NATIONAL SCIENCE FOUNDATION
Proposal Abstract

Proposal Title: Convergence Accelerator Phase I (RAISE): Preparing the Future
Workforce of Architecture, Engineering, and Construction for
Robotic Automation Processes
Institution: Florida International University
Abstract Date: 07/29/19

The NSF Convergence Accelerator supports team-based, multidisciplinary efforts that address challenges of national importance and show potential for deliverables in the near future.

The broader impact/potential benefits of this Convergence Accelerator Phase I project will address a crucial national problem by preparing the nation's workers and businesses in the Architecture, Engineering, and Construction (AEC) industries for an increasingly automated future workplace. This convergent research and development project involves researchers in architecture, construction, engineering, computer science, STEM education and economic development, as well as industry collaborators from the robotics, architecture, engineering, construction and software industries. Its Phase 1 deliverables will benefit businesses, workers and professionals in the AEC industry cluster, as well as regional and national economic development policy. Phase 1 provides the platform for critical solutions: maximizing employment opportunity, minimizing job displacement, and improving national economic competitiveness in the AEC industries. Improving AEC industry performance also promises solutions leading to a more energy efficient and sustainable built environment.

This Convergence Accelerator Phase I project will contribute to research and application of Artificial Intelligence (AI) and immersive virtual environments in education as well as examining economic impacts of automation technology adoption in the AEC industries. The rapid adoption of AI and automation promises new employment and business opportunities, but will also create job displacement and business disruption. The Project's Phase 1 research objectives are to develop 1) a prototype interactive virtual reality robotics training and educational software package, and 2) a new model to measure the economic impact of automation adoption. Phase 1 will provide a platform for an immersive virtual software to teach new skills, improve process workflows, and increase efficiency in the AEC industries. Integrating advanced technologies including Reinforcement Learning, Computer Vision, Augmented and Virtual Reality, the project will advance methods of remote and on-site training for a large segment of employees in the AEC industries. By applying STEM learning strategies, the project will contribute to understanding how people learn in technology rich environments and bridge the gap between technology advancement and application to practice. The Project's economic analysis will utilize a "bottom-up" approach to estimating the employment impacts resulting from the adoption of AI and robotics.

This award reflects NSF's statutory mission and has been deemed worthy of support through evaluation using the Foundation's intellectual merit and broader impacts review criteria.