FROM BATTLEFIELD TO CLASSROOM:
DESIGNING PATHWAYS TO ENGINEERING FOR AMERICAN GIs

SPONSOR: National Science Foundation, EEC (Solicitation: 09-29)

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Syracuse University -
LCS College of Engineering; School of Education; and Institute for National Security and Counterterrorism

Purpose: One critical challenge of war is to resettle veterans of the armed forces into productive civilian roles and professions. Such an obligation repays soldiers for their service and significant sacrifice. The Post-9/11 GI Bill, whose benefits begin 1 August 2009, offers the most comprehensive education benefits package since the original GI Bill of 1944, providing a range of opportunities and services for veterans and dependents. It is believed that many GIs will emerge from their military experiences with skill sets pitched toward technical fields and will even favor engineering education. The opportunity exists for this group to be instrumental in our nation's now urgent need for future scientists and engineers. In joining these trends at this critical juncture in time, ***it is imperative that planning and implementation for the influx of GIs into academia hinge upon projections about GIs' goals, aspirations and likely behavior that are informed by a sound evidentiary base***. This is the purpose of the proposed project.

Intellectual Merit: Through direct information sources (surveys and focus groups), and public record documents, the proposed research fills a gap in knowledge about the projected enrollment and higher education intentions and aspirations of Post-9/11 GI bill-eligible veterans pursuing engineering degree programs. Using a mixed method approach for data collection and analysis, we prioritize the following:

(1) Project the enrollment of benefits-eligible GIs in science and engineering degree programs
- Identify key factors determining whether GIs are likely to pursue engineering
- Develop statistical models using key factors to predict numbers of GIs pursuing engineering
- Determine broad factors for guiding future projection and predictive research
- Develop framework for NSF/federal agencies for budgets and programs in future proposal requests

(2) Develop, design, deploy, and analyze results from transportable survey tools and multivariate qualitative focus groups composed of diverse and segmented target sub-groups
- Gather information sources needed to learn more about the GI technical talent pool
- Develop assessment tools for profiling GI engineering aspirants for stimulating a pipeline of veterans
- Develop criteria to design and improve methods of attraction for benefits-eligible GIs
- Identify factors and variables that diverse veterans use to define their own aspirations

(3) Develop innovative concepts for guiding custom education programming and supportive industry and government partnerships for professional development
- Develop a knowledge base of support resources that GIs report as needed or helpful for enhancing recruitment, transition, persistence, degree completion, professional development, and academic support.
- Develop strategies to leverage the diversity of veterans for the engineering pipeline, including redressing barriers and challenges.

Broader Impacts: It is anticipated that NSF, other agencies, and institutions will apply these research results in planning for the influx of veterans into higher education. This project will provide data to inform future program solicitations and scale programmatic content to need and enable stakeholders to perform the following critical activities:
- Maximize enrollment and retention by learning about GI motivations to pursue technical education
- Engage industry partners as potential employers, valuable resources for veterans' career development, and partners in academic institutional investment to support new educational programs
- Track educational programs veterans enter, critical to evaluating the efficacy of those programs
- Map the pipeline from the battlefield to postsecondary education, with sensitivity to traditionally underrepresented groups in science and engineering
- Extend the concept of "health" beyond well-researched physical and mental needs of GIs to address educational and professional health
- Relate the acute recovery needs of the U.S. economy with well-trained, highly committed human assets within the armed forces, including their potential catalyzing role in the emergent movement within academe toward public engagement.

PROJECT OVERVIEW: GOALS, OBJECTIVES, AND WORK PRODUCTS
This proposed project takes advantage of this set of converging historical opportunities to develop concepts, information sources and datasets, and program ideas designed to help stakeholders think proactively, creatively, and pragmatically about translating veterans' experiences and talent into technical and engineering career pathways. At the core of the proposed project is the premise that planning projections must be based on understanding—with depth and sophistication—the aspirations, needs, concerns, expectations, and hopes of veterans as they transition from active duty to higher education contexts and as these academic contexts define partnerships to guide them toward professional development. In this respect, the proposed project is designed as a planning initiative with multiple stakeholders in mind to achieve the following goal and objectives, with attendant work products:

Goals: Translating Veteran Technical Talent into Career Pathways in Postsecondary Engineering Education
This proposed project has three goals: to learn a great deal more about this untapped technical talent pool; to use qualitative and quantitative methods to develop and test innovative concepts for translating veterans' abilities, potential interests, and aspirations into viable career pathways in engineering; and to generate and evaluate new ideas for embedding professional development partnerships into customized career pathways in ways that reflect veterans' interests and the needs of the U.S. technical workforce.

Objectives:
- Identify, define, and gather information and information sources necessary to learn more about the current talent pool of veterans in order to frame and inform the project goal of translating veteran talent into a technical career pathway
- Develop, design, deploy, and analyze the results of transportable survey tools and multivariate qualitative focus groups composed of diverse and segmented target sub-groups
- Determine factors and variables that may guide future projection studies and predictive research, and provide exploratory modeling results
- Develop innovative concepts for guiding custom education programming, including program modules and priorities, and supportive institutional, industry, and government partnerships for professional development

Work Products:
- Framework for NSF and other federal agencies for determining budgets and programs in future requests for veteran-related education proposals
- Identification of preliminary factors and variables that diverse veterans use to define their own interests and aspirations for technical and engineering higher education
- Exploratory data models that quantify relationships between identified variables, and the likelihood that veterans will pursue an engineering or engineering technology program
- Assessment tools for profiling veteran engineering aspirants for the purpose of stimulating a pipeline of veterans into STEM education
- Identification of support resources that diverse veteran engineering aspirants report as needed and/or helpful for engineering education programs and career planning
- Engineering program concepts that address strategies and services for enhancing transition, recruitment, and persistence; curriculum and degree completion strategies tailored to the population
- (e.g., innovative use of credit-transfers and credit-bearing internships); university-industry government partnerships for professional development and priorities for employee network
- Journal articles, conference and workshop presentations, and white paper on evaluation results broadly accessible for various stakeholders. The PI, Dr. Laura J. Steinberg, is Dean of the College of Engineering and Computer Science at Syracuse University and intends to use the "bully pulpit" associated with this position to publicize and disseminate widely the results of this research effort.