficulties.
 - * Attendees with responsibility for planning/undertaking GCSPs ('members of the target group') were significantly ($p < 0.05$) less concerned about:
 - * raising funds,
 - * establishing the research experience component of the program,
 - * establishing the global dimension component of the program.
- After the workshop, members of the target group were slightly (but not significantly) more concerned about obtaining faculty support.
- * After the workshop, members of the target group self-reported more positive feelings about implementing GCS programs.
 - * After the workshop, members of the target group reported having more well-developed plans about establishing GCS programs.
 - * Members of the target group reported significantly ($p < 0.05$) more developed plans for:
 - * raising funds,
 - * facilitating interdepartmental interactions,
 - * obtaining faculty support,
 - * establishing the research experience, interdisciplinary curriculum, global dimension, and service learning components of the programs,
 - * obtaining approval from the national GCS program steering committee.

Summer Institute:

Post-workshop feedback suggests that participants left with a host of new ideas for curriculum and for shepherding change processes, some of which they are already putting into practice. 'It was so packed with info it will take time to digest it all'; 'Now I have some great tools'; 'I have learned a great deal from this workshop'; 'It revamped my thought process'; 'Eye opening'.

Training and Development:

See previous entry; this workshop grant is substantially aimed at professional development and support for faculty members who will be implementing educational programs (Grand Challenge Scholars Programs) at their home institutions.

These programs in turn will benefit students at these institutions, providing educational and para-curricular tracks that support interdisciplinarity, global engagement, entrepreneurship, service learning, and work on the grand challenge problems of the 21st century.

Outreach Activities:

This workshop grant has been primarily focused on building a national network of engineering schools focused on problems and educational pathways of significant social importance. Participant schools will build individual outreach programs. In addition, publicity for these programs, for the grant activities, and for associated activities such as the regional summit on the Educational Imperatives of the Grand Challenges and the national Extraordinary Stories Student Award Program all help to increase broad understanding of and participation in science and technology. These workshops in particular catalyzed partnerships with Wellesley and Babson Colleges -- non-engineering schools -- now beginning to build GCSPs of their own. Over the next year, grant funds will also be used for more explicit dissemination.

Curricular target(s) of Project

Project Products, Publications, Materials

Journal Publications:

Book(s) of other one-time publications(s):

Lynn Andrea Stein and the National Grand Challenge Scholars Program Steering Committee, "Workshop on Developing a National Network of Grand Challenge Scholars Program" , bibl. Workshop Notes, April 22, 2010 at the Franklin W. Olin College of Engineering, Needham, MA 02492, (2010).
Workshop Notes Workshop Notes

Lynn Andrea Stein, Mark Somerville, and Jonathan Stolk, "Program Notes from Meeting the Needs of the 21st Century: Designing for Student Engagement" , bibl. Program Notes from the Franklin W. Olin College of Engineering's Initiative for Innovation in Engineering Education Summer Institute, (2010).
Program Notes

Other Specific Products:

Powerpoint presentation and supporting dataset

Powerpoint presentation and supporting dataset from the evaluation of the April 22 workshop.

In our dissemination of the workshop results, we will use these materials to support our methods.

Internet Dissemination

Internet Dissemination:

<http://www.grandchallengescholars.org>

This is the site for the National Grand Challenge Scholars Program including the workshop.

Additional Information

Contributions:

Contributions within Discipline:

Addressing the NAE Grand Challenges over the next 20-plus years will require the efforts and talents of many men and women educated in a range of engineering disciplines, the majority of whom are currently high school age or younger.

The NAE Grand Challenges Scholars Program (GCSP) aims to educate engineering undergraduates who will play leading roles in the NAE Grand Challenges. The April workshop and June follow-on, together with other activities of the steering committee and institutional representatives, are rolling out a number of GCSPs and creating the kinds of educational opportunities for students originally envisioned in this grant proposal and in its precursor activities at the inaugural NAE Grand Challenges Summit held at Duke University in March 2009.

Contributions to Other Disciplines:

In addition to the GCSPs under development and in progress at engineering schools across the country, grant activity has generated interest at liberal arts and business schools and is prompting a likely expansion of the GCSP to these institutions. In addition, on campuses where the GCSP is limited to engineering students, the interdisciplinary nature of the challenges and the corresponding educational requirements guarantee that the impact of these changes will affect non-engineering students as well. Students not enrolled in a GCSP will benefit as this program shifts attention to the socially crucial problems and broadly-based skills on which this kind of engineering education is based. It is likely that the GCSP will also engage some students who now leave engineering because they do not perceive the societal value of an engineering degree.

Contributions to Education and Human Resources:

See previous answers: This workshop grant is aimed at professional development for faculty and consequent establishment of educational and para-curricular programs for students that broadens traditional engineering programs and incorporates interdisciplinarity, global engagement, entrepreneurship, service learning, and work on the grand challenge problems of the 21st century. Through work under this grant, multiple academic institutions have established and more are establishing programs of these sorts; the number of students directly affected is in the tens to hundreds now and growing rapidly.

Contributions to Resources for Science and Technology:

The work of this grant is creating a community of practice within which ideas and approaches can be shared. Participants can work collaboratively towards shared aims. Over the next year, joint efforts will lead to multi-institutional work and exchange of programs and ideas. Individual institution GCSPs also provide models for other schools to emulate or adapt.

Contributions Beyond Science and Engineering:

The problems inspiring this work -- and the solutions undertaken by students and by academic institutions -- are of broad societal interest. This project is an early stage of a major shift in engineering education and practice, informing policy, workforce, and public discourse.

Conference Proceedings:

Special Requirements for Annual Project Report:

Categories for which nothing is reported:

Products: Journal Publications
Conference Proceedings
Special Reporting Requirements
Animal, Human Subjects, Biohazards

Contact Information for Project: Primary contact for project information
Contact Information for Project: Type of Institution
Contact Information for Project: Collaborating Awards

Project Activities and Findings: Project Goal(s)
Project Activities and Findings: Updated Project Description
Project Activities and Findings: Innovations or Unique Successes to Date
Project Activities and Findings: Other Features of Project

Curricular target(s) of Project: Discipline(s) Affected by Project
Curricular target(s) of Project: Subject(s) Affected by Project
Curricular target(s) of Project: Title(s) of Course(s) Affected by Project
Curricular target(s) of Project: Summary Description of Pedagogical Approaches

Project Products, Publications, Materials: Types of products
Project Products, Publications, Materials: Other Types of Products

Internet Dissemination: FTP Server Address
Internet Dissemination: Gopher Server Address

Additional Information: Description of Equipment or Instrumentation
Additional Information: Additional Sources of Funding

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