TARGET

New partnerships among scientists, engineers, and educators (both theorists and practitioners) take innovations from development to practice

NEAR-TERM ACTIONS	MID-TERM ACTIONS	LONG-TERM/ASSESSMENT
• Promote partnerships among computer scientists, other STEM disciplinary scientists, learning scientists, and education practitioners to catalyze new technologies for learning	• Establish multidisciplinary teams to support K-12 teacher education including projects exploring how to maximize teacher expertise in exploiting new tools	• Assess whether cyberlearning is recognized and supported as a field of investigation • Assess effectiveness of and adoption of cyberlearning approaches

Stuck on You

Researchers from Purdue University and the University of South Carolina have discovered how oysters bond together to form massive reef complexes. Studying the common Eastern oyster (*Crassostrea virginica*), the researchers found that the oysters produce a unique adhesive material for affixing themselves to each other, a cement that differs from the glues used by other marine organisms. "Such knowledge can help us develop biomedical materials including wet setting surgical adhesives. These insights may also help us prevent marine bio-adhesion for keeping ship hulls clean, thereby reducing drag, fuel consumption, and carbon emissions," said Purdue chemist Jonathan Wilker, one of the study's lead researchers. Read more about it.

Image credit: Jonathan Wilker, Purdue University

PERFORM AS A MODEL ORGANIZATION

Perform as a Model Organization emphasizes the importance to NSF of attaining excellence and inclusion in all operational aspects.

NSF sets high standards for performance and integrity in support of our mission and in enabling our workforce to carry out activities efficiently, effectively, and sustainably. The Foundation promotes a culture of excellence that encourages diversity, creativity, and initiative. NSF is committed to broadening participation. This is reflected in our recruitment and selection of reviewers and panelists as well as the selection and empowerment of staff. We implement first-rate administrative, financial, information technology, and infrastructure systems that support individual staff members and provide high-quality customer service to the public. NSF aspires to be a learning organization that aims for continual improvement in our processes and continual development of our people. NSF is committed to the principles underlying open government including transparency, participation, and collaboration, and to translating this commitment into action. NSF serves as a model for other organizations that fund research and education and takes a leadership role in cross-agency activities.

PERFORMANCE GOALS

M-1: Achieve management excellence through leadership, accountability, and personal responsibility.

When the people who comprise NSF—career staff, rotators, and contractors—clearly understand their roles and responsibilities in service to the agency's mission, NSF will be at its best as an effective, efficient organization. Therefore, communicating clear standards and expectations is part of an ongoing conversation within NSF, engaging those involved in research programs and in agency administration, and aimed at generating a results-oriented performance culture. It is particularly important that NSF management be held to the highest standards to reflect NSF's commitment to performance excellence. It is the responsibility of each manager to provide an operational environment that promotes integrity, creativity, and fiscal accountability.

New NSF managers will be integrated into the agency through mandatory elements of the New Executive Transition (NExT) program, mentoring, and executive coaching. NSF will build on lessons learned from the experiences of all staff, including our rotators who bring fresh ideas and viewpoints. NSF has a major commitment to diversity and fair treatment of all current and prospective employees and is taking action necessary to become a model Equal Employment Opportunity (EEO) agency.

TARGET

More effective management enables all staff to understand how their duties support the mission of the Foundation

NEAR-TERM ACTIONS	MID-TERM ACTIONS	LONG-TERM/ASSESSMENT
• Review current performance management system and initiate expansion of coverage of Senior Executive Service (SES) and General Workforce (GWF) performance management to rotating staff • Increase use of feedback mechanisms to continuously improve management leadership skills and accountability, defining baselines where appropriate • Initiate process to attain status as a model EEO agency as defined by the U.S. Equal Employment Opportunity Commission (EEOC)	• Develop plan to improve the performance management system • Assess impact of expanding coverage of performance management framework to rotating staff • Implement action plan for employee engagement to address employee feedback • Assess progress toward model EEO status	• Assess implementation of the plan to improve the performance management system • Use continuing feedback mechanisms to assess progress for employee engagement plan. Refine plan, as needed

Evolution Chain Reaction

Image credit: Rob Oakleaf

NSF supports research that advances the frontiers of knowledge in the life sciences by increasing our understanding of complex living systems. New insights into biodiversity and evolutionary dynamics could prove crucial to environmental sustainability. A team of researchers is studying the ongoing emergence of a new species of fruit fly—and the sequential development of a new species of wasp. Jeff Feder, a University of Notre Dame biologist, and his colleagues say the introduction of apples to America almost 400 years ago ultimately may have changed the behavior of a fruit fly, leading to its modification and the subsequent modification of a parasitic wasp that feeds on it. Pictured above, a female apple maggot fly, *Rhagoletis pomonella*, implants an egg into an apple. Wasps that attack and eat the flies' larvae appear to be changing on a genetic level as the flies change genetically. "It's a nice demonstration of how the initial speciation of one organism opens up an opportunity for another species in the ecosystem to speciate in kind," said Feder. "Biodiversity in essence is the source for new biodiversity." Read more about it.

M-2: Infuse learning as an essential element of the NSF culture with emphasis on professional development and personal growth.

