# **1.63 Environmental Workforce and Innovation**

**Project Number & Title**

1.63 - Environmental Workforce and Innovation

**Project Lead and Deputy**

Brandon Jones - NCER

**Project Period**

FY16 – FY 19

**Project Summary**

The innovation and technology explosion over the last century has led to vast human benefits in terms of standard of living, health care, education, communication, mobility, and many other measures. Because most innovations and new technologies were designed with a specific benefit in mind, they produced such side effects as resource depletion, ecosystem degradation, hazardous waste, and disproportionate human exposures to toxics. As part of the Federal effort to incentivize research and innovation, activities in this project are focused on connecting to the academic and private sectors for workforce development, innovative research and sustainable technologies. Project activities are part of an overall effort to address existing environmental problems and, more importantly, to empower communities to apply more sustainable ideas, designs and ways of living.

**Project Description**

Problem and Decision Context

*Fellowships:* EPA recognizes that scientific, technical, engineering and mathematical (STEM) competence is essential to the Nation’s future wellbeing in terms of national security and competitive economic advantage. Community health and vitality is predicated, in part, on the availability of an adequate supply of scientists, technicians, engineers and mathematicians, to develop innovative technologies and solutions for community application. With this in mind, SHC manages the Greater Research Opportunities (GRO) and Science To Achieve Results (STAR) Fellowships to help ensure there is a highly skilled pool of technical professionals that are trained to address environmental issues that are pressing to society. The Fellowships help defray costs associated with advanced, environmentally-oriented study, leading to a bachelor’s, master’s or doctoral degree. Fellowships are rewarded, in part, based on the stated goals of applicants with respect to further engagement in environmental research, adherence to EPA statutes and policies while conducting research, and aligning of stated research goals with assessment criteria, including how research goals will promote sustainability principles.

*People, Prosperity and the Planet (P3):* Providing opportunities for upcoming generations to understand the concept and importance of sustainability are critical as communities move forward to a more balanced approach regarding how humans interact with the environment and its associated services. EPA’s People, Prosperity & the Planet Program (P3) is an innovative student design competition for sustainability. Student teams are involved in projects that provide benefit to people, promote prosperity and protect the planet by designing tangible, cutting-edge solutions for communities to use to address environmental challenges. EPA’s P3 offers students and faculty the opportunity to work in multidisciplinary teams to address challenges to sustainability and to move ideas toward demonstration or the marketplace. P3 proposals are evaluated and awarded for their potential to produce sustainable solutions while providing students and faculty with applied experiences in promoting the environmental sciences and sustainable solutions.

*Small Business Innovation Research (SBIR):* SBIR is intended to support the development of technologies that will ultimately be commercialized and improve our environment and quality of life, create jobs, increase productivity and economic growth, and improve the international competitiveness of the U.S. technology industry. SHC manages EPA’s SBIR Program where awards are made to small, high-tech companies to help develop and commercialize cutting-edge environmental technologies. Awards are in two phases, first, to prove the scientific merit and technical feasibility of the proposed concept and, if successful, to next develop and commercialize the technology. Annual contracts to small businesses are awarded to move ideas toward the marketplace.

Outputs

FY 16 - A Synthesis of Innovative ideas from the SBIR and P3 Programs

Focus Areas

*Focus Area #1: Fellowships -* The GRO Undergraduate and STAR Graduate Fellowship programs were initiated in 1982 and 1995 respectively. Both programs are part of the national effort to help ensure that the United States meets its current and projected human resource needs in the environmental science, engineering, and policy fields. The goal of the programs are to encourage promising students to obtain advanced degrees and pursue careers in an environmental field. This goal is consistent with the mission of EPA, which is to provide leadership in the nation’s environmental science, research, education, assessment, restoration, preservation, pollution prevention and sustainability efforts.  Both programs have proven to be beneficial to the public by providing a steady stream of well-trained environmental specialists to meet society’s environmental challenges. They have also provided new environmental research in engineering and in the physical, biological, health, and social sciences.

Some key products and aspects of the Fellowship programs include:

* Programmatic metrics
* Publications
* Presentations
* Simulation Models
* Solicitations
* Awards
* Peer Review
* Programmatic Review
* Decision Meeting
* Program Funding
* Program Management
* Contract Management
* Social Networking
* Communication Management
* Conference Planning
* Federal STEM activities and planning
* Outreach and networking

*Focus Area #2: People, Prosperity and the Planet (P3) & Small Business Innovation Research -* Increased awareness and understanding of sustainability are critical components for promoting a systematic shift towards more environmentally benign and sustainable products, processes, and systems. It is essential that all involved in the design, discovery, demonstration, and implementation of sustainable innovations understand the fundamental techniques and principles that underlie sustainability.  Innovative research can take the form of wholly new applications or applications that build on existing knowledge and approaches for new uses.

