



Creating Solutions. Inspiring Action.®

Summer Member Meeting

June 11 – 12, 2012

**St. Regis Hotel
Washington, DC**

AGENDA:

MONDAY, JUNE 11, 2012

ST. REGIS HOTEL, WASHINGTON DC

▶ 3:00 P.M.

Depart for Russell Senate Office Building

Meet in St. Regis Lobby at 2:45 p.m.

▶ 3:30 - 5:30 P.M.

BHEF Regional Projects Public Launch Event

Kennedy Caucus Room (SR-325)

Russell Senate Office Building

Introduction

- **William E. Kirwan, II**, BHEF Chair and Chancellor
University System of Maryland
- **Tom Kalil**, Deputy Director for Policy, White House Office of
Science and Technology Policy
- **The Honorable C.A. Dutch Ruppersberger** (D-MD)
U.S. House of Representatives (invited)

Keynote Address

- **Freeman Hrabowski, III**
President, University of Maryland, Baltimore County

Announcement of Advanced Cybersecurity Education Scholars (ACES) Program

- **Wes Bush**, BHEF Vice Chair and Chairman & CEO
Northrop Grumman Corporation

Keynote Panel

Moderator

- **Roger Ferguson, Jr.**, President & CEO, TIAA-CREF and
Member, President's Council on Jobs and Competitiveness

Panelists

- **Mark Wrighton**, Chancellor, Washington University
in St. Louis
- **Marion Blakey**, President and CEO, Aerospace Industries As-
sociation
- **Patrick O'Shea**, Vice President for Research and Senior Re-
search Officer, University of Maryland

Official Launch of first 12 BHEF Workforce Regional Projects

- **Brian Fitzgerald**, CEO, Business-Higher Education Forum

Networking session with regional teams

AGENDA:

MONDAY, JUNE 11, 2012 (cont.)

ST. REGIS HOTEL, WASHINGTON DC

- ▶ 5:45 P.M. **Return to St. Regis Hotel via Shuttle**

- ▶ 6:30 - 7:30 P.M. **Chairman's Opening Reception**
 Astor Terrace

- ▶ 7:30 - 9:00 P.M. **Opening Dinner**
 Astor Ballroom
 Dinner Speaker
 - **Scott Fleming**, President & Vice Chairman, Madison Education Group and Education Policy Advisor, "Romney for President" Campaign

AGENDA:

TUESDAY, JUNE 12, 2012

ST. REGIS HOTEL, WASHINGTON DC

- ▶ 7:30 - 8:30 A.M. **Breakfast**
Chandelier

- ▶ 8:30 A.M. **Depart for Eisenhower Executive Office Building of the White House**
Meet in St. Regis Lobby at 8:15 a.m.

- ▶ 9:30 - 11:30 A.M. **Roundtable with White House Officials**
Indian Treaty Room (Room 474)
Eisenhower Executive Office Building, The White House

- ▶ 11:45 A.M. **Return to St. Regis Hotel**

- ▶ 12:00 - 1:30 P.M. **Lunch**
Chandelier

- ▶ 1:30 - 2:30 P.M. **Learning Session: BHEF and the Office of Naval Research Launch the Next Generation U.S. STEM Education Model®**
Astor Ballroom
Moderator
 - **William H. Swanson**, Chairman & CEO,
Raytheon Company

- ▶ 2:30 - 3:15 P.M. **Business Meeting and Closing Session**
Astor Ballroom

OVERVIEW



Welcome to the Summer 2012 Member Meeting of the Business-Higher Education Forum (BHEF). This meeting will be different from previous BHEF gatherings, as we have two significant offsite marquis sessions that will present to the public and share with the White House Administration the groundbreaking BHEF member-led initiatives being developed to meet regional workforce needs; positioning BHEF to lead this important conversation of bi-partisan issues that will underpin the upcoming election.

On Monday afternoon, as a group, we will shuttle from the St. Regis Hotel, to the Kennedy Caucus Room in the Russell Senate Office Building, where BHEF will publically launch a dozen regional workforce projects (in both STEM and CRI), as well as the new National Undergraduate STEM Partnership. This event will feature BHEF members and special guests as keynote speakers, a keynote panel, a major announcement, and the recognition of all parties involved in the twelve projects. Following, our members will have the opportunity to network with a room full of congressional and federal representatives, and key stakeholders prior to re-boarding the coaches and returning to the hotel.

Upon returning to the St. Regis, our traditional reception and opening dinner will welcome members from the National Advisory Council on Innovation and Entrepreneurship. This council, co-chaired by Steve Case (chairman and CEO, Revolution and co-founder, AOL), Mary Sue Coleman (president, University of Michigan), and Desh Deshpande (chairman, Sparta Group), was formed by U.S. Commerce Secretary Gary Locke to support President Obama's innovation strategy by helping to develop policies that foster entrepreneurship and identifying new ways to take great ideas from the lab to the marketplace to drive economic growth and create jobs. We hope this serendipitous opportunity opens the door for new BHEF memberships. Also joining us as our keynote dinner speaker will be Scott Fleming, the President and Vice Chairman of the Madison Education Group, who is also a senior education advisor to the "Romney for President" campaign.

Tuesday morning, we will shuttle to the historic Indian Treaty Room in the Eisenhower Executive Office Building of the White House complex, where BHEF members and special guests will engage in a rich, substantive discussion with senior Administration officials on workforce issues. This closed event is a tremendous opportunity for us to showcase BHEF innovation and ask the Administration to join us in making tangible progress on creating regional and national business, higher education, and government workforce demands.

Following lunch, back at the St. Regis, BHEF will conduct a learning session where we will unveil the new U.S. STEM Education Model Version 2.0. This build out has been funded by the Office of Naval Research and incorporates the structure of the award-winning Version 1.0 while further developing the postsecondary components, with a particular focus on the first two years of undergraduate education. BHEF chair and University System of Maryland (USM) chancellor Brit Kirwan will open the session by presenting USM's compelling new STEM attrition data that highlight the urgency to address these issues.

