



Creating Solutions. Inspiring Action.

Winter Member Meeting

February 2 – 3, 2012

Fairmont Olympic Hotel
411 University Street
Seattle, WA



AGENDA:

THURSDAY, FEBRUARY 2, 2012

- ▶ 3:15 - 4:30 P.M. **Keynote Speaker**
Congress

Meeting Washington States' Innovation Workforce Needs
 - The Honorable **Christine Gregoire**, Governor, State of Washington

- ▶ 4:30 - 5:30 P.M. **Opening Program**
Senate

Gaming as Science: Cracking the AIDS Protein Mystery
Demo of the "Foldit" Game
 - **David Baker**, Professor of Biochemistry, University of Washington
 - **Firas Khatib**, Postdoctoral Fellow, University of Washington

- ▶ 6:00 - 7:00 P.M. **Chairman's Opening Reception**
Garden

- ▶ 7:00 - 8:30 P.M. **Dinner**
Garden

AGENDA:

FRIDAY, FEBRUARY 3, 2012

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

- ▶ 8:30 - 10:00 A.M. **President's Council on Jobs and Competitiveness**
Garden
 - The Honorable **Charles Bolden**, NASA Administrator
 - **Darlene Miller** (co-chair), CEO & President, Permac Industries

- ▶ 10:00 A.M. - 12:00 P.M. **Plenary Session I**
Metropole

Aligning Education with Skills for the 21st Century Workforce

Moderator:
 - **David Jones, Jr.**, Chairman and Managing Director, Chrysalis Ventures

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

- ▶ 1:30 - 2:30 P.M. **Learning Session**
Metropole

The New Frontier of Cognitively Informed Web-Based Instruction

 - **Candice Thille**, Director, Open Learning Network, Carnegie Mellon University

- ▶ 2:30 - 4:30 P.M. **Plenary Session II**
Metropole

Advancing the BHEF STEM Agenda: The STEM Higher Education and Workforce Project's National and Regional Strategies

Moderator:
 - **Mark Wrighton**, Chancellor, Washington University in St. Louis

AGENDA:

FRIDAY, FEBRUARY 3, 2012 (cont.)

- ▶ 4:30 - 5:00 P.M. **Closing Remarks**
Metropole
- ▶ 6:00 - 7:00 P.M. **Closing Reception**
Garden
- ▶ 7:00 - 8:30 P.M. **Closing Dinner**
Parliament

AGENDA:

SATURDAY, FEBRUARY 4, 2012

- ▶ 8:30 A.M. **Boeing Everett Airplane Assembly Center Tour**
Bus departs hotel
(8:15 am - Tour participants meet in lobby)

- ▶ 11:30 A.M. **Bus returns to hotel**

OVERVIEW



W

Welcome to the Business-Higher Education Forum's (BHEF) Winter 2012 Member Meeting highlighting the competitive challenges that the global economy places on U.S. companies, the economy, and the workforce, and framing a powerful case for urgency in addressing these challenges to create and fill jobs, and speed the nation's economic recovery. Meeting sessions will explore:

- BHEF's work in both the *College Readiness, Access and Success* and *STEM initiatives*—to increase alignment of higher education with high-demand jobs in the innovation economy and to ensure that graduates possess world-class technical skills and the necessary workplace competencies—equipping business and higher education leaders to lead systemic efforts to improve degree attainment in order to achieve their regions' unique workforce needs; and
- BHEF's business and academic leaders' collaboration with the President's Council on Jobs and Competitiveness to strengthen STEM undergraduate and graduate education in order to address critical STEM workforce needs.

The meeting opens on Thursday afternoon with a moderated conversation with **Washington State Governor Christine Gregoire**, who will discuss the challenges of meeting Washington State's workforce needs, especially the state's high technology, aerospace, and innovation workforces.

Later that day is an interactive learning session with the "Foldit" team (see page 19). This group of scientists and engineers used gaming to crack a protein mystery that had baffled AIDS researchers for a decade—in just three weeks! **Dr. David Baker**, professor and Howard Hughes Medical Institute Investigator at the University of Washington, and **Dr. Firas Khatib**, senior fellow at the Baker Laboratory, will facilitate a session that highlights how this ground-breaking tool has the ability to change the way we think about science and innovation.

Friday morning focuses on advancing BHEF's action agenda for education and workforce competitiveness, beginning with a listening and action session with representatives from the **President's Council on Jobs and Competitiveness High Tech Education working group**,

including NASA Administrator **Charles Bolden**, and **Darlene Miller**, working group co-chair and CEO & President of Permac Industries. Following this session, the first plenary will focus on BHEF's *College Readiness, Access, and Success Initiative*, drilling into the skills necessary in the 21st century workplace and strategies that will arm students with these skills to meet workforce demands.

The afternoon features two sessions concerning strategies to increase STEM student persistence. First, **Dr. Candace Thille**, director of the Open Learning Network at Carnegie Mellon University will discuss how cognitive science can be used to improve learning in lower division courses, especially in critical gateway STEM courses. The second session will focus on how BHEF's *STEM Higher Education and Workforce Project* is building new models to increase STEM persistence, particularly within the first two years of postsecondary education.

PRESIDENT'S COUNCIL ON JOBS AND COMPETITIVENESS

ENGAGING AT THE NATIONAL LEVEL: CREATING A COLLABORATIVE AGENDA WITH THE PRESIDENT'S COUNCIL ON JOBS AND COMPETITIVENESS

BHEF member Lew Hay, Chairman of NextEra Energy, has invited the members of **President Obama's Council on Jobs and Competitiveness High Tech Education working group** to attend the meeting. NASA Administrator **Charles Bolden** will represent the Obama Administration and CEO members of the **High Tech Education** working group also will attend to discuss the recommendations from the Council's [year-end report](#) to President Obama.

The President's Council on Jobs and Competitiveness was created to provide non-partisan advice to the President on strengthening the nation's economy and workforce and ensuring the competitiveness of the United States. This Council, made up of distinguished citizens outside the federal government including several BHEF members, offers the perspectives of the private sector on how the federal government can best foster growth, competitiveness, innovation, and job creation.

In mid-January, the Council released a report to the President containing recommendations to close the gap between available jobs and qualified workers and to address the long-term skills gap by aligning education and training with workforce needs. The recommendations align with the BHEF *College Readiness, Access, and Success Initiative* focus on workplace skills, which will be discussed in Plenary Session I. The Council also has advanced such goals as doubling the number of private sector STEM internships available to college students and creating metrics for success in undergraduate engineering education, two topics that directly align with BHEF's *STEM Higher Education and Workforce Project*.

PLENARY SESSION I**ALIGNING EDUCATION WITH SKILLS FOR THE 21ST CENTURY WORKFORCE**

Today's economy places new demands on the nation's workforce. Notably, employers in search of the right talent to compete in the global economy have increased expectations of the skills employees need. Plenary Session I focuses on the national imperative to address workforce demand and economic competitiveness, examining the structural misalignment between what is taught P-12 and postsecondary education, and the skills demanded by today's workforce. The session uses BHEF's regional work as context, framing a conversation about the skills that employers need for their 21st century workforce and the importance of postsecondary education as a means of acquiring these skills. In particular, members will clarify perceptions of the skills in shortest supply and discuss strategies to push the skills conversation from the national discussion into regional economies.

