Proposal:1936968   **PI Name:**Yue , Chuan

Proposal Title: Convergence Accelerator Phase I (RAISE): Toward Fair, Ethical, Efficient, and Trustworthy Crowdsourcing Platforms to Support Crowdworkers in Jobs of the Future
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/potential benefit of this Convergence Accelerator Phase I project is multifaceted. Crowdsourcing has created a vast and rapidly growing online labor market. However, today's crowdsourcing platforms cannot well support crowdworkers, job requesters, and the healthy growth of this important online labor market due to four major problems: fairness, ethics, efficiency, and trustworthiness. This project is a convergence of the research and development from multiple intellectually distinct disciplines including Computer Science, Economics & Business, and Humanities & Social Sciences. By performing fundamental research with rapid development advances through partnerships with crowdsourcing platform providers, this project will deliver techniques that can be used to create fair, ethical, efficient, and trustworthy crowdsourcing platforms to support American crowdworkers. It will also enable job requesters including researchers, companies, and government or humanitarian aid organizations to receive high-quality and trustworthy task submissions for them to confidently conduct their important studies and make important decisions. This project will actively involve students from underrepresented groups including female and minority students. It will train students on research and on producing high-quality deliverables. It will widely disseminate its results via activities such as publishing research papers and promoting the wide use of the deliverables.

This Convergence Accelerator Phase I project has significant intellectual merit. It addresses the critical interdisciplinary challenges of creating a healthy crowdsourcing labor market that is crucial to the important studies, computations, and decisions of researchers, companies, as well as government and humanitarian aid organizations. This labor market is vast and rapidly growing, but has four major problems intertwined from the fairness, ethics, efficiency, and trustworthiness perspectives in a very complicated manner. This project addresses the four major problems by performing fundamental research with rapid development advances through partnerships with crowdsourcing platform providers. It will (1) design incentive structures based on economic theory to incentivize fairness in crowdsourcing, (2) design research, training, and assessment mechanisms to incorporate ethics into crowdsourcing, (3) design machine learning models to improve the efficiency of crowdworkers, and (4) design machine learning models to securely protect both crowdworkers and job requesters. It will integrate the designed techniques at the client-side into a web browser extension, and at the server-side into some industrial partner's crowdsourcing platform. Overall, it takes a convergence approach to advance the scientific knowledge and understanding of crowdsourcing and its closely related disciplines including economics, business,

humanities, social sciences, and computer science.

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.