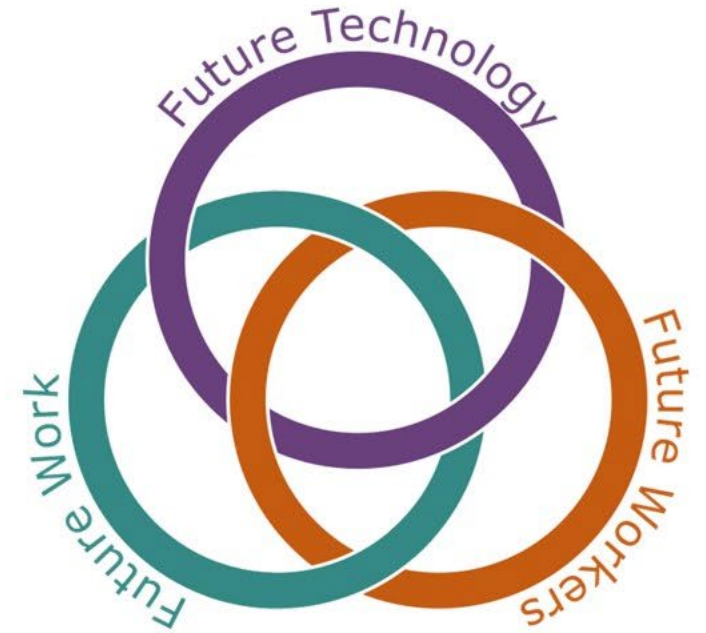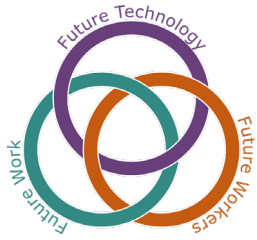# 2020 Awardees

- Exploring Creative Design at the Human-technology Frontier Through the Emerging Artist-technologist Occupation

- Future Telemedicine Technologies and Multidisciplinary Workforce Readiness

- Immersive Virtual Reality Instructional Modules for Response to Active Shooter Events

- Mitigating Risks in Future Police Work through Social Telerobotic Communication

- Planning for the future of rural telerobotic surgical healthcare

- The Future of Workplace Wellness

FW-HTF-P: Exploring creative design at the human-technology frontier through the emerging "artist-technologist" occupation

(award #)

PIs: *Raffaella Borasi; Mark Bocko; James Doser; Zhiyao Duan; Joseph Testani – University of Rochester, Rochester NY*

Exploring how AI and AR/VR technology advances are impacting the emerging occupation of Artist-Technologist (individuals working at the intersection of art and technology) – so as to better understand the creative process at the human-technology frontier, and how it can be best developed and supported.

Place Presenter's Zoom Image/Video Here

Future Technology

RQ: *How are XR and AI most likely to affect future Artist-Technologists' creative design of media products?*

Future Work

RQ: *What will it take to create a more inclusive, equitable and supportive working environment for future Artist-Technologists?*
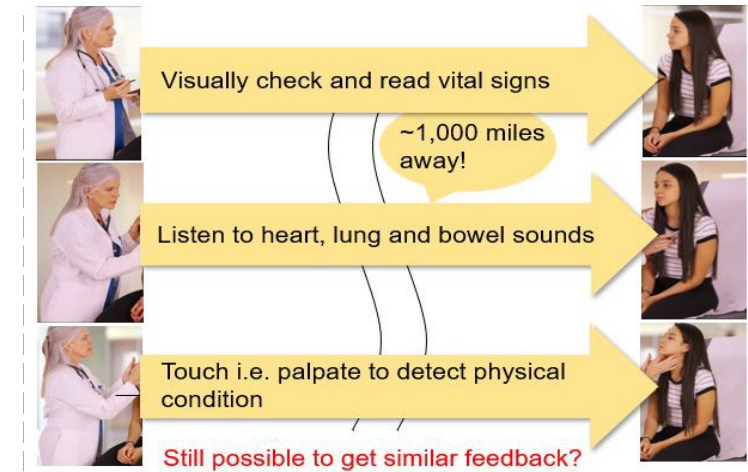
Future Workers

RQ: *How can we best prepare Artist-Technologists to be successful in their expected future roles?*
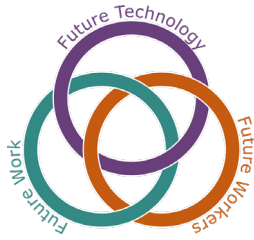
2026516 FW-HTF-P: Future Telemedicine Technologies and Multidisciplinary Workforce Readiness

PI: Sang-Eun Song, University of Central Florida, s.song@ucf.edu
Co-PIs: Damla Turgut, Dawn Eckhoff, Hansen Mancy, Michelle Taub

Idea: tele-palpation and digital auscultation enabled synchronized multimodal telemedicine. Objectives (planning project): 1) identify and establish core telemedicine technologies and 2) plan educational integration for future workforce.