PLENARY SESSION II**ADVANCING THE BHEF STEM AGENDA: THE STEM HIGHER EDUCATION AND WORKFORCE PROJECT'S NATIONAL AND REGIONAL STRATEGIES**

Demand for workers with bachelor's degrees in STEM fields is increasingly disproportionate to the number of students graduating with degrees in these disciplines. With nearly half of undergraduate freshmen STEM majors not attaining a STEM degree, a real opportunity exists to boost dramatically the number of STEM graduates by creating new models for STEM undergraduate education that could profoundly change the student experience during the first two years of college. Through the introduction of research-based interventions, BHEF, with its members, is implementing complementary regional and national strategies with goals to increase persistence in STEM majors, deepen student learning, and create a direct link to STEM careers. Plenary Session II will first discuss BHEF's role in driving a national STEM undergraduate agenda. The session will then delve into the deployment of member-led regional pilot projects that will serve as inputs for the national strategy.

Aligning Education with Skills for the 21st Century Workforce

Overview

The demands of the global economy have fundamentally increased the need for a better-educated, highly-skilled workforce to drive innovation and competitiveness. Anthony Carnevale, director of the Georgetown Center on Education and the Workforce, points to the recent recession as additional fuel accelerating the number of jobs requiring a postsecondary education.¹ Indeed, more than one-third of all future jobs will require a two-year degree or higher, and in some fields—including four out of the five fastest-growing fields—more than 75 percent of positions will require at least a two-year degree.² These trends demonstrate the increasing importance of postsecondary education as a means of acquiring critical skills required in the 21st century workplace.

Despite the demand, BHEF's research shows that the supply of workers exiting the education pipeline qualified to fill high-demand jobs likely will be insufficient. In fact, while 54 percent of all jobs requiring a two-year degree or higher will be in five high demand career fields, only nine percent of 12th grade students are interested in those careers *and* proficient in math (a predictor of college readiness and success), increasing the gap between workforce supply and employer demand.

Employers' expectations have increased as well. An Association of American Colleges and Universities (AAC&U) survey found that employers are looking for higher-order skills—practical competencies such as critical thinking, problem solving, analytical reasoning, and working collaboratively—that translate across cultures and sectors and help employees succeed in dynamic workplaces. ACT's WorkKeys® system offers one framework to measure employer demand and the skills that potential and current employees possess. The William and Flora Hewlett Foundation is tackling this challenge with its focus on deeper learning skills, which it hopes will improve American competitiveness.

During this plenary session, Barbara Chow, the Education Program Director for the Hewlett Foundation, will join members in a discussion that explores the needs and priorities that business places on 21st century workforce skills, and implications for addressing those needs in K-20 education. In particular, we will explore:

- Members' perceptions of the skills most necessary to support today's workforce;
- Innovative solutions to address the skills misalignment hobbling our economy; and
- Strategies to push the skills conversation from a national discussion into regional economies.

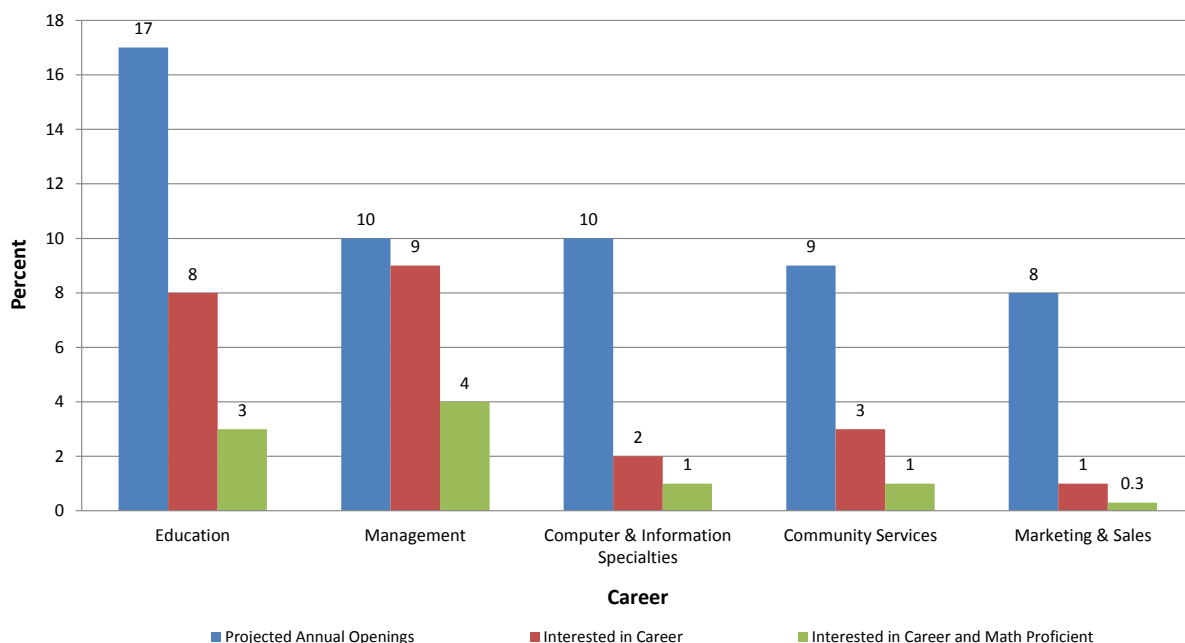
David Jones, Jr., Chairman and Managing Director of Chrysalis and co-chair of BHEF’s College Readiness, Access, and Success Initiative (CRI) will facilitate this session, driving toward a clear understanding of the skills needed in today’s workplace and innovative strategies to address their development.

Workforce Projections for High-Demand Fields

Projections indicate that America will face significant shortages in students both math proficient and interested in careers requiring postsecondary education, particularly “high-demand” fields. Career areas with substantial projected growth include Education (e.g., teaching assistants, P-12 teachers, and postsecondary instructors), Management (e.g., sales managers and financial managers), Marketing and Sales (e.g., salespersons and advertising/promotions managers), Community Services (e.g., paralegals, social workers, and lawyers), and Computer and Information Specialties (e.g., computer support specialists and computer software engineers). In fact, these five career areas alone account for 54 percent of all annual job openings requiring postsecondary education. However, according to BHEF’s analysis, there are significant gaps between the projected annual openings for the five highest-demand careers and students that are both math proficient and interested in entering those careers (See Figure 1).

These substantial employment gaps will be aggravated by employers’ increased expectations that students possess a broader set of intellectual and practical skills. As a result, now, more than ever, a postsecondary degree is necessary to address a deeper *qualitative* misalignment challenge—the skills mismatch.

Figure 1
Misalignment Between Top 5 Projected Annual Job Openings & Students Available To Fill These Positions



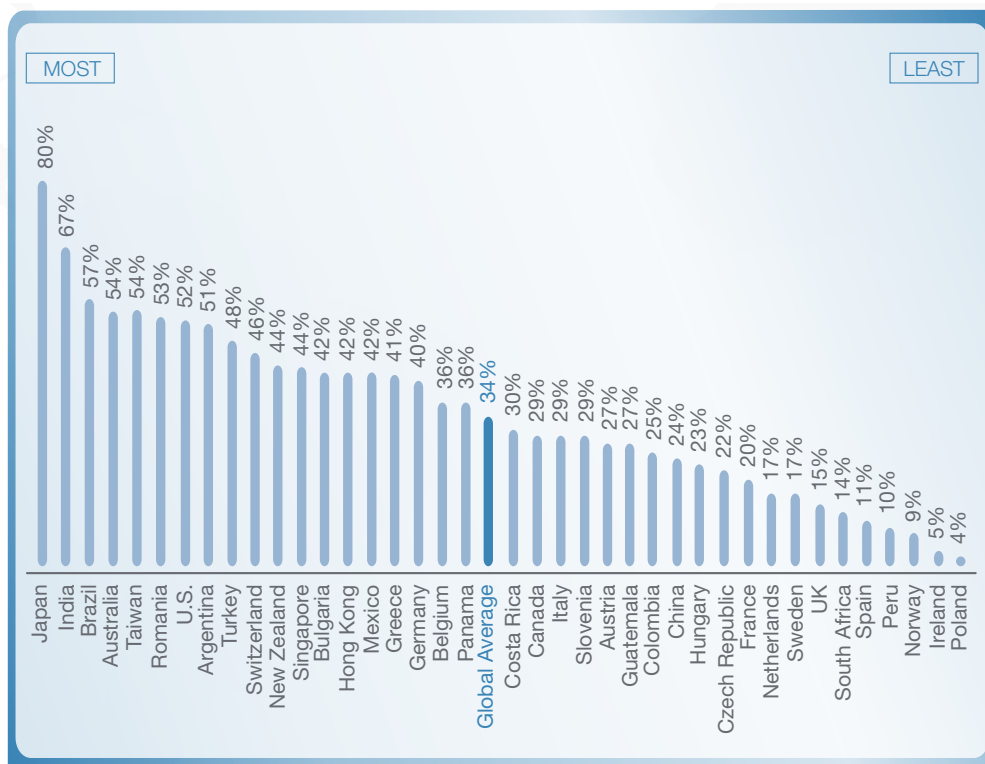
Source: BHEF. (2011). Analysis of EPAS data provided by ACT.

