

NATIONAL SCIENCE FOUNDATION  
**Proposal Abstract**

**Proposal:**1937010

**PI Name:**Lu , Aidong

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**Proposal Title:** Convergence Accelerator Phase I: Smart Platform of Personalized Learning, Assessment and Prediction for Future Career Training of Skilled Workers

**Institution:** University of North Carolina at Charlotte

**Abstract Date:** 08/08/19

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 benefit of this Convergence Accelerator Phase I project is to address the critical needs for developing and sustaining skilled technical workforce, which are a key component of the U.S. economy. This project proposes to develop a smart training platform through digitalizing the training processes and embedding advanced techniques of big data, (Artificial Intelligence) AI, smart sensing, mixed reality, kinesiology and fire engineering. The results could accelerate the changes of traditional training programs to new types of training and certification related to the latest technology advances. Specifically, this project will benefit firefighters with a new training platform that reduces injuries, shortens training process, and prepares more people as future firefighters with virtual training programs. This will save lives and reduce costs of both property damage and human casualty in fires. With the developed platform that will be made publicly available, firefighters will learn STEM skills and achieve an easy transition into new positions that require similar skills in later in their careers. The platform could be extended to a variety of skilled worker occupations such as health care and smart manufacturing. This project will also strengthen college and online programs of fire safety and train minority students at two participating universities.

This Convergence Accelerator Phase I project proposes to innovate the training of skilled workers through a smart, personalized and augmented training platform that coordinates training across organizations. The platform will integrate data-centric techniques to serve multiple purposes of various participants and provide a comprehensive suite of training functions. Specifically, this project will investigate several research tasks: intelligent wireless sensing system for simultaneous user tracking, action recognition, and user identification; smart and adaptive sensing for comprehensive evaluation of user actions and impacts on environments; new data-driven methods for injury assessment and prediction; deep learning based recommendation models for personalized training activity and future jobs; and collaborative augmenting methods for creating various training environments and immersive analytics for analyzing large-scale data provenance. These methods form a holistic environment for adaptive training of the future workforce. As a special case, the investigators will evaluate and demonstrate the application of the developed system on training of firefighters through close collaborations among university fire engineering programs, fire departments and a training academy, and a nationwide firefighter association.

This award reflects NSF's statutory mission and has been deemed worthy of support

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through evaluation using the Foundation's intellectual merit and broader impacts review criteria.