Proposal Title: Convergence Accelerator Phase I: Empowering Neurodiverse Populations for Employment through Inclusion AI and Innovation Science
Institution: Vanderbilt University
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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 to dramatically increase the engagement of individuals with autism spectrum disorders (ASD) in the workforce. While approximately two-thirds of 2.5 million adults with ASD in the US have average intelligence, more than 50% of them remain unemployed or underemployed. Many individuals with ASD have unique capabilities that are in high demand across many job sectors; optimizing workforce engagement for these individuals holds the potential to transform great societal cost into great societal value. This project utilizes convergent expertise in Artificial Intelligence (AI), virtual reality, robotics, together with expertise in neuroscience, and behavioral and organizational psychology, to develop intelligent tools and systems to facilitate employment of individuals with ASD that have high potential for rapid commercialization and deployment. Specifically, the proposed research will develop intelligent training systems for interviews and other job relevant social interaction skills for individuals with ASD, and skill assessment tools for employers to enhance recruitment and retention. The entire project is based on the foundational idea that many people with ASD have the potential to participate in the workforce in ways that contribute to society while also sustaining personal success and well-being.

This Convergence Accelerator Phase I project presents a comprehensive research plan to create new AI tools, systems, and predictive models, inclusive of employer and stakeholder input, to connect people with ASD to employers via embedded, technologically based, research-informed supports for individuals and organizations alike. For people with ASD, inherent challenges related to social initiation, engagement, and communication impede their adaptive independence, including finding and keeping jobs. This issue has become a top priority of the National Institutes of Health Interagency Autism Coordinating Committee. The project involves six convergent, mutually reinforcing research components: (1) a pipeline to employment for people with ASD; (2) an affect-sensitive, closed-loop virtual reality interview training platform to assess and intervene on skill deficits while also gathering aggregate data relevant to employer training; (3) opportunities for home assessment and practice outside of traditional educational settings through the use of AI-agent mediated collaborative virtual environments and (4) closed-loop interactive socially assistive robots; (5) novel computer vision and wearable computing tools for assessment of real-world generalization of skills learned within VR and robotic systems; and (6) customizable, innovative assessment tools using data-driven visual AI to identify strengths, talents, and job-relevant skills.

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.