

# NATIONAL SCIENCE FOUNDATION

## Proposal Abstract

**Proposal:**1936992

**PI Name:**Zhang , Xiaoli

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**Proposal Title:** Convergence Accelerator Phase I (RAISE): AI-Enabled Personalized Training for Displaced Workers in Materials Supply Chain

**Institution:** Colorado School of Mines

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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 of this Convergence Accelerator Phase I project is to create artificial intelligence (AI) -enabled tools aimed at curbing the looming workforce displacement crisis due to the 4th industrial revolution. The developed AI technology will allow personalized training techniques to be ported to the emerging jobs. Specifically, the personalized training and assessment generation can be used across workers with various backgrounds and areas, focusing only on what workers need to learn, skipping what they have already mastered, which can cut training time dramatically while boosting knowledge and skill acquisition, build workers self-awareness and self-confidence, and ensure the fair treatment of workers. Whilst the immediate test beds are in mining, metal processing and manufacturing, which take advantage of existing core education and research strengths and our industrial consortia and stakeholder industries, the impact of the tools can be tailored for other fields in engineering. Through the multidisciplinary cooperation across academia, industry, and education fields, this project will enhance the scientific understanding of future worker training and forms a pedagogical convergence of AI techniques, educational sciences, and traditional engineering & sciences, which meet the future interdisciplinary job requirements.

This Convergence Accelerator Phase I project will replicate personalized tutoring methods with an AI-enabled approach that will allow for automatic assessment of the skills and gaps for displaced workers and for fast, fair, and cost-effective training at scale to place them in new jobs. We will focus on three research objectives that are mutually dependent for achieving our research goal. First, the multidisciplinary cooperation across academia, industry, and education fields will enhance our scientific understanding of future worker training and will define meaningful model structure, featurized inputs, and assessment metrics for the AI tool. Second, a new learning approach will modularly learn and transfer knowledge from available worker-job combinations to generate the customized training program for a given new worker-job combination that was not seen during training. Lastly, the team will develop a solid plan which will integrate the AI-enabled tool with the existing university and industrial training programs and pave the way for practical deployment of the AI tool in industry. The deliverables of this project will serve the US needs across the entire materials supply chain sector and develop a diverse, globally competitive STEM workforce.

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

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