Visually check and read vital signs

~1,000 miles away!

Listen to heart, lung and bowel sounds

Touch i.e. palpate to detect physical condition

Still possible to get similar feedback?

System architecture of the proposed advanced telemedicine has been identified including Patient Unit and Provider Station that can be connected via existing network.
It enables synchronized multimodal medical data acquisition that may reveal new diagnostic measure.


Patient Unit and Provider Station

Identified that 10 of 20 fastest-growing occupations between 2016-2026 are predicted to be in the healthcare field. Top three are Home health aides (47%), Physician assistants (PAs) (37%), and Nurse practitioners (NPs) (36%), which are the core expertise of the proposed advanced telemedicine system.

Future workers in the healthcare-centered work environment require multidisciplinary knowledge and experiences difficult to glean from conventional textbook learning. Active participation in biomedical research integrated class is needed. Orlando Medical City is being developed demanding 30000 jobs $7.6B impact next decade. UCF accommodating nearly 70000 students is the main workforce provider in imminent need of this planning and its implementation.
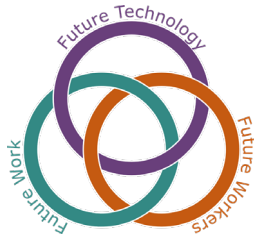
Award Number: **2026412, FW-HTF-P: Immersive Virtual Reality Instructional Modules for Response to Active Shooter Events**
PI(s): Dr. Sharad Sharma, Computer Science Department, Bowie State University, Bowie, MD. Email: ssharma@bowiiestate.edu

Brief overview: The primary focus of this project is to increase the efficiency and preparedness of public safety professionals for active shooter events, with a focus on the design of future technologies for conducting emergency response training.

Place Presenter's Zoom Image/Video Here

Future Technology

The pilot research in this project involves developing immersive virtual reality instructional (VRI) modules to serve as a platform for emergency training to be deployed across institutions of higher education (IHEs).
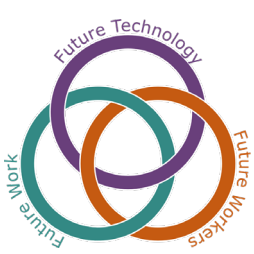

Future Work

This work builds on our existing VRI module for active shooter response and will expand the simulation environment to include public safety professional training with an active shooter scenario. The research will engage 15-200 university volunteers (faculty, staff, and visitors) and the instructional modules will be built and evaluated with 15-20 public safety professionals from Bowie State University.

Future Workers

These active shooter response training drills and exercises will facilitate the implementation of emergency operation plans and the translation of plans into action.

FW-HTF-P: Mitigating Risks in Future Police Work through Social Telerobotic Communication, Award No. 2026658

PIs: **Nader Jalili, PhD,** njalili@ua.edu; **Darrin Griffin, PhD,** djgriffin1@ua.edu; **Christian Cousin, PhD,** cacousin@eng.ua.edu: **The University of Alabama**

The objective is to develop a teleoperated social robot to equip law enforcement officers (LEOs) with the ability to remotely communicate and interact with others across multiple verbal and non-verbal modes. The team is actively exploring the needs, risks, and opportunities of social robotic technologies for use in hazardous operations in law enforcement and public safety.

Future Technology

- Mobile robots equipped with two-way audio/video communications, remote manipulation, and controllers
- Robot was modified and improved based on LEO and stakeholder feedback
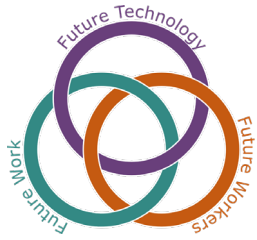