Programs like P3 and SBIR have provided incentive funding 1) to encourage sustainability thinking and research experiences for students and 2) to small businesses to translate their innovative ideas into commercial products that address environmental problems. These innovations are the primary source of new technologies that can provide improved environmental protection at lower cost with better performance and effectiveness. P3 & SBIR have helped spawn successful commercial ventures that not only improve our environment, but also create jobs, increase productivity and economic growth, and enhance the international competitiveness of the U.S. technology industry.

Some key products and aspects of the P3 & SBIR programs include:

· Programmatic metrics and reports

· Curriculum development

· Patents

· Publications

· Environmental technology market research analysis

· Job formation

· Non-profit formation

· For-profit formation

· Deployed sustainable technologies

· Improved public understanding of sustainability principles and applications

* Program funding
* Phase I & II Grants
* EPA P3 Competition at the National Sustainable Design Expo (NSDE)
* Contractor support
* Program management
* Contract management
* Communication management
* Grants management
* Outreach and networking with audience and partners
1. Academia
2. Professional societies
3. Other federal agencies and departments
4. Education societies
5. International Community
6. Entrepreneurial community

· Solicitations

· Peer Review

· Programmatic Review

· Phase I & II Awards

· Phase I Final Reports

**Nature of the Work**

*Fellowships:* 100% of the fellowship budget goes to review of applications, awards, awards management, and integration of STEM program activities across the Federal enterprise.

*P3 – People, Prosperity and the Planet:* 100% of the budget goes to review of applications, extramural research grants, grants management, synthesis, associated program support, and showcasing annual team projects at the national Expo.

*Small Business Innovation Research:* 100% of the budget goes to review of applications, extramural research contracts (awards), contracts management, synthesis and the associated program support.

**Collaboration**

*Fellowships:*

* ORD Labs and Centers
* EPA Program Offices
* Professors/Advisors
* Undergrad and Graduate Students
* Professional Societies
* Academia
* Federal STEM Enterprise

*People, Prosperity and the Planet (P3):*

· General Public

* ORD Labs and Centers

· EPA Program Offices

· Professional Societies

· International development community

· Venture and Angel Investor Community

· Entrepreneurial and Small business community

· Business and entrepreneurial academic education

*Small Business Innovation Research (SBIR):*

· General Public

· ORD Labs and Centers

· Federal SBIR Enterprise

· International development community

· Venture and Angel Investor Community

· Entrepreneurial and Small business community

**Assumptions/Constraints**

*Fellowships:* Assumptions -The annual cycle of the program and its relation to the academic calendar is key to the success of the program. The timing of fellowship awards and reaching the participating students in time for them to pursue their work is critical. Timing of awards is important to conducting a fair and robust competition.

Constraints - Agency policies regarding placement of non EPA personnel in EPA facilities (GRO Internships) are somewhat cumbersome but successful. , The application of grant and contract policies, as well as RFA clearance and award procedures often create hurdles as Fellowship awards supports individuals when most Agency policies concerning assistance agreements are focused on institutional awards.

*People, Prosperity and the Planet (P3):* Assumptions – Decisions and administrative support are responsive to the annual cycle of the program and its relation to the academic calendar. The success of the program is contingent upon timing of grant awards and reaching the participating schools in time for them to pursue their work. Timing of awards is critical to conducting fair and robust competition.

Constraints – EPA’s P3 Program is unique in the federal challenge and innovation contest arenas for participants because EPA offers a broad range of topics and the competition is open to any U.S. college or university. This broad scope attracts highly qualified investigators and creative students. However, the bureaucratic process associated with each of the above milestones makes applying to P3 less attractive. P3 stakeholders “live” in the annual cycle of the academic calendar. The current bureaucratic processes threaten the program’s viability by seriously constraining EPA’s ability to award grants in sync with academic calendars and stay relevant with research and innovation trends. Streamlining the bureaucratic processes will improve the program by ensuring EPA sparks and propels the cutting edge in the sustainable technology research arena.

*Small Business Innovation Research (SBIR):* Assumptions – As an Agency Program that is administered through ORD, SBIR is mandated by law and an annual solicitation is required. SBIR budget is a specific set-aside of the EPA extramural R&D budget. The small business administration administers the government wide SBIR program.

Constraints – Personnel and length of time to make awards.

**Project Charter Team Members**

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