The Demand for Higher-Order Skills

Even with the annual average unemployment rate at 8.9 percent in 2011,³ employers remark that they are unable to find employees who fit the growing demands of their organizations. AAC&U commissioned a survey of more than 300 employers and found that 91 percent are “asking employees to take on more responsibilities and to use a broader set of skills than in the past”⁴ ManpowerGroup, a workforce staffing agency, found that the oversupply of available workers and undersupply of available talent is the result of employers’ increased selectivity about specific skills desired beyond the basic technical skills necessary to succeed on the job.⁵

The United States ranks among the top nations reporting difficulty finding the right talent to fill job openings (See Figure 2). This “employability crisis” is particularly problematic at a time when talent—personnel with the right skillset to succeed in a job position—is an increasingly essential part of a nation’s competitive edge.⁶ To address this misalignment, the U.S. education system, from P-12 through higher education, needs to arm students with the higher-order skills demanded by employers in the new global economy.

Figure 2
ManpowerGroup 2011 Talent Shortage Survey:
U.S. Employers Rank 7th Worldwide Among Employers Reporting Difficulty Filling Jobs



Source: ManpowerGroup. (2011). Talent Shortage Survey Results.

Note: Manpower Group annually surveys nearly 40,000 employers across the globe to assess the impact of the talent shortage on the global economy. Graph indicates the percent of employers reporting difficulty filling jobs, by country.

The Growing Demand for Analytical Talent

In a recent report, McKinsey & Company recognized the growing role in today’s economy of “big data”—large pools of data that can be captured, communicated, aggregated, stored, and analyzed. In fact, across all sectors, data has become essential to an organization’s innovation, competitiveness, and overall growth. This new wave of information requires employers to seek a talent base with the analytical skills to leverage the collection of big data; yet, McKinsey’s research shows that there will likely be a shortage of available personnel with the analytical skillset to keep up with this growing demand. Specifically, demand for quantitative talent could be up to 60 percent greater than the available supply by 2018.⁷

Addressing the Skills Challenge

The misalignment between P-12 and postsecondary education outcomes, and the demands of the 21st Century workplace, has led to further inquiry into how to better equip students for 21st century jobs. AAC&U's Liberal Education and America's Promise (LEAP) initiative, launched in 2005, aims to "recalibrate college learning" through a liberal arts education. Specifically, LEAP's six intellectual and practical skills of essential learning outcomes incorporate higher-order skills such as inquiry and analysis; critical and creative thinking; written and oral communication; quantitative literacy; information literacy; and teamwork and problem solving.⁸

The Hewlett Foundation has adopted an education agenda to introduce "deeper learning"—content knowledge, cognitive strategies, and learning behaviors—into today's schools. The deeper learning agenda crosswalks with the Common Core State Standards and aims to drive curriculum toward an agenda that can provide the nation's students with the knowledge and abilities demanded by the workforce.⁹ The Hewlett Foundation works alongside organizations to: (1) promote policies or strategies that create incentives for schools to focus on deeper learning; (2) build educational systems' capacity and practice, both online and in the classroom, to reach large numbers of students with deeper learning; and (3) support proof points, including model P-12 schools and community colleges, and fund research that documents how deeper learning is an attainable and necessary goal for all students.¹⁰

Many individual companies have designed and implemented their own assessment programs to identify employer-needed skills, often using ACT's WorkKeys[®] system. As a measure of the skills necessary for approximately 16,000 jobs, not only does WorkKeys allow students to gain a better understanding of the skills necessary for today's jobs, but employers are able to better assess which candidates possess the skills to perform well. For example, BHEF member-led organization Boeing uses ACT's WorkKeys to develop accurate profiles of employee abilities and overcome gaps in both technical and deeper learning competencies.

Update on the Common Core State Standards Initiative

Existing state tests measure a limited set of knowledge and skills that do not represent the broader set of competencies sought by the deeper learning agenda. Two consortia secured Race to the Top Assessment Funding to develop the assessments that align with the Common Core State Standards Initiative: SMARTER Balanced Assessment Consortium (SBAC) and Partnership for Assessment of Readiness of College and Careers (PARCC). These assessments are an opportunity to shift the current classroom focus to help students obtain the deeper learning skills that are necessary in the 21st century economy. Assessments for the Common Core State Standards still are being developed and will not be in place until the 2014-2015 school year.

The Common Core State Standards Initiative is a state-led effort coordinated by the National Governors Association (NGA) and the Council of Chief State School Officers (CCSSO), designed to ensure that all students leave high school college and career ready. As of January 2012, 46 states and the District of Columbia have adopted the new standards.

BHEF's Action Framework

There is an urgent need to coalesce leaders around an agenda to ensure that higher order skills are incorporated into P-16 education. In particular, business, postsecondary, and P-12 communities must engage in a systematic, in-depth dialogue on the importance of these skills in the workplace, developing proof points of effective networks to focus policy makers' and public attention on the necessity of supporting and developing these skills.

Over the next several months, with a planning grant from the Hewlett Foundation, BHEF will formulate a strategy to address the skills gap. Activities will include (1) examining and validating the role of deeper learning skills in the new economy; (2) identifying effective approaches in the business sector for building these skills and mastering content; (3) formulating a strategy for the corporate community to raise public awareness and advocate for the inclusion of these skills in education reform efforts, notably the implementation of Common Core standards; and (4) developing a national community of practice composed of companies, postsecondary institutions, schools, and others engaged in regional pilots providing proof points of efficacious approaches to building public and policy makers' demand for delivering deeper learning skills.

PLENARY I END NOTES



- 1 Carnevale, A.P., Smith, N., & Strohl, J. (2010). *Help wanted: Projections of jobs and education requirements through 2018*. Washington, DC: The Center on Education and the Workforce.
- 2 This analysis is derived from a data set provided to BHEF by ACT. The O*NET occupations assigned to career areas were used to populate lists of occupation employment projections provided by the US Bureau for Labor Statistics (BLS) and by state agencies. We used expected annual openings per year for occupations including openings due to growth and replacement.
- 3 Bureau of Labor Statistics. *Labor force statistics from the current population survey*. Retrieved January 10, 2012, from <http://www.bls.gov/cps/>.
- 4 Hart Research Associates. (2010). *Raising the bar: Employers' views on college learning in the wake of the economic downturn. A survey among employers conducted on behalf of the Association of American Colleges and Universities*. Washington, DC: Author.
- 5 ManpowerGroup. (2011). *Manufacturing talent for the human age*. Milwaukee, WI: Author.
- 6 ManpowerGroup. (2011). *Talent shortage survey results*. Milwaukee, WI: Author.
- 7 Brown, B., Bughin, J., Byers, A.H., Chui, M., Dobbs, R., Manyika, J., & Roxburgh, C. (2011). *Big data: The next frontier for innovation, competition, and productivity*. McKinsey Global Institute, McKinsey & Company.
- 8 The Association of American Colleges and Universities. *The essential learning outcomes*. Retrieved January 10, 2012, from <http://www.aacu.org/leap/documents/EssentialOutcomesChart.pdf>.
- 9 The William and Flora Hewlett Foundation. *The education program in 2010*. Retrieved January 10, 2012, from http://www.hewlett.org/uploads/files/annual_report_2010/The_Education_Program_in_2010_WFHF.pdf.
- 10 The William and Flora Hewlett Foundation. (2010). *Education program strategic plan*. Menlo Park, CA: Author.