BHEF's business meeting will be integrated with the closing session. Members will elect new leadership, recognize those leaders, both transitioning out of BHEF positions and those retiring, and discuss broader organization-related news. The day closes by confirming key takeaways from the summer meeting and highlighting any identified next steps.

U.S. SENATE PARTNERSHIP LAUNCH EVENT

INTRODUCTION OF A NEW INDUSTRY-HIGHER EDUCATION SOLUTION FOR THE NEXTGEN U.S. WORKFORCE

By the auspices of Senator Kirsten Gillibrand, BHEF secured the historic Kennedy Caucus Room in the Senate Russell Building to present *Introduction of a New Industry-Higher Education Model for the NextGen Workforce*. Here, BHEF will publically launch a dozen regional pilot projects in both STEM and CRI, in addition to the new National Undergraduate STEM partnership.

This session is a keystone public event for BHEF and its members. During a session at the White House on May 23rd, we were pleased to learn of the President's interest in moving a STEM undergraduate completion agenda. Tom Kalil, Deputy Director for Policy, White House Office of Science and Technology Policy, will open the program, frame the national need for increased STEM graduation rates, and provide the ideal segue for BHEF Chair and Vice Chair, Brit Kirwan and Wes Bush, respectively, to take center stage and publically announce the full scope of the relationship between the University of Maryland System and Northrop Grumman Corporation.

This landmark announcement will be followed by an elite panel of industry and academic experts, which will be moderated by BHEF member, Roger Ferguson, President and CEO of TIAA-CREF. As former Vice Chairman of the Federal Reserve, Roger will provide an expert economic frame for the discussion. Panelists include BHEF member Mark Wrighton, Chancellor, Washington University in St. Louis; Marion Blakey, President and CEO, Aerospace Industry Association, and Patrick O'Shea, Vice President for Research, University of Maryland, College Park.

The program will wrap by recognizing all BHEF regional project representatives, who will come to the stage for a photo op and planned media. Everyone will then be invited to participate in a structured networking session, where Senators and their staff are scheduled to come and meet our delegations.

At 5:30 p.m., coaches will begin to return our group to the St. Regis for the Chairman's Opening Reception. However, transportation will remain at the Russell Building for as long as needed for BHEF members who are speaking with the press.

BHEF ROUNDTABLE WITH WHITE HOUSE ADMINISTRATION

REGIONAL AND NATIONAL BUSINESS, HIGHER EDUCATION, AND GOVERNMENT PARTNERSHIPS TO ADDRESS THE NATION'S JOBS AND SKILLS CHALLENGES

For the first time since BHEF became an independent not-for-profit organization in 2004, its members and special guests have been invited to the White House to engage in a substantive dialogue with senior Administration officials on higher education issues of mutual concern. President Obama has launched a college completion initiative and both the White House Domestic Policy Council (DPC) and the Office of Science and Technology Policy (OSTP) have identified undergraduate STEM education as a key leverage point for addressing critical workforce needs. The shift of the Administration from an almost complete focus on K-12 education to the undergraduate level reflects evolving priorities toward addressing the needs of the economy and a 21st century workforce. From the recent PCAST recommendations and numerous budget convenings among the Administration and Federal agencies, it is clear that BHEF's decision to focus on the first two years of STEM higher education, develop regional on-the-ground demonstration projects, and establish a national partnership group that aligns undergraduate STEM stakeholders positions BHEF in a leadership role to shape the Administration's education and workforce policies moving forward.

A major goal of the June 12th meeting at the White House will be to identify opportunities to engage Federal mission agencies in BHEF's regional and national efforts, and establish an ongoing dialogue with the Administration on education and workforce issues and how BHEF's agenda addresses these issues. On the regional side, we will use this meeting to explore ways that Federal agencies in specific sectors, e.g. cybersecurity, agriculture, entrepreneurship, energy, and aerospace, could connect with the regional projects BHEF members are developing in STEM and CRI. While Federal grant funding for BHEF projects is certainly an option, this meeting provides an opportunity to redefine business, higher education, and government partnerships to engage Federal laboratories and R&D facilities in their core competencies around expertise, training opportunities, and facilities/equipment.

On the national level, BHEF has established an alliance of academic and industry associations, professional societies, and government agencies around a set of joint operating principles, priorities, and activities following more than a year of convenings and partnership development among the participating organizations. At the White House meeting, we will present a letter of commitment signed by the leaders of organizations including AAU, APLU, AIA, and NDIA to OSTP Director John Holdren as a response to the Administration's call to action on STEM higher education reform and workforce development. We will invite the Administration and Federal mission agencies to join this group and create a community of effective practice in STEM education.

LEARNING SESSION**U.S. STEM EDUCATION MODEL® 2.0**

In the afternoon learning session, we will demonstrate for the first time the BHEF-Office of Naval Research (ONR) Next Generation U.S. STEM Education Model. The award-winning BHEF U.S. STEM Education Model®, developed by Raytheon and gifted to BHEF in 2009, is a simulation tool that allows users to see the effect of single and multiple policy interventions on STEM student and workforce outcomes.

In this session, BHEF chair and University System of Maryland (USM) chancellor William ‘Brit’ Kirwan will present groundbreaking research from USM focusing on student attrition from STEM fields during college, contextualizing the institutional challenges that Version 2.0 of the Model helps to address. Then, Dr. Michael Kassner from ONR will provide framing remarks about how he expects this improved tool to guide the Navy’s nationwide civilian STEM workforce development efforts.

Funded by the Office of Naval Research, Version 2.0 specifically examines high-leverage strategies that can improve retention in STEM fields, with the ultimate goal of meeting the nation’s demand for a highly-educated STEM workforce. During this learning session, members and guests will have the opportunity to learn from the model’s findings, probe the assumptions underlying the model, and discuss the implications of this work, including the dozen new interventions and strategies that are built into the model and can improve STEM retention in postsecondary education and ultimately increase the U.S. STEM workforce.