NSF stresses personal learning and development to enhance performance, further our knowledge base on all aspects of NSF activity, and continue to build for the future. For example, NSF fosters personal responsibility for professional growth through use of Individual Development Plans (IDP) and Independent Research and Development (IRD) Plans

across the agency, while expecting managers to provide needed guidance on the development of such plans. NSF reinforces this effort by investing in staff education and learning resources (e.g., Program Manager Seminars, Embassy Science Fellows, AcademyLearn, policy "town hall" meetings, certification programs, on-line courses) as well as targeted development opportunities to upgrade skills and knowledge of all staff as individuals and as members of teams working toward common objectives. Each manager will work with his or her staff to promote learning as the foundation of NSF's performance culture.

TARGET

NSF emphasizes learning for personal and professional development for all staff

NEAR-TERM ACTIONS	MID-TERM ACTIONS	LONG-TERM/ASSESSMENT
• Establish effective practices for assessing and addressing developmental needs of NSF staff	• Establish priorities for resource use in closing identified gaps in NSF learning portfolio	• Assess NSF learning portfolio and effective use by NSF staff
• Review current NSF learning opportunities and develop a plan for addressing gaps	• Review on-boarding program using employee feedback to plan for improvement	• Evaluate effectiveness of supervisors' and employees' use of assessment capabilities and learning portfolios to create individual development plans.
• Establish comprehensive on-boarding procedures appropriately tailored to position		

Engineering K-12 Education

Image credit: Elsa Head, Tufts University

NSF invests in projects that encourage future generations of scientists and engineers and revitalize the nation's science, technology, engineering, and mathematics (STEM) educational pipeline. Chris Rogers at Tufts University is working to improve science education by bringing engineering into K-12 classrooms. He and his colleagues have found that teaching engineering early is important because the engineering principles of building and designing to solve problems motivates young students to pursue science and math. When he started, there were few studies of the benefits of introducing engineering to the K-12 curriculum. To change this, Rogers started the Center for Engineering Education and Outreach (CEEO) in the School of Engineering at Tufts. The Tufts' Student Teacher Outreach Mentorship Program (STOMP) was one of the center's first efforts. STOMP enlists undergraduate engineering students to mentor K-12 teachers and students, like these fifth-grade students in Arlington, MA, using activities focused around engineering. A core principle behind STOMP is that all elementary school students are capable of learning engineering concepts and that those concepts can be built on throughout the years. One measure of the program's success is the fact that it has grown to include nearly 10 universities that have STOMP outreach programs, connected via the STOMP network. Now, Rogers and his CEEO colleagues are developing and testing curriculum materials for introducing engineering concepts in grades 3 through 5. Read more about it.

M-3: Encourage and sustain a culture of creativity and innovation across the agency to ensure continuous improvement and achieve high levels of customer service.

While NSF supports potentially transformative research through our grant programs, we also promote *internal* institutional transformation through creativity and innovation. Currently, NSF is taking a new and novel approach to become a model Federal steward with regard to environmental responsibility and sustainability. In the continued

transition to fully electronic business processes, we are transforming the processes underlying our proposal decision and award actions. NSF is working to improve internal administrative processes on a continuing basis to provide efficient, effective service for all NSF staff. The current NSF headquarters' lease expires in December 2013. The *Future NSF* project is tasked with ensuring NSF's core mission and the business of the agency are expressed and supported by the design and function of the future NSF headquarters.

NSF's success as a world-class, grant-awarding institution is dependent on the business processes, both programmatic and administrative, that support the agency each and every day. NSF continues to maintain a leadership role in Federal grants management in service to research and education constituencies. NSF is committed to standardization and streamlining of Federal systems that interface with the grantee community, so that our grantees can operate their business systems accountably and efficiently. Through continued development of Research.gov, NSF is exploring creative mechanisms to be even more transparent and accountable to the research community and the American public. NSF also pursues strategies that strengthen accountability efforts of the awardee community through business assistance and reporting tools. In addition, NSF is taking steps to improve contract management and oversight throughout all acquisition phases.

NSF applies a spirit of experimentation to its own business processes. This is aimed both at making the organization more efficient and effective as well as stimulating creativity in the research and education activities we support. This commitment is a defining element of this plan, and it will be visible in numerous ways over the next five years. Examples of this experimentation include innovative approaches to the facilitation and review of proposals for NSF funding, such as "blind reviews" and "grade-free" panels, "Ideas Labs" that incorporate creative problem-solving techniques and real-time collaborations to identify the most pressing challenges and questions in science and engineering research and education, and continued investment in leading-edge technologies and capabilities for NSF business systems and processes.

TARGET

NSF uses the innovation and creativity of our staff to improve agency processes and systems on a continuing basis

NEAR-TERM ACTIONS	MID-TERM ACTIONS	LONG-TERM/ASSESSMENT
• Establish plan for periodic assessment of primary NSF business processes and systems • Revitalize system for taking employee input into consideration in improving business processes and systems • Plan for upgraded financial system	• Conduct periodic assessments of primary business processes and systems based on established metrics • Plan for new processes and systems based on employee input • Implement upgraded financial system	• Review effectiveness of periodic assessment • Assure upgraded financial system meets NSF needs and Federal requirements

TARGET

NSF organizations achieve high levels of customer satisfaction

NEAR-TERM ACTIONS	MID-TERM ACTIONS	LONG-TERM/ASSESSMENT
• Develop a range of mechanisms, including use of current IT capabilities and open government/social media platforms, to obtain information on customer satisfaction on behalf of both internal and external customers • Explore methods to increase participation rates for respondents of NSF customer satisfaction activities	• Develop action plans to address areas of improvement identified by customer satisfaction information	• Assess customer satisfaction on a continuing basis and develop or refine action plans, as needed