

Project Summary

Robotics is poised to enter many arenas of human everyday use with the potential of positively impacting quality of life, especially for growing populations with special needs. However, research in the field of *human-robot interaction (HRI)* and the new field of *socially assistive robotics (SAR)*, the study of robotic systems capable of providing help through social rather than physical interaction, is currently limited by a lack of richly interactive robotic testbeds suitable for human-subjects experimental evaluation. The NSF 2006 Cluster Workshop on Human-Robot Interaction, held in late September 2006, cited this lack of infrastructure as an important barrier to research success. This proposal involves the acquisition of just such infrastructure that will enable novel interdisciplinary integrative research covering a broad spectrum of HRI topics as well as a comprehensive program of education and K-12 outreach.

Intellectual merit: SAR studies a unique set of problems related to utilizing robot embodiment to provide social assistance to users in a variety of convalescence, rehabilitation, education, and training settings. The proposed infrastructure consists of richly interactive humanoid robot platforms and state-of-the-art data collection equipment. The infrastructure will enable the growth of SAR, which itself provides grounding for a major area of HRI research by requiring realistic validation with human subjects/users for studies involving key open topics in the field of HRI, including embodiment, affect/attitude modeling and recognition, mixed initiative interactions, user modeling, modeling personality and empathy, and engagement and learning through imitation. The proposed infrastructure will enable research projects in those areas, with uniquely large-scale and longitudinal experimental validation with relevant user populations. The infrastructure-enabled research will produce a large and unique corpus of data that will be made available to the research community. The expected scientific impact will go well beyond novel insights toward a better understanding of the fundamentals of HRI and its relevance for special needs populations.

Broader impact: The nature of SAR research is inherently aimed at improving quality of life for large and growing under-served populations. The proposed infrastructure and research will also impact human resource development through the dovetailed educational and K-12 outreach programs that will reach hundreds of students of all ages. Further, by involving the interdisciplinary team that goes beyond computer science and electrical engineering to include kinesiology, pediatrics, and development disorder experts, the research will bring new expertise and new membership into the CISE community. Finally, the proposed infrastructure will enable the acquisition of pilot data that are necessary for pursuing funding from the National Institutes of Health and from foundations.