U.S. SENATE PARTNERSHIP LAUNCH EVENT



Introduction of a New Industry-Higher Education Solution for the NextGen U.S. Workforce

Overview

On June 11, BHEF is poised to hold a public launch of the Business-Higher Education Forum's *National Undergraduate Partnership Strategy and Regional Workforce Projects*—sharing the power of revolutionary industry-higher education partnerships to meet unique regional workforce needs. Representing some of the most accomplished and important industry and academic leaders in the nation, this event announces that our members are no longer satisfied to be among those who “admire the problem,” and are prepared meet America’s workforce and education challenges head-on.

Twelve projects will be announced in California, Florida, Iowa, Kentucky, Maryland, Massachusetts, Missouri, New York, Ohio, and Wisconsin. These initiatives build learning incubators designed to resolve America’s toughest workforce issues in today’s high-demand fields: cybersecurity, big-data, life sciences, water, energy, engineering, and entrepreneurship. Each of BHEF’s regional workforce projects showcases the commitment and urgency by businesses and higher education institutions to confront critical workforce challenges in their regions by strategically connecting companies’ core competencies with undergraduate education to increase persistence of students, particularly women and underrepresented minorities, toward degrees and careers in high-demand areas.

The projects will contribute to recommendations recently made by the President’s Council of Advisors on Science and Technology, calling for greater attention on the first two years of college and on the need for one million additional STEM graduates over the next ten years. They also respond to the recommendations of the President’s Council on Jobs and Competitiveness, which include increasing the number of industry-driven undergraduate research internships and production of engineering degrees nationally.

The event itself will unfold in two parts, a formal event with marquee speakers and panelists, and a networking reception with Senators, Congressional staff, media, and the broader stakeholder community. We are delighted that Tom Kalil, Deputy Director for Policy, White House Office of Science and Technology Policy, will provide opening remarks that will frame the event’s national

touch point—the gaps in America’s workforce, especially in high-demand fields, and their correlation to national security issues. BHEF Chair Brit Kirwan will then speak to the challenge from the perspective of the state of Maryland, and suggest that many other states face similar issues.

Freeman Hrabowski, III, president, University of Maryland, Baltimore County, will be our keynote speaker at this event, speaking to the promise of increasing success among women and minorities in STEM and other disciplines in which they are underrepresented, as well as the need for projects such as BHEF’s, which are creating real measurable change.

Wes Bush, BHEF vice chair and chairman and CEO, Northrop Grumman Corporation, will join Brit on the dais, where they will announce their landmark collaboration to co-create a new clinical undergraduate teaching model for cybersecurity—with a goal of enrolling underrepresented students in one third of the seats in this interdisciplinary honors program.

Immediately following, Roger Ferguson, Jr., CEO and president of TIAA-CREF and former vice chairman of the Federal Reserve, will offer framing remarks about the critical linkages among higher education, the workforce, and competitiveness in order to broaden the focus. He will lead a panel that includes, Mark Wrighton, chancellor of Washington University in St. Louis; Marion Blakey, president of the Aerospace Industries Association; and Patrick O’Shea, vice president of research, University of Maryland College Park, each describing their unique role in the formation of these new partnerships and projects.

Mark Wrighton will describe an equally innovative model for linking Washington University in St. Louis’ engineering school with the University of Missouri St. Louis and two feeder community colleges to boost persistence and deepen learning in information technology and engineering, particularly among underrepresented students, to create a more diverse student pool. They will discuss specifically the unique role a private research university can have on its region’s workforce needs. Marion Blakey will frame the national challenges companies in her industry face as the human capital market continues to dwindle. Patrick O’Shea will dive deeper into the specifics of the ACES Program and address how the partnership with Northrop Grumman is a new day for such collaborations.

Following the panel, Brian Fitzgerald will announce each BHEF regional workforce project and briefly introduce each member lead and team present. Teams will then come to the dais so they are identifiable to the press and pause for a photo op. The formal agenda will transition to a reception where national and regional press will be on site to interview the panelists and the teams and where participants can speak with the members to learn more about each project.

Invitations were sent to all Senators that had a regional project in their state. We expect a key staff member to be present from each state. Senators were asked to arrive at 4:30 p.m., following the formal schedule.

BHEF’s work—as an organization and of individual members—has captured the attention of national policymakers. BHEF anticipates over 200 key stakeholders will attend the event. We are continuing to work with our members and in-house media team to secure national and regional press placement.

BHEF Regional Workforce Projects

The Business Leaders for Education (BLE), a coalition of Louisville, KY's business leaders, including **Chrysalis Ventures** and **LG&E Energy**, will address the significant skills misalignment present between education production and business needs, mobilizing business support and driving the alignment of the region's 55,000 degree education attainment goal to core competencies needed for the 21st century workforce.

California Polytechnic State University, in partnership with **Northrop Grumman**, **Parsons**, and **Raytheon**, will leverage its Learn by Doing approach and large undergraduate engineering base to establish a cybersecurity undergraduate program consisting of a new undergraduate-focused lab supporting a new curriculum and student-driven applied research projects, and a graduate-level certificate program to attract a more diverse group of students to the high-demand field of cybersecurity.

Case Western Reserve University, in partnership with **The Sherwin Williams Company**, will develop a project focusing on first-year students in materials and polymer science to provide industry internships, co-op experiences, and other hands-on learning opportunities; and with the **Eaton Company**, to increase the persistence of community college students in the region to persist and succeed in STEM fields, focusing initially on information technology.

The City University of New York, in partnership with **IBM**, will draw on the expertise and resources of seven campuses in the CUNY system to offer students new academic and career pathways in analytics, urban energy, and water sustainability in the built environment. Students will be provided a broad-based curriculum and externship opportunities to work on interdisciplinary teams to develop informed, practical, and technically sound solutions to challenging sustainable energy and natural resource management problems.