Advancing the BHEF STEM Agenda: The STEM Higher Education and Workforce Project's National and Regional Strategies

Overview

Even in the current recession, 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 not enjoyed by workers in other fields. In short, STEM education is a powerful platform for individual and societal economic success. Yet, increasing demand for a highly skilled STEM workforce confronts a foundational misalignment between STEM employment opportunities and a workforce unprepared to fill open positions. Unless addressed, this divide will limit our country's ability to innovate.

Supported by evidence from the BHEF *STEM Research and Modeling Project*, BHEF views the first two years of STEM undergraduate education as the greatest leverage point to increase both the number of STEM degrees attained and the depth and quality of STEM knowledge and skill. This area represents a unique opportunity for collaboration among BHEF business and higher education members to improve STEM undergraduate outcomes and meet workforce demand. We believe that a focused, nuanced approach that learns from regional and sectorial differences, yet has a national focus and influence, will yield maximum impact.

BHEF has launched the *STEM Higher Education and Workforce Project* through complementary regional and national strategies that will identify and encourage the scaling of programs, policies, and strategies that: deepen the relevance and content of STEM undergraduate learning; increase enrollment, persistence, and successful graduation of students; and increase the alignment of undergraduate STEM education and workforce needs. The regional strategy will support pilot projects in which BHEF member corporations and universities will collaborate in regional efforts to identify and implement innovative approaches to meet joint education and workforce needs. This work directly aligns with a grant to BHEF from the Office of Naval Research (ONR) to help the Navy in the planning and implementation of its STEM higher education investments. ONR will use a next-generation *U.S. STEM Education Model* to leverage high-impact intervention strategies. BHEF's national undergraduate STEM strategy will disseminate key findings and policy implications from the regional pilots, scale evidence-based practice, and align our work to a broader STEM

education conversation, including with the President's Council on Jobs and Competitiveness, where higher education has historically not been the focus.

This plenary session explores:

- The role BHEF members can play in increasing the quality, persistence, and retention of STEM undergraduate students during their first two years of college;
- The development and deployment of regional pilot projects by BHEF members;
- The creation of a network of networks to scale/export lessons learned from regional pilots to additional member locations and inform the broader national strategy; and
- The value of a national platform for STEM higher education and the role BHEF can play in catalyzing such a strategy.

STEM Initiative co-chair Mark Wrighton will facilitate a conversation about these issues.

Regional STEM Pilot Planning

A key strategy of the *BHEF STEM Higher Education and Workforce Project* is the development of pilots that leverage our business, higher education, and government members in particular regions of the country to increase STEM student retention, particularly among women and underrepresented minorities, deepen STEM learning, and align undergraduate STEM education to regional workforce requirements. These pilots are intended to be locally-developed in response to the unique workforce needs and STEM resources available in each region. We will explore evidence-based approaches to increasing student persistence, including: redesigned courses and new methods of teaching STEM; early internships in corporate and government facilities; research experiences for first-year undergraduate students; early career advising, mentoring, and academic support for undergraduates; new cognitive science-based learning tools; and connections with Professional Science Master's programs.

Since the STEM Working Group call in October, we have refined the scope of this agenda and focused our activities on several sites. On the university side, we have had in-depth conversations with the University System of Maryland; Washington University in St. Louis; University of Wisconsin; Case Western Reserve University; The Ohio State University; and University of Houston on developing pilots at their institutions or in their systems. On the industry side, we have been exploring partnership roles with Battelle Memorial Institute; Boeing; EADS; Northrop Grumman; Raytheon; and SAIC and will continue ongoing discussions with our business and government members as we move forward.

Our initial pilot site is at the University System of Maryland (USM), where a concept for a new kind of undergraduate experience in STEM is currently under development. This pilot is focusing on the emerging field of cybersecurity and will build on the considerable cyber resources available within the university system and in corporate and government facilities throughout the region (see page 16). Additional pilots under development include the expansion of a partnership between

the School of Engineering and Applied Science at Washington University in St. Louis and Boeing to significantly increase the size and capability of the engineering workforce in the greater St. Louis area. Washington University is examining ways to extend its reach into local community colleges and the University of Missouri, St. Louis to develop new “2+2” programs to strengthen opportunities for students to bridge from two-year into four-year engineering programs responsive to emerging regional employment needs.

In Ohio, the Battelle Memorial Institute is in discussions with Case Western Reserve University, The Ohio State University, and other potential partners regarding opportunities to create new models for undergraduate STEM education, and increase STEM student persistence, with a possible focus on biomedicine. At the University of Wisconsin, we have explored possible pilots at the Madison and Milwaukee campuses bridging industry and undergraduate higher education in the areas of energy and water, which offer the potential of combining multiple academic disciplines and exciting internship opportunities for students.

An Emerging BHEF Regional Pilot: The Undergraduate Cyber “Teaching Hospital” at the University of Maryland

In planning a BHEF regional pilot at the University System of Maryland (USM), our discussions with administrators and faculty members have focused on addressing the clear regional and national need for a highly trained workforce in cybersecurity. The greater Washington, DC area offers a wealth of world-class resources that could be brought to this initiative, including those of local BHEF members. The University of Maryland, College Park recently announced the opening of the Maryland Cybersecurity Center (MC2), designed to spearhead cybersecurity research and education on that campus. The university has also developed a residential honors program in which undergraduates are housed in enriching, academically themed dormitories, where they live and study together in teams.

USM is now exploring the concept of an undergraduate residential honors program focused on cybersecurity based on the model of a teaching hospital, in which students, residents, staff physicians, researchers, and other medical specialists work and learn together. In this case, undergraduates from academic departments across the university would study cybersecurity problems and issues in a real-world, real-time setting side-by-side with graduate students, faculty members, and industry and government professionals developing technologies and strategies for cybersecurity assurance. The program could draw on experts from engineering and computer science as well as such wide-ranging fields as business, cryptography, public policy, and health sciences, and create a new cadre of “cyber-enabled” graduates.

This program could serve as a bridge between the CyberPatriot Challenge program active in Maryland and USM’s cyber Professional Science Master’s programs, and offer summer and academic-year learning opportunities for students and faculty members at other USM institutions, community colleges, and high schools. Also, given the still-formative nature of the field of cybersecurity, the strong collaboration of university, industry, and government experts in designing and launching this program could help shape and define cyber as an academic discipline, ensuring rigor and consistency in the development of experts in this field. Moreover, the unique clinical, real-world focus of the program could provide a compelling national model for undergraduate STEM education.

Providing the Navy the Tools to Increase the Impact of Its Investments in STEM Higher Education

In June, 2011, the Office of Naval Research (ONR) held a Summit discussing with hundreds of stakeholders the discrepancy between students graduating, from both high school and higher education, with the preparation and interest needed to pursue STEM careers, and the impending Naval workforce needs. It was at this meeting that the Secretary of the Navy committed to doubling the Navy's investment to STEM over five years to more than \$100 million, and released the new STEM2STERN Roadmap, which sets forth the Navy's broad priorities and goals for ensuring that it continues to develop and attract top STEM talent to its workforce. BHEF's U.S. STEM Education Model, originally developed by Raytheon engineers, is uniquely suited to provide guidance to the Navy in developing its STEM higher education investment portfolio.