Drake University, in partnership with the **Principal Financial Group**, are spearheading a partnership in Des Moines, IA to chart a new direction for Iowa's capital region through the Capital Crossroads regional effort, a committee of regional education, business, and foundation leaders working to make Greater Des Moines one of the nation's top mid-sized metro areas. This project will use deep cross-sector collaborations focused on strengthening the education-through-workforce pipeline to ensure the region acquires the trained human capital it needs to meet the demands of the 21st century workforce.

Miami Dade College, in partnership with **NextEra Energy**, will develop a Bachelor of Science in Information Systems Technology (BSIST), creating pathways for students from high school to associate to bachelor's degrees in information technology fields, including cybersecurity, and provide students with critical skills and knowledge required to direct and control computerized information resources in a range of sectors.

The Ohio State University, in partnership with **Battelle Memorial Institute** and **Case Western Reserve University**, will team up to address the workforce needs of the state's regional "medical corridor," and increase students' interest in health sciences and access to jobs in the health industry. This project will also support university efforts in implementing course redesign in STEM to support incoming students and increase the persistence of STEM students, particularly those from groups underrepresented in STEM fields.

BHEF Regional Workforce Projects (cont.)

San José State University, in partnership with **Oracle** and a wide range of stakeholders from industry, government, community colleges, and community organizations, will establish a Silicon Valley Center for Cybersecurity that will respond to the regional and national workforce need for cyber professionals by creating stackable degree components (certificates) and providing undergraduates with enhanced learning experiences outside the classroom, including internships.

The University System of Maryland (USM) is leading a multi-campus effort to bring the unique resources of institutions in the system to address Maryland's STEM workforce needs. **The University of Maryland College Park**, in partnership with **Northrop Grumman**, will create the nation's first undergraduate multidisciplinary residential cybersecurity honors program. **The University of Maryland Baltimore County (UMBC)** is developing a project that connects STEM undergraduates to new career pathways by applying their knowledge to innovation and entrepreneurship, which will begin with a focus on chemistry and link STEM undergraduate education to business, R&D, and innovation.

The University of Massachusetts System, in partnership with the **Massachusetts Competitive Partnership** (which includes BHEF members **Raytheon** and **Suffolk Construction**), will create a multi-campus strategy focusing on community college articulation, persistence, and increasing STEM degree attainment by underrepresented minority students and increase student access and success to significantly increase number of the number of STEM degrees awarded to URM students at both the A.S. and B.S. levels.

The University of Wisconsin System, in partnership with the **Milwaukee Water Council** and other regional stakeholders, will seek to address regional workforce needs for highly trained professionals in the water industry by tapping the distinct strengths of four universities in the system to integrate engineering, science, and technology education to create new approaches to the sustainable use of water systems, and provide students with new learning opportunities with business and industry in this field.

Washington University in St. Louis will partner with local two- and four-year colleges and regionally-based companies to address growing local workforce needs in information technology. Through a joint public-private undergraduate engineering program with Washington University, the University of Missouri St. Louis, and community colleges, the project will increase the diversity, quality of training, and graduation rates of students prepared to fill high-demand IT occupations in the St. Louis region.

BHEF ROUNDTABLE WITH WHITE HOUSE ADMINISTRATION



Regional and National Business, Higher Education, and Government Partnerships to Address the Nation's Jobs and Skills Challenges

Overview

BHEF has traditionally used its summer meetings to explore in detail the immediate priorities of the Administration. For example, in summer 2011, U.S. Secretary of Education Arne Duncan had an in-depth conversation with BHEF members about improving P-12 education outcomes and what business and higher education together can do to help better prepare students for college and, ultimately, the workforce. This meeting offers another such opportunity, focusing on high-demand jobs and, in particular, the need to build the science, technology, engineering, and mathematics (STEM) workforce so necessary for economic competitiveness.

The January 2012 State of the Union address marked a shift in the Obama Administration's priorities in education away from a primarily K-12 focus, particularly in STEM, and built a renewed sense of urgency around higher education outcomes. At the core of such a shift is a focus on keeping college affordable for all students, developing new innovative higher education partnerships, preparing and connecting students to the workplace, and ensuring enough STEM students graduate to keep the nation at the forefront of global competitiveness.

Both the White House Domestic Policy Council (DPC) and the Office of Science and Technology Policy (OSTP) have identified undergraduate STEM education as a key leverage point for addressing critical workforce needs. Beginning in March 2012 the DPC, OSTP, and many of the federal mission agencies began hosting meetings over the President's FY13 budget, giving an unusual plea to organizations such as BHEF to re-think engagement and the role we can play in aligning, leveraging, and scaling projects that connect undergraduate education to mission-critical research, STEM degrees, and jobs. As the agencies begin a bitter fight for their R&D dollars, there is an emerging opportunity for BHEF and its members to serve in a catalytic leadership role. Rarely is the federal government so willing to listen, actively participate, and collaborate on projects.

For the first time since BHEF became a non-profit organization in 2005, its members and special guests have been invited to the White House to engage in a substantive dialogue with senior Administration officials on issues of mutual concern. The shift of the Administration to the focus on undergraduate education reflects evolving priorities toward addressing the needs of the economy and a 21st century workforce. Recent PCAST recommendations (calling for one million new STEM graduates) and numerous budget convenings among the Administration and federal agencies have made clear that BHEF's decision to focus on high-demand jobs and especially the first two years of STEM higher education positions BHEF in a leadership role to shape the Administration's education and workforce policies in the months and potential years ahead. Furthermore, there are new federal grant opportunities and interagency coalitions (e.g., Widening Implementation and Demonstration of Evidence-based Reforms (WIDER) and Expeditions in Education (E2)) creating near-term opportunities to align and showcase BHEF's work regionally and nationally.

At this White House dialogue, BHEF members will engage on topics related to these themes, including:

- The unique attributes of their regional workforce projects
- What would be helpful for the federal agencies to effectively align their workforce needs to BHEF's existing projects
- How members are engaging in innovative partnerships, connecting universities and companies, and that would be enhanced by federal involvement
- The federal funding landscape and question where opportunities exist for BHEF projects, e.g. new federal grant opportunities or the Co-STEM OSTP working group

Federal STEM Education Investment Landscape

The most comprehensive inventory of federal investments in STEM was concluded in December 2011. The inventory project determined it was not duplication of efforts which was a main concern; rather, it was a question of how to **strategically focus and align the limited federal dollars available** to make a more significant impact in areas of national priority.

Currently, federal agencies are making some 252 distinct investments in STEM education for a total budgetary commitment of \$3.4 billion. To put the current investment in perspective, federal investment in STEM education today is less than 1 percent of the \$1.1 trillion spent annually on education in the United States. The majority (80%) of STEM education funding among Federal agencies comes from the National Science Foundation (NSF: 34%), the Department of Education (DOEd: 29%), and the Department of Health and Human Services (HHS; 17%). No other agency accounts for more than five percent of the total funding (See Figure 1).

Of the total \$3.4 billion spent by federal agencies on STEM education investments, \$1.1 billion worth of investments has the primary goal of targeting groups that are underrepresented in STEM. Approximately \$967 million (28%) is spent on activities that *target the specific workforce needs of science mission agencies* (See Figure 2). As these agencies' missions are quite different from one another, their workforce needs are also quite different. This does not exclude the cases where there are cross-cutting skill-sets needed among the disparate workforce needs, which could be best addressed by collaborative opportunities. The mission agency workforce investments, albeit a small piece of the investment pie, directly align with BHEF's regional project structure and provide a tangible funding area to pursue opportunities within.

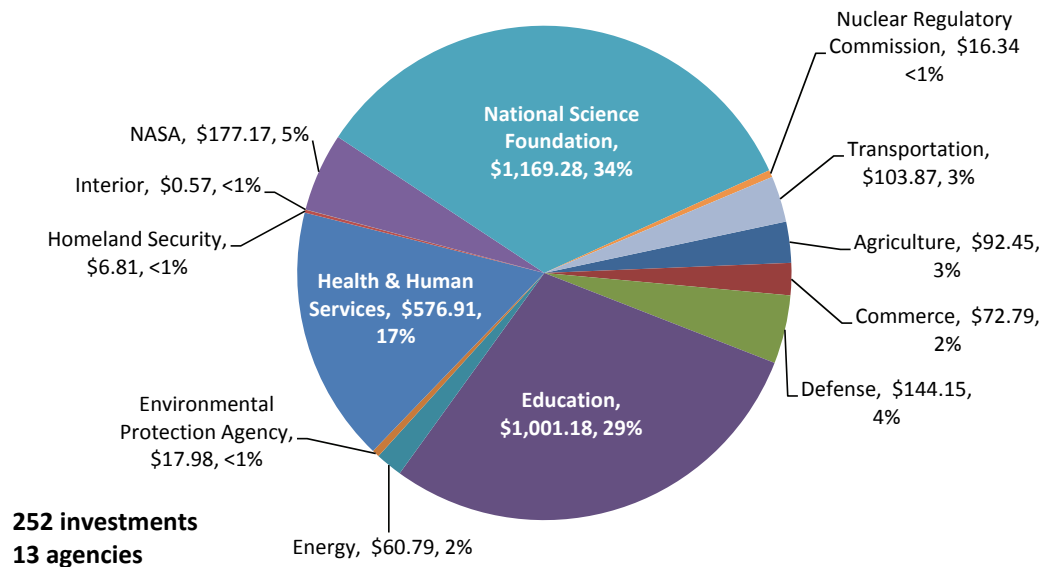
Developing Effective Partnerships with Federal Agencies & the Administration

The National Research Council has identified two key resources that federal science mission agencies possess: STEM knowledge and products, and access to STEM professionals. Federal agencies are using their access to practicing scientists and engineers, both their own employees and the large number of researchers whom they support at universities, national laboratories, or other institutions, to conduct frontier science and engineering research, access to practicing scientists and engineers, both their own employees and the large number of researchers whom they support at universities, national laboratories, or other institutions. In addition, mission agencies also support technology that can be used to illustrate the applications of science, mathematics, and engineering.

One of BHEF's major goals of the White House meeting is to identify opportunities to engage federal mission agencies in our regional and national efforts, and establish an ongoing dialogue with the Administration on education and workforce issues. On the regional side, BHEF will use this meeting to explore ways that federal agencies in specific sectors, e.g., cybersecurity, agriculture, entrepreneurship, energy, and aerospace, could connect with the on-the-ground projects BHEF members are developing in STEM and CRI. While federal grant funding for BHEF projects is certainly an option, as the NRC has identified, this meeting provides an opportunity to redefine business, higher education, and government partnerships to engage federal laboratories and R&D facilities in their core competencies around expertise, training opportunities, and facilities/equipment.