In October, 2011, BHEF received a multi-year grant from ONR to develop an expanded version of the Model, retooled to target high-leverage interventions directly related to the Navy's workforce. BHEF is implementing a tri-fold strategy involving system dynamics modeling to: (1) identify the highest-leverage strategies to increase the number of students interested and proficient in STEM fields of interest to the Navy; (2) support this modeling work by data analysis and research to better understand the factors influencing student interest and proficiency in STEM through the undergraduate level; and (3) collaborate with BHEF's national network of leaders to build on the lessons learned from the new modeling project.

As part of this grant, in January, 2012, BHEF held the first of a series of workshops designed to elicit ideas on strengthening the Navy's STEM human-capital pipeline, and to develop the Model to address Navy STEM workforce requirements. This workshop was hosted by the Naval Surface Warfare Center at Carderock, Maryland, and was attended by more than 25 representatives from ONR, the broader Navy STEM education and research community, as well as by university, industry, and government officials. Using the Model as a focus for the discussion, we came away with valuable insights on the challenges facing the Navy's future STEM workforce demands, and ideas for interventions that could be modeled to help the Navy meet those demands.

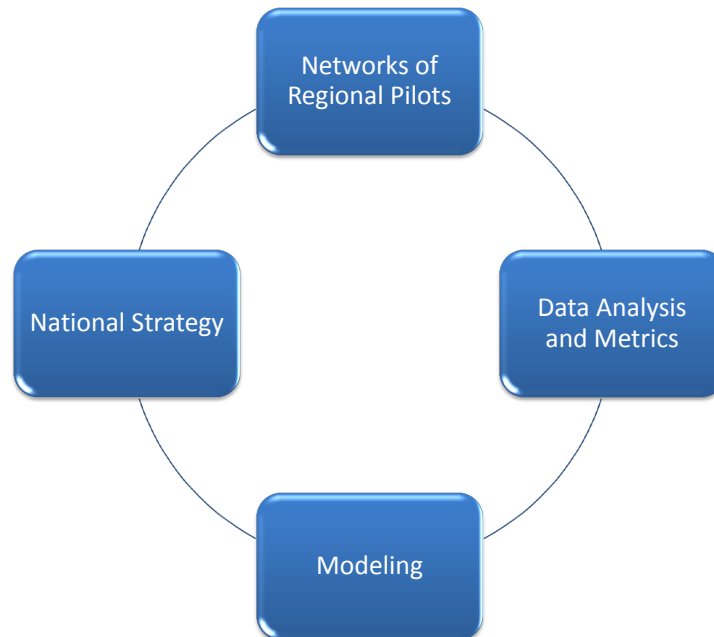
The product of this work will be an adaptation of the U.S. STEM Education Model allowing the Navy to view the outcomes associated with its current higher education investment portfolio, and provide a tool to better understand high-impact interventions and Navy-specific leverage points. The Navy STEM Coordination Office will use this tool to inform its new and continued investments in STEM higher education.

Catalyzing a National STEM Higher Education Strategy

Historically, much of the STEM education focus by the Federal government and business has been on P-12. A comparable movement is engaging higher education, industry, and government around the goal of staunching the loss of talent from STEM while aligning college STEM education with emerging workforce needs needed for the undergraduate level. BHEF has initiated discussions with key higher education and industry associations on developing a national strategy to align research, advocacy, and scaling of best practices in undergraduate STEM education.

This national network will serve to disseminate and scale effective intervention strategies developed through BHEF regional pilots. It will also serve as a highly visible communication and advocacy vehicle to fill in a policy gap in the STEM pipeline between P-12 and the workforce. The first convening, held in January 2012, brought together representatives from the Aerospace Industries Association, American Council on Education, American Society for Engineering Education, Association of American Universities, Association of Public and Land-grant Universities, National Defense Industries Association, and TechNet to begin a discussion on developing complementary strategies. With the group's consensus around the need for a broader strategy, our next steps are to host a series of workshops that create a shared platform for research, goal-setting, implementation, and scaling.

BHEF STEM Higher Education and Workforce Project Strategy



GAMING AS SCIENCE: CRACKING THE AIDS PROTEIN MYSTERY



Introducing Foldit: A Multiplayer, World-Wide Game to Solve Complex Biological Problems

Among the most difficult challenges in biological research is protein folding—the process by which amino acids form specific shapes as they become proteins—and modeling protein structure. Knowing the structure of a protein is key to understanding how it works and how to target it with drugs. The number of different ways even a small protein can fold is astronomical because there are so many degrees of freedom, and determining that final structure requires substantial investments of funding and computer time.

To address the computer capacity challenge, **Dr. David Baker**, Professor of Biochemistry and Howard Hughes Medical Institute Investigator at the University of Washington, whose laboratory studies protein folding and structure, took a cue from SETI, the Search for Extraterrestrial Intelligence, which harnesses unused time on ordinary people's home computers to analyze radio data from sky telescopes for patterns that might reflect sentient alien life. Baker adapted SETI software to create a structure prediction program called Rosetta which, by early 2008, extended his protein-folding network to nearly 200,000 members volunteering their home computers' downtime to the project.

The power of Rosetta enabled Baker and his team to significantly advance our understanding of protein structures, but he wanted to add an interactive dimension to the project for his volunteers. For this, he teamed up with a group of University of Washington computer scientists to create Foldit, a multiplayer online protein-folding game in which individuals and teams from around the world compete to solve protein challenges concerning such conditions as HIV, Alzheimer's, and cancer. All a player needs is a computer and an internet connection.

Foldit is comprised of different components, including one which seeks to understand if humans' pattern-recognition and problem-solving abilities can make them more efficient than existing computer programs at pattern-folding tasks. Another allows players to actually design proteins that could help prevent or treat important diseases. In 2011, the Baker Lab published in *Nature Structural & Molecular Biology* the findings of a group of players named the *Contenders*, who

solved the crystal structure of a retroviral protease involved in HIV called M-PMV and provided new insights into the design of retroviral drugs. The article acknowledged that this discovery followed the failure of a wide range of attempts by leading scientists to solve this problem.

Dr. Baker will join us for a presentation of Foldit, and lead a special challenge. Selected BHEF corporate and university members will face off in a competition to solve two biological problems: 1) designing a protein, and 2) predicting a protein's structure before it folds. He will also engage BHEF members in a discussion of how such games can advance student learning and engage the public in authentic scientific research.

PRESIDENT'S COUNCIL ON JOBS AND COMPETITIVENESS



Engaging at the National Level: Creating a Collaborative Agenda with the President's Council on Jobs and Competitiveness

The President's Council on Jobs and Competitiveness was established early in 2011 to develop and recommend strategies to accelerate job growth and strengthen the nation's long-term economic position. The Council has pursued a three-phase approach to its work: seeking to catalyze job growth by capturing "low-hanging fruit" over the short-term; focusing on broader ways to accelerate job creation while also lifting U.S. competitiveness over the next two to five years; and developing proposals on strategic factors influencing American competitiveness over the next five to ten years.

Members of the Council, made up of leaders from business, academia, and other sectors, including BHEF members Lew Hay, Chairman & CEO of NextEra Energy, and Roger Ferguson, CEO of TIAA-CREF, have engaged in a series of activities to solicit ideas on job creation which have involved quarterly meetings with the President and regional/sectoral events across the country. To date, the Council has held three quarterly meetings with the President and senior White House staff, and seven regional/sectoral "listening and action" sessions focusing on such topics as stimulating jobs in high tech industries, improving the national infrastructure, and boosting the U.S. engineering workforce.

Last year the Council issued an interim report entitled *Taking Action, Building Confidence*, which includes a number of recommendations that directly align with BHEF's *STEM Higher Education and Workforce Project*. This project seeks to build complementary regional and national strategies to increase STEM persistence, particularly by women and underrepresented minorities, deepen learning, and align undergraduate education with regional workforce needs. The Council's recommendations that mostly directly align to BHEF's work are:

- Increasing by 10,000 the annual number of U.S. engineering degrees, focusing on strategies to directly engage undergraduates and increase their retention in undergraduate engineering programs;

- Working with deans of engineering at U.S. universities to establish a “Tech Standard of Excellence Seal” to recognize undergraduate engineering programs with high rates of student retention, establish metrics for success around engineering degree attainment, and encourage private investment to incentivize adoption of successful models;
- Doubling the number of internships available to engineering undergraduates in the private sector, which includes the creation of a consortium of companies pledging to significantly expand internship opportunities for students in the early undergraduate years;
- Increase government support for undergraduate research; and
- Fostering regional ecosystems of innovation for entrepreneurs and creating or expanding mentorship programs at all levels to stimulate entrepreneurial activity.

Jobs Council and BHEF member Lew Hay has invited the Council's High Tech Education working group, co-chaired by Intel CEO and President Paul Otellini and Permac Industries CEO and President Darlene Miller, to lead a listening and action session to explore potential opportunities for deeper collaboration between the Council and BHEF. We will be joined by NASA Administrator Charles Bolden in a discussion of the recommendations from the Council's upcoming final report and strategies to operationalize those recommendations in the context of BHEF's *College Readiness Initiative* and the *STEM Higher Education and Workforce Project*.



DAVID BAKER

PROFESSOR OF BIOCHEMISTRY
UNIVERSITY OF WASHINGTON

David Baker is Professor of Biochemistry at the University of Washington and an Investigator for the Howard Hughes Medical Institute, where is Principal Investigator of Baker Labs.

Baker is a member of the National Academy of Sciences and the American Academy of Sciences. Dr. Baker's research is focused on determining the structures of naturally occurring proteins and designing new proteins with new structures and functions. His group has designed potent influenza virus inhibitors and HIV vaccine candidates, and is broadly interested in the design of new therapeutics. Dr. Baker's group is also exploring new routes to involving the public in biomedical discovery and therapeutic design through the Rosetta@home computing project and the FoldIt online protein folding and design game.

He received his Ph.D. degree in biochemistry with Randy Schekman at the University of California, Berkeley and did postdoctoral work in biophysics with David Agard at UCSF. Baker received young investigator awards from the National Science Foundation and the Beckman Foundation, as well as the Packard Foundation fellowship in Science and Engineering. He has also received the Irving Sigal award from the Protein Society and the Overton Prize from the International Society of Computational Biology. He is a recipient of the Feynman Prize from the Foresight Institute, the AAAS Newcomb Cleveland prize, the Sackler prize in biophysics, and the 2012 Centenary award from the Biochemical society.



CHARLES BOLDEN, JR.

(MAJOR GENERAL, USMC RET.)

ADMINISTRATOR

NASA

Charles Bolden, Jr., retired Marine Corps Major General nominated by President Barack Obama and confirmed by the U.S. Senate, began his duties as the twelfth Administrator of the National Aeronautics and Space Administration on July 17, 2009. As Administrator, he leads the NASA team and manages its resources to advance the agency's missions and goals.

Bolden's confirmation marks the beginning of his second stint with the nation's space agency. His 34-year career with the Marine Corps included 14 years as a member of NASA's Astronaut Office. After joining the office in 1980, he traveled to orbit four times aboard the space shuttle between 1986 and 1994, commanding two of the missions. His flights included deployment of the Hubble Space Telescope and the first joint U.S.-Russian shuttle mission, which featured a cosmonaut as a member of his crew. Prior to Bolden's nomination for the NASA Administrator's job, he was employed as the Chief Executive Officer of JACKandPANTHER LLC, a small business enterprise providing leadership, military and aerospace consulting, and motivational speaking.

A resident of Houston, Bolden was born Aug. 19, 1946, in Columbia, S.C. He graduated from C. A. Johnson High School in 1964 and received an appointment to the U.S. Naval Academy. Bolden earned a bachelor of science degree in electrical science in 1968 and was commissioned as a second lieutenant in the Marine Corps. After completing flight training in 1970, he became a naval aviator. Bolden flew more than 100 combat missions in North and South Vietnam, Laos, and Cambodia, while stationed in Namphong, Thailand, from 1972-1973.

After returning to the U.S., Bolden served in a variety of positions in the Marine Corps in California and earned a master of science degree in systems management from the University of Southern California in 1977. Following graduation, he was assigned to the Naval Test Pilot School at Patuxent River, Md., and completed his training in 1979. While working at the Naval Air Test Center's Systems Engineering and Strike Aircraft Test Directorates, he tested a variety of ground attack aircraft until his selection as an astronaut candidate in 1980.

Bolden's NASA astronaut career included technical assignments as the Astronaut Office Safety Officer; Technical Assistant to the Director of Flight Crew Operations; Special Assistant to the Director of the Johnson Space Center; Chief of the Safety Division at Johnson (overseeing safety efforts for the return to flight after the 1986 Challenger accident); lead astronaut for vehicle test and checkout at the Kennedy Space Center; and Assistant Deputy Administrator at NASA Headquarters. After his final space shuttle flight in 1994, he left the agency to return

to active duty with the operating forces in the Marine Corps as the Deputy Commandant of Midshipmen at the U.S. Naval Academy.

Bolden was assigned as the Deputy Commanding General of the 1st Marine Expeditionary Force in the Pacific in 1997. During the first half of 1998, he served as Commanding General of the 1st Marine Expeditionary Force Forward in support of Operation Desert Thunder in Kuwait. Bolden was promoted to his final rank of major general in July 1998 and named Deputy Commander of U.S. Forces in Japan. He later served as the Commanding General of the 3rd Marine Aircraft Wing at Marine Corps Air Station Miramar in San Diego, Calif., from 2000 until 2002, before retiring from the Marine Corps in 2003. Bolden's many military decorations include the Defense Superior Service Medal and the Distinguished Flying Cross. He was inducted into the U.S. Astronaut Hall of Fame in May 2006.



BARBARA CHOW

PROGRAM DIRECTOR, EDUCATION PROGRAM
THE WILLIAM AND FLORA HEWLETT FOUNDATION

Barbara Chow began her term as the Education Program director with the Hewlett Foundation in the fall of 2008, coming from the House Budget Committee where she served as policy director. From 2001-2007 she was the executive director of the National Geographic Education Foundation and vice president for education and children’s programs at National Geographic.

Chow served in both terms of the Clinton administration. From 1993 to 1997, she was a special assistant to the president for legislative affairs, acting as White House liaison to Congress on economic, budget, and appropriation matters. From 1997 to 2001, Chow worked in the Office of Management and Budget, where she was the program associate director for education, income maintenance, and labor. Starting in 2000, she kept the OMB position and added the position of deputy director of the White House Domestic Policy Council.

Earlier in her career, she worked as a member of the staff of the U.S. Senate Budget Committee, as staff member of the Senate Democratic Policy Committee specializing in energy and natural resource issues, and as a manager of federal budget policy at Price Waterhouse. She also served on two presidential transition teams – in 1992 for President-elect Clinton and in 2008 for President-elect Obama.