Figure 1: Federal STEM Education Investments by Agency¹

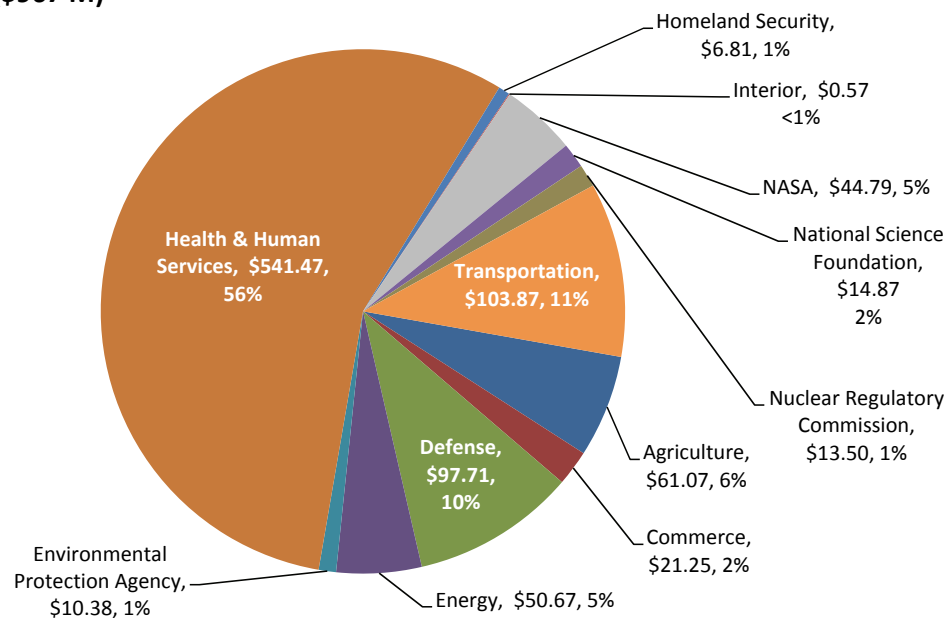
Federal STEM Education Investments by Agency (\$3,440 M)



Source: National Science and Technology Council, December 2011

Figure 2: Funding for Agency Mission-Specific Workforce Education by Agency²

Funding for Agency Mission Workforce by Agency (\$967 M)



Source: National Science and Technology Council, December 2011

New National & Presidential Initiatives in 2013 Provide Opportunities for BHEF

BHEF has established an alliance of academic and industry associations, professional societies, and government agencies around a set of joint operating principles, priorities, and activities, following more than a year of convenings and partnership development. At the White House meeting, the partners will present a letter of commitment signed by the leaders of eight organizations including Aerospace Industry of America, American Chemical Society, American Council on Education, Association of American Universities, Association of Public and Land-Grant Universities, American Society for Engineering Education, National Defense Industry Association, TechNet to OSTP Director, John Holdren as a response to the Administration's call to action on STEM higher education and workforce development reform.

The America COMPETES Reauthorization Act of 2010 called for the formation of a National Science and Technology Committee on STEM Education (CoSTEM) and charged it with developing a five-year strategic plan to advance the state of American STEM education. The NSTC Committee on STEM Education (CoSTEM) was created on February 1, 2011, and includes representatives from 11 federal agencies, as well as the Office of Science and Technology Policy (OSTP) and the Office of Management and Budget (OMB). Many of the representatives from CoSTEM will be meeting with BHEF at the White House Meeting. The national undergraduate partnership group already has active participation with the National Science Foundation and the Office of Naval Research. We will invite the Administration, CoSTEM members, and other federal mission agencies to join this group and create a community of effective practice in STEM education.

The President's Council of Advisors on Science and Technology (PCAST) in its February 2012 report to the President, said if the United States wants to remain the competitive forerunner in STEM fields, the nation will require approximately one million more STEM professionals than what will be produced at current rates over the next decade. In response to the PCAST report, the President announced two new initiatives in the FY13 budget request that positions BHEF's national partnership group for a definitive response. The first, *Widening Implementation and Demonstration of Evidence-based Reforms (WIDER)* would be developed to increase the use of evidence-based undergraduate STEM education practices through institutional reforms. WIDER could provide funding for BHEF's pilot projects, each demonstrating innovative education models based on evidence-based interventions that showcase institution's willingness to adapt to meet regional workforce needs. The second, a new NSF program, *Expeditions in Education (E2)*, connects EHR with NSF research directorates and offices in order to integrate, leverage, and expand STEM education research and development with NSF research activities. The E2 program could offer a tangible way to align BHEF's regional projects to education research, in addition to providing an incentive to fix the projects to research occurring on project campuses.

- 1 Executive Office of the President, National Science and Technology Council. (2011). *The Federal Science, Technology, Engineering, and Mathematics (STEM) Education Portfolio. A Report from the Federal Inventory of STEM Education Fast-Track Action Committee, Committee on STEM Education*. Washington, DC.
- 2 Executive Office of the President, National Science and Technology Council. (2011). *The Federal Science, Technology, Engineering, and Mathematics (STEM) Education Portfolio. A Report from the Federal Inventory of STEM Education Fast-Track Action Committee, Committee on STEM Education*. Washington, DC.

LEARNING SESSION



BHEF and the Office of Naval Research Launch the Next Generation U.S. STEM Education Model®

Overview

BHEF's U.S. STEM Education Model® has influenced policy and practice since its public release in 2009. Version 2.0—more robust in the number and sophistication of its simulations—promises even more significant impact. In this learning session, we will provide an advance release of the BHEF-Office of Naval Research (ONR) Next Generation U.S. STEM Education Model. This event will focus on the build-out of Version 2.0 and its new interventions and strategies to improve STEM retention in postsecondary education and ultimately increase the U.S. STEM workforce. The session will include a presentation from BHEF chair and University System of Maryland (USM) Chancellor Brit Kirwan on groundbreaking research from USM focusing on student attrition from STEM fields during college, contextualizing the regional challenges that the model will help to address. Dr. Michael Kassner, ONR's director of research, will also provide framing remarks regarding how such a modeling tool can guide the Navy's workforce development efforts nationwide.

BHEF's U.S. STEM Education Model: Impact on Policy and Practice

In 2009, BHEF unveiled the [BHEF U.S. STEM Education Model®](#), a first-of-its kind system dynamics model designed to simulate the impact of adopting evidence-based policies and practices to strengthen student outcomes in the STEM disciplines. The model was developed through the leadership of BHEF member William ("Bill") Swanson, Chairman and CEO of the Raytheon Company, and was donated to BHEF for open source use.

The model produced a critical, overarching finding that has shaped policy and practice: the first two years of STEM undergraduate education constitute the greatest leverage point for increasing both the number of STEM degrees attained, and the depth and quality of STEM knowledge and skills. This finding represents a unique opportunity for collaboration among BHEF business and higher education members to improve STEM undergraduate outcomes and meet workforce demand. It also led to the launch of BHEF's STEM Higher Education and Workforce Project, including regional projects that will reshape the first two years of STEM undergraduate education.

BHEF's modeling and data analysis has influenced the Obama's Administration's priorities, including the President's Council of Advisors on Science and Technology (PCAST) recent report, "[*Engage to Excel: Producing One Million Additional College Graduates with Degrees in Science, Technology, Engineering, and Mathematics*](#)." The PCAST report states, for example, that interventions for improving STEM education during the first two years of college are critical. The Obama White House and key mission agencies are responding to the report's recommendations.

Advancing to Version 2.0

In August 2011, BHEF received a multi-year grant from ONR to utilize system dynamics modeling to identify the most effective evidence-based practices for increasing the number of STEM majors graduating from college to meet the Navy's civilian workforce needs. Specifically, BHEF is extending the work started in the 2009 BHEF U.S. STEM Education Model to build a next generation system dynamics model. Version 2.0 will help the Navy better understand the challenges it faces regarding future STEM workforce demands and invest in strategies to increase the number of students who persist in STEM majors and graduate in STEM fields that are of strategic interest to the Navy.

Through this work, refinements in the model are yielding further insights into the STEM human capital pipeline and the types of interventions that can improve persistence and graduation in STEM. Preliminary findings include:

1. A focus on undergraduate education has the highest potential ROI in developing the STEM workforce.
2. High-impact retention strategies in the first two years of college will have a greater effect on the STEM pipeline than later interventions (e.g., those targeting college juniors and seniors).
3. Opportunities made available to students outside the university (e.g., internships and scholarships that link funding to service) can increase STEM graduation rates.
4. New teaching and learning models, such as cognitive tutors and intelligent courseware, offer innovative ways to improve student learning in STEM, which in turn improves retention and graduation.
5. Increasing persistence will create capacity challenges in third and fourth-year courses—and the time taken to address them will lessen the impact of STEM retention programs.

Modeling The STEM Education Supply Chain

STEM occupations are among the highest paying, fastest growing, most powerful drivers of economic growth and innovation. STEM workers enjoy low unemployment and career flexibility. By extension, therefore, STEM education is a powerful platform for both individual and societal economic success. Despite the increasing demand for a highly-skilled STEM workforce, however, there exists a foundational misalignment between STEM employment opportunities and STEM

educational outcomes, leading to a workforce unprepared to fully meet the needs of the workplace. Unless addressed, this STEM divide will limit our country's ability to innovate, which in turn could curtail U.S. competitiveness in the global marketplace.

The 2009 BHEF U.S. STEM Education Model® seeks solutions to this critical set of issues, and Version 2.0 refinements offer additional detail on the postsecondary components of the supply chain. The first simulation model to examine the U.S. education system using system dynamics principles and tools, the model helps policymakers, educators, and researchers map the complex structure of the U.S. STEM education pipeline from K-12 through college and identify potential solutions to strengthen student outcomes in STEM.

In practice, the model simulates the impact of various policies and programs on the number of graduates produced in the elementary through graduate school education system in the STEM disciplines who go on to pursue STEM-related careers in industry and education. It gives users the ability to test the potential of various scenarios to increase the number of students choosing to major and graduate in STEM disciplines. The model incorporates a variety of demographic inputs and standardized test scores to track the flow of students through the K-16 education system and into careers in STEM teaching or STEM industries. Insights from the model help its users both analyze the many factors that affect the number of students who ultimately pursue STEM careers, and develop case-specific strategies to improve student outcomes in STEM disciplines.

This work is part of BHEF's STEM Initiative, which aims to identify new forms of collaboration among business and industry, higher education, and government to increase the persistence of students, particularly women and underrepresented minorities, who graduate in STEM fields; deepen STEM knowledge and skills; and strengthen the alignment of undergraduate STEM education to workforce needs.

NEW MEMBER BIOGRAPHY



MARY ANN DAVIDSON

CHIEF SECURITY OFFICER
ORACLE CORPORATION

Mary Ann Davidson is the Chief Security Officer at Oracle Corporation, responsible for Oracle Software Security Assurance. She represents Oracle on the Board of Directors of the Information Technology Information Sharing and Analysis Center (IT-ISAC), and serves on the international board of the Information Systems Security Association (ISSA). She has been named one of Information Security's top five "Women of Vision," is a Federal 100 award recipient from *Federal Computer Week*, and was recently named to the ISSA Hall of Fame. She has served on the Defense Science Board and as a member of the Center for Strategic and International Studies Commission on Cybersecurity for the 44th Presidency. She has testified on cybersecurity to the U.S. House of Representatives (Energy and Commerce Committee; Armed Services Committee; and Homeland Security Subcommittee on Emerging Threats, Cybersecurity, and Science and Technology) and the U.S. Senate Committee on Commerce, Science and Technology.

Davidson has a BSME from the University of Virginia and an MBA from the Wharton School of the University of Pennsylvania. She has also served as a commissioned officer in the U.S. Navy Civil Engineer Corps, during which she was awarded the Navy Achievement Medal.

NEW MEMBER BIOGRAPHY



JONATHAN LASH

PRESIDENT
HAMPSHIRE COLLEGE

Jonathan Lash, an internationally recognized expert on practical solutions to global sustainability and development challenges, is the sixth President of Hampshire College.

Lash has served since 1993 as president of World Resources Institute (WRI), an environmental think tank that under his leadership has quadrupled its budget, and globalized its work with offices in eight countries and partners in more than 50 countries. WRI is an international leader on issues ranging from low carbon development to sustainable transportation.

From 1993 to 1999, Lash was co-chair of the President's Council on Sustainable Development, a group of government, business, labor, civil rights, and environmental leaders appointed by Bill Clinton that developed visionary recommendations for strategies to promote sustainable development. He played a key role in the creation and success of the U.S. Climate Action Partnership, which in 2007 issued the highly influential "Call to Action" on global warming.