Chow served as a member of the board of Grantmakers for Education from 2001 to 2006, the last two years as co-chair and then chairperson; as ex-officio board member of the National Environmental Education Foundation from 2004 to 2006; and as a member of the steering committee of the Geography Education National Implementation Plan from 2001 to 2006.

Chow has a bachelor’s degree in government from Pomona College and a master’s degree in public policy from the University of California, Berkeley.



CHRISTINE GREGOIRE

GOVERNOR, STATE OF WASHINGTON

Christine Gregoire is the 22nd governor of Washington state. She is the second female governor of Washington. She was the National Governors Association chairwoman for the 2010-11 term.

Facing a \$2.2 billion budget shortfall when she took office in 2005, Governor Gregoire balanced the state's budget as she expanded health care coverage to low-income children, led an effort to make government more efficient and accountable, introduced a plan to create a world class education system, and launched a bold plan to save Puget Sound. In 2007, she proposed and the voters passed a constitutionally protected rainy-day fund to help the state prepare for economic downturns like we face today.

Gregoire introduced and won approval for a landmark transportation package to create jobs and address critical challenges to Washington's roads and bridges. She established a dedicated fund to reduce class sizes, helped increase enrollments at colleges and universities, and protected vital social services for the state's most vulnerable individuals and families.

Gregoire is committed to promoting and expanding business and creating family-wage jobs in the state of Washington. The governor's "Next Washington" plan lays out strategies and initiatives to encourage business development and growth, and has helped create more than 200,000 jobs in Washington since she took office. Forbes magazine recently ranked Washington as the 2nd best state in which to do business. Fortune magazine recently ranked Washington in the top five to start a small business.

Reelected overwhelmingly by Washington voters in 2008 and facing a historic multi-billion dollar shortfall brought on by the uninterrupted, deepening national recession, Gregoire continues to work with the Legislature to balance the budget while striving to support job creation and economic growth.

Governor Gregoire graduated from the University of Washington with a teaching certificate and Bachelor of Arts degree in speech and sociology. She received her law degree from Gonzaga University.

SPECIAL GUEST BIOGRAPHY



FIRAS KHATIB

POSTDOCTORAL FELLOW
UNIVERSITY OF WASHINGTON

Firas Khatib is a postdoctoral researcher in David Baker's Laboratory in the Biochemistry Department at the University of Washington. He was awarded a Postdoctoral Research Fellowship in Biology from the National Science Foundation to work on Foldit and was the lead author on two recent Foldit publications in *Nature Structural & Molecular Biology* and *Proceedings of the National Academy of Sciences USA*. Khatib received his PhD in Bioinformatics from UC Santa Cruz in 2008 and his bachelor's degree in Applied Mathematics from UC Berkeley in 2001.

SPECIAL GUEST BIOGRAPHY



DARLENE MILLER

CEO AND PRESIDENT
PERMAC INDUSTRIES

Darlene Miller is the owner and CEO of Permac Industries, a precision machining company located in Burnsville, Minnesota that manufactures custom precision parts for customers worldwide, in virtually all industries.

Starting as a Sales Representative at Permac in 1992, she became a part owner in 1993, and took full ownership the following year in 1994. Under Miller's leadership, Permac Industries was named the U.S. Chamber Small Business of the Year for the entire USA in 2008.

Miller was recently appointed to the President's Council on Jobs and Competitiveness sharing responsibilities with CEOs of such high-profile companies as GE, DuPont, American Express, and America Online.

Currently a member of the U.S. Chamber of Commerce's Board of Directors and Advisory Council, Miller has also actively served on numerous industry and community boards including: PMPA and MPMA (Manufacturing Trade Associations), and the Minnesota Valley Medical Manufacturers Network (MEDNET), which she co-founded in 2006.

As a two-time member of Minnesota Governor Pawlenty's trade missions to both South America and India, Miller has garnered a keen insight to global markets, understanding how they pertain to business in Minnesota, and their applicability nationwide.

Hope for Tomorrow has been one of Miller's personal passions since 2002. Its mentoring program pairs business leaders with students to help create self confidence and tomorrow's leaders. She's proud to have co-founded several chapters along with the first Boys Chapter.



CANDACE THILLE

DIRECTOR

OPEN LEARNING NETWORK, CARNEGIE MELLON UNIVERSITY

Candace Thille is the Director of the Open Learning Initiative (OLI) at Carnegie Mellon University, a position she has held since the program's inception in 2002. She is the co-director of OLnet, an international open educational research network jointly run by Carnegie Mellon and the Open University in the UK.

Thille's focus of research and development is in applying results from the learning sciences to the design, implementation and evaluation of open web-based learning environments. In her seven years in the academic sector, she has published and presented over eighty conference proceedings, workshops, articles, and book chapters on open educational resources and effective web-based learning environments. Thille also currently serves as a redesign scholar for the National Center for Academic Transformation; as a Fellow of International Society for Design and Development in Education; and on the Global Executive Advisory board for Hewlett Packard's Catalyst Initiative. She recently served on a working group at the U.S. Department of Education tasked to write the National Education Technology Plan for the Obama Administration and is currently serving on a working group for U.S. Department of Education evaluating the effectiveness of online courses for secondary students.

NEW MEMBER BIOGRAPHY



REAR ADMIRAL MATTHEW KLUNDER

CHIEF OF NAVAL RESEARCH; DIRECTOR, TEST AND
EVALUATION AND TECHNOLOGY REQUIREMENTS
OFFICE OF NAVAL RESEARCH

Rear Adm. Matthew L. Klunder graduated from the U.S. Naval Academy in 1982 and earned his wings of gold at Meridian, Miss., in September 1984. Subsequent flying tours were based in Naval Air Station (NAS) Miramar, Calif.; NAS Patuxent River, Md.; Naval Air Facility Atsugi, Japan; and NAS Lemoore, Calif., where he was qualified in numerous aircraft including the E-2C Hawkeye and F/A-18 E/F Super Hornet.

Klunder has served at sea in Airborne Early Warning Squadron (VAW) 112, VAW-115 as a department head, VAW-115 as commanding officer, and Carrier Air Wing 2 as air wing commander. He has made eight deployments and multiple surge operations to the Atlantic, Pacific, and Indian Oceans and to the Mediterranean Sea and Arabian Gulf.

His shore tours include serving as a flight instructor, Naval Air Training and Operating Procedures Standardization officer and Commander Naval Air Force, U.S. Pacific Fleet evaluator at VAW-110; test pilot/project officer at Force Warfare Test Directorate; senior operations officer and Single Integrated Operational Plan officer at the Joint Staff J-3/National Military Command Center; as Joint Staff liaison officer and section chief at the U.S. State Department; as Combined Air Operations Center deputy director at Al Udeid Air Base in Qatar; and deputy director for Information, Plans, and Security for OPNAV N3/N5. Highlights during these tours include receiving the 1988 Hawkeye of the Year award, the 1991 Test Pilot of the Year award, and the 2002 George C. Marshall Statesman award.

In July 2010, Klunder reported as director of Intelligence, Surveillance and Reconnaissance Capabilities Division, OPNAV N2/N6F2 following his assignment as the 83rd commandant of midshipmen at the U.S. Naval Academy.

Klunder received his bachelor's degree from the U.S. Naval Academy and his master's degrees in Aerodynamics and Aviation Systems from the University of Tennessee and strategic studies from the National War College.

He has flown over 45 different aircraft and accumulated 21 world flying records. His awards include the Legion of Merit (3 awards), Defense Meritorious Service Medal (2 awards), Meritorious Service Medal (2 awards), Joint Commendation Medal (2 awards), Navy Commendation Medal (4 awards), and various unit and campaign awards.

In November 2011, he became the 24th chief of naval research, with additional duties as director, Test and Evaluation and Technology Requirements.