Prior to WRI, Lash held posts as director of Vermont Law School's Environmental Law Center, Vermont Secretary of Natural Resources, and Vermont Commissioner of Environmental Conservation, and as a federal prosecutor. During his tenure in Vermont government, he helped write and implement statutes on issues ranging from pollution prevention to protection of streams. As a senior staff attorney for the Natural Resources Defense Council, he litigated and campaigned on energy and pollution issues.

Early in his career, Lash served as a Peace Corps volunteer in the Dominican Republic and then as a trainer for volunteers going to El Salvador, Nicaragua, and the Dominican Republic.

He holds law and master's degrees from Catholic University of America and a bachelor's degree from Harvard University. He is a graduate of the Putney School in Vermont.

Lash writes frequently about issues of sustainability and has served on a variety of international commissions and boards. He has been named as "one of the 100 Most Influential People in Business Ethics" by *Ethisphere Magazine* (2007) and one of the world's Top 100 Most Influential People in Finance by *Treasury and Risk Management Magazine* (2005). He was profiled in *Rolling Stone's* "Warriors and Heroes," as one of 25 leaders "fighting to stave off the planet-wide catastrophe."

NEW MEMBER BIOGRAPHY



THAD SIMONS

PRESIDENT & CHIEF EXECUTIVE OFFICER
NOVUS INTERNATIONAL, INC.

Thad Simons is President and Chief Executive Officer of Novus International, Inc. He has responsibility for overall company management and strategic planning functions. Novus is a privately held company. Simons joined Novus as general counsel in July 1991. In September 1993, he was asked to head the human resources function. In November 1995, Simons became responsible for business development and successfully led a number of new business initiatives. Then, since March 2001, he has led Novus in its growth into a global animal health and nutrition company with sales of nearly \$1 billion.

Simons is on the Board of Directors for the National Chicken Council, the World Affairs Council St. Louis, the World Agricultural Forum, the Japan America Society of St. Louis and the Boeing Institute of International Business of the St. Louis University School of Business. He is also a member of the Missouri and Georgia Bars, the American Bar Association and Licensing Executives Society. In 2001, he was recognized as the International Businessperson of the Year by the World Trade Center of St. Louis. In 2007, he was presented the International Visionary Award by the Boeing Institute of International Business at St. Louis University.

NEW MEMBER BIOGRAPHY



JOHN SPEER, III

PRESIDENT & CHIEF EXECUTIVE OFFICER
ELLUCIAN

John Speer is president and chief executive officer of Ellucian. Previously, Speer was president and chief executive of Datatel, Inc. He has more than 28 years of experience in the higher education technology community, personally helping hundreds of colleges and universities manage change through the implementation of advanced information management systems. In 2010, Speer was recognized by Ernst & Young as Entrepreneur of the Year for Greater Washington. He has also provided technology strategic planning for reaffirmation visiting committees for the Commission on Colleges, Southern Association of Colleges and Schools (SACS).

From 1997 until August 2006, he was Datatel's vice president of sales. In this role, he was responsible for Datatel's business development activities, including new client acquisitions and ongoing client relationship management. Speer joined Datatel's Software Development Division in 1984, and in 1986 relocated to California to help open Datatel's Western Region office. He returned to Datatel headquarters in 1994 to lead the Central Region Business Development Team.

Speer graduated James Madison University in 1983, having majored in management information systems. Since 1993, he has served on Datatel's Strategic Planning Committee responsible for shaping Datatel's long-term vision and direction.

Having trained in the IBM Total Quality Management (TQM) program in the early 1990s, Speer became a champion for continuous improvement initiatives at Datatel. He played a pivotal leadership role in Datatel receiving the United States Senate Productivity and Quality Award in 1997; and has been an active member of the Continuous Quality Improvement Network (CQIN) since 2000. Today, Speer is actively involved in advancing the adoption of the Malcolm Baldrige National Quality Award principles throughout higher education, and participates on both the AACCT and ACCT Corporate Councils.

NEW MEMBER BIOGRAPHY



TERESA SULLIVAN

PRESIDENT
UNIVERSITY OF VIRGINIA

Teresa A. Sullivan is the eighth President of the University of Virginia.

Prior to her appointment at the University of Virginia, Sullivan was the Provost and Executive Vice President for Academic Affairs at the University of Michigan. She was also Professor of Sociology in the College of Literature, Science, and the Arts. From 2002 to May 2006, Sullivan was executive vice chancellor for academic affairs for the University of Texas System (UT). In that role, she was the chief academic officer for UT's nine academic campuses.

Additionally, her responsibilities included developing tuition-setting procedures, initiating and supporting educational and research collaborations among the various campuses, and developing external collaborations. Sullivan first joined the University of Texas at Austin in 1975 as an instructor and then assistant professor in the Department of Sociology. From 1977-81, she was a faculty member at the University of Chicago. Ms. Sullivan returned to Texas in 1981 as a faculty member in Sociology. In 1986 she was named to the Law School faculty as well. Ms. Sullivan also held several administrative positions at Texas including: Vice President and Graduate Dean (1995-2002), Vice Provost (1994-95), Chair of the Department of Sociology (1990-92), and Director of Women's Studies (1985-87).

Sullivan's research focuses on labor force demography, with particular emphasis on economic marginality and consumer debt. The author or co-author of six books and more than 50 scholarly articles, her most recent work explores the question of who files for bankruptcy and why. Ms. Sullivan has served as chair of the U.S. Census Advisory Committee. She is past secretary of the American Sociological Association and a fellow of the American Association for the Advancement of Science.

A graduate of James Madison College at Michigan State University, Sullivan received her doctoral degree in sociology from the University of Chicago.

FUTURE MEETINGS



Winter 2013 Meeting
February 21 – 22, 2013
Washington, DC

Summer 2013 Meeting
June 10 – 11, 2013
Washington, DC