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



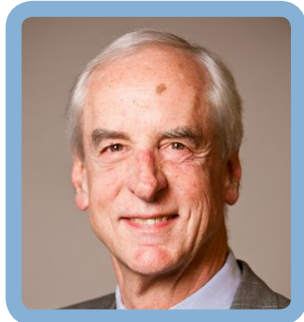
MOHAMMAD QAYOUMI

PRESIDENT
SAN JOSÉ STATE UNIVERSITY

Before his arrival to San José State University in 2011, Qayoumi served as president of Cal State East Bay since 2006. He came to Cal State East Bay from Cal State Northridge, where he served as vice president for administration and finance and chief financial officer from 2000 until 2006, and was also a tenured professor of engineering management. Previously, Qayoumi served as associate vice president for administration at San José; director of utilities and engineering services, director of technical services, and staff engineer, University of Cincinnati, Ohio. In addition, Qayoumi served as an engineer on a variety of projects in the United Arab Emirates and Saudi Arabia.

In addition to serving his native Afghanistan as senior advisor to the country's minister of finance and as a member of the board of directors for the Central Bank of Afghanistan, Qayoumi is a member of the Silicon Valley Leadership Group, and serves on several local boards. He has also published eight books and more than 85 articles.

Qayoumi holds a bachelor's in electrical engineering from the American University of Beirut. He holds four degrees from the University of Cincinnati: a Master of Science in nuclear engineering, a Master of Science in electrical and computer engineering, an MBA, and a Ph.D. in electrical engineering.



HUNTER RAWLINGS III

PRESIDENT
ASSOCIATION OF AMERICAN UNIVERSITIES

Hunter R. Rawlings III became president of the Association of the American Universities on June 1, 2011. Prior to this position, Rawlings served as president of Cornell University from 1995 to 2003, and as interim president for one year between 2005 and 2006. He served as president of the University of Iowa from 1988 to 1995.

Rawlings was Cornell's tenth president. As part of his commitment to academic excellence, he provided strong support for increasing student diversity and for Cornell's need-blind admission policy, which was made permanent during his tenure.

Rawlings renewed Cornell's emphasis on the importance of undergraduate teaching, setting an example by teaching an undergraduate course in the Department of Classics during the last two years of his presidency. He established the new position of vice provost for undergraduate education and the Cornell Presidential Research Scholars Program, which is now named in his honor.

Rawlings set strategic scientific priorities for Cornell, resulting in, among other things, the Cornell Genomics Initiative and New Life Sciences Initiative. Rawlings also reorganized the biological sciences on the Ithaca campus and set in motion the plans for constructing a pioneering facility for life science technologies. At the same time, he provided additional support for the programs in the humanities and social sciences at Cornell, recognizing their critical significance for the future of human societies in a rapidly changing scientific and technological environment.

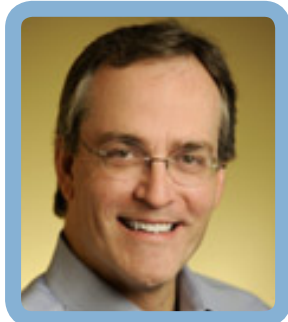
At the conclusion of his presidency in 2003, Rawlings was elected president emeritus and began serving as a full-time professor in Cornell's Departments of Classics and History. From 2005 to 2006, he served as interim president.

While president at the University of Iowa, Rawlings chaired the Governor's Commission on Foreign Language Studies and International Education from 1988 to 1991.

Prior to the University of Iowa, Rawlings spent 18 years at the University of Colorado at Boulder, where he was a faculty member, chairman of the Classics Department, associate vice chancellor for instruction, and then vice president for academic affairs for the University of Colorado system.

A national spokesperson for higher education, Rawlings has served as chair of both the Association of American Universities and the Ivy Council of Presidents. He is a member of the American Academy of Arts and Sciences, and he serves on the boards of the American School of Classical Studies in Athens, Haverford College, and the National Academy Foundation.

NEW MEMBER BIOGRAPHY



PAUL ROOKE

CHAIRMAN & CEO
LEXMARK

Paul Rooke is chairman and chief executive officer of Lexmark International, Inc. He became chairman of the Lexmark board of directors in April 2011 after being named president and CEO and elected to the board in October 2010.

Previously, Rooke was an executive vice president of Lexmark and served as president of the former Imaging Solutions Division (ISD) from July 2007 to October 2010. In that role, he was responsible for meeting the needs of Lexmark's worldwide customers for inkjet printers, all-in-one products, and related supplies and support, including development, manufacturing, marketing, and sales.

From December 1999 to July 2007, Rooke was president of Lexmark's former Printing Solutions and Services Division (PS&SD). In that role, he was responsible for providing Lexmark's worldwide business customers with products, supplies, software, solutions, and services.

Rooke joined Lexmark at the company's inception in 1991 and has held various management assignments, including president of Lexmark's division responsible for worldwide supplies distribution, and vice president of worldwide marketing and U.S. sales in ISD (formerly named Consumer Printer Division).

Rooke began his career in 1980 as a manufacturing engineer with IBM. In 1984, he came to IBM's Lexington, Ky., facility as manager of Wheelprinter automation. He worked in a variety of diverse assignments for IBM, including manager of cost engineering, product planning and assistant to the vice president of the Systems Printer Division.

Rooke holds a bachelor's degree in mechanical engineering from the University of Michigan and a master's degree in business administration from the University of Kentucky.

NEW MEMBER BIOGRAPHY



VICTOR STAFFIERI

CHAIRMAN, CHIEF EXECUTIVE OFFICER & PRESIDENT
LG&E ENERGY AND KU ENERGY, LLC

Victor Staffieri was named to his current position in 2001. He has 29 years of experience in the electric and natural gas utility industry.

Staffieri began his career as an attorney at Long Island Lighting Company in Hicksville, New York, in 1980. Prior to joining LG&E Energy as senior vice president, general counsel and corporate secretary in 1992, he held several management positions at Long Island Lighting, culminating in general counsel and secretary. Staffieri subsequently became LG&E Energy's senior vice president — public policy, and general counsel; president, Louisville Gas and Electric Company; president, Distribution Services Division; chief financial officer; and president and chief operating officer, before being promoted to his present position.

Staffieri was chairman of the Louisville Area Chamber of Commerce, for which he also was vice chairman of its Finance and Administration Steering Committee and a member of its African-American Affairs Committee. He served as chairman of the Coordination Council for Economic Development Activities — Regional Economic Development Strategy, cabinet member and chairman of Community Campaign for Metro United Way, and dinner chair for The National Conference. Staffieri recently chaired a business task force on postsecondary education in cooperation with the Kentucky Chamber of Commerce.

Staffieri has a bachelor's degree from Yale University, and a Juris Doctor from the Fordham University School of Law. He currently belongs to the board of directors of the Edison Electric Institute (Washington, D.C.). Staffieri was formerly on the boards of the Electric Power Research Institute (Palo Alto, California), Jefferson County/Louisville Area Chamber of Commerce Family Business Partnership (co-chairman), Kentucky Country Day School, Metro United Way, MidAmerica Bancorp, the Louisville Area Chamber of Commerce, and Leadership Louisville.

NEW MEMBER BIOGRAPHY



TERESA SULLIVAN

PRESIDENT
UNIVERSITY OF VIRGINIA

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

Prior to U.Va., 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.

Prior to coming to the University of Michigan, Sullivan was executive vice chancellor for academic affairs for the University of Texas System, a position she held from 2002 until May 2006. In that role, she was the chief academic officer for the nine academic campuses within the University of Texas System.

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



Summer 2012 Meeting
June 11 – 12, 2012
Washington, DC

Winter 2013 Meeting
February 21 – 22, 2013
TBD

Summer 2012 Meeting
June 17 – 18, 2013
Washington, DC