Future Work

- Team has partnered with Tuscaloosa and Oxford Police Departments, Law Enforcement Academy Tuscaloosa, and Jacksonville State University
- Trainings/visits scheduled on/for 11/13/20, 1/13/21, 1/15/21, 1/22/21
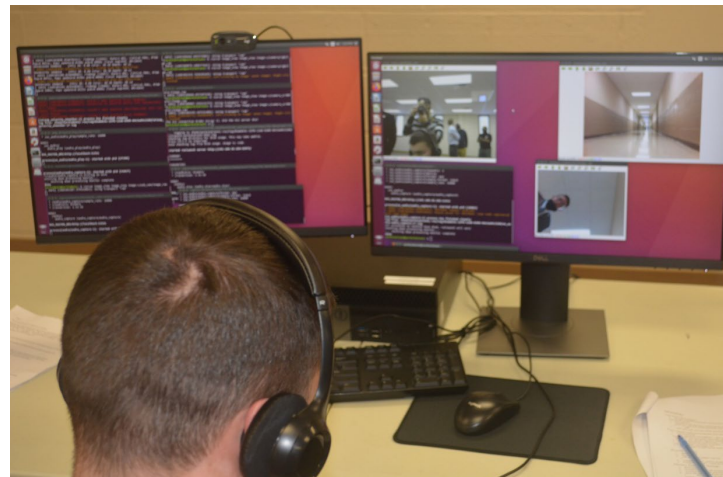
Future Workers

- LEOs trained in nonverbal, intercultural, and mediated communication
- LEOs trained on robot platform and provided feedback on robot/interface for an iterative design approach

Future Work of Telerobotic Healthcare
PI(s): Stephen Seslar, MD, Blake Hannaford, Ph.D., Tadayoshi Kohno, Ph.D.,   University of Washington
(Planning award NSF# 2025814)

Remote work (telesurgery) will disrupt work dynamics of surgical teams. Extend "in-room" understanding of **team dynamics and trust in surgical work teams** to remote work.

Place Presenter's Zoom Image/Video Here

Aim 1: Meeting of regional stakeholders and technology experts.

Aim 2: Explore new tech. To mitigate impacts of remote work in surgery.

**Aim 3:** Conduct mock remote procedures between Seattle and rural hospital.

- Remote work (telesurgery) will disrupt work dynamics of surgical teams.
- Extend "in-room" understanding of team dynamics and trust in surgical work teams to remote work.
- Study Team from:
  - Medicine (Cardiology)
  - Robotics (teleoperation)
  - CyberSecurity
  - Sociology
  - Public Health
  - Business/Administration
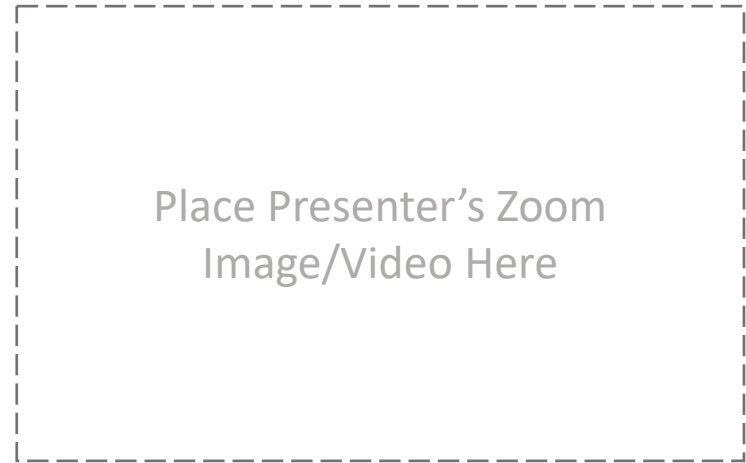
- Increase access to care for rural americans.
- Growth in elderly population is acute in rural areas away from specialty care.
- Reduce long distance travel for emergent and routine specialty care.
- Train graduate students in this new area

W

Seattle Children's
HOSPITAL • RESEARCH • FOUNDATION
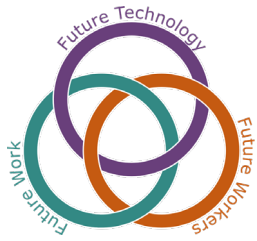
#2026512 FW-HTF-P: The Future of Workplace Wellness

PI(s): Pavan Turaga, Arizona State University, pturaga@asu.edu
Co-PI: Ellen Green, Matt Buman, Dosun Shin, Todd Ingalls, Assegid Kidane, Grisha Coleman (new contributors Max Bernstein, Milagros Zingoni)

Geometric Media Lab

ASU College of Health Solutions Arizona State University

School of Arts, Media and Engineering — ASU Herberger Institute for Design and the Arts, Arizona State University

The Design School — ASU Herberger Institute for Design and the Arts, Arizona State University

The New American Film School — ASU Herberger Institute for Design and the Arts, Arizona State University

Create the future of workplace wellness: personalized via AI enabled insights, interactive media inspired by WELL building standards, workspace design aimed at reducing sedentary behavior, and measures of mental and physical health of workers and increased efficacy of wellness coaches.

Future Technology

Prototyping workstations to reduce sedentary behavior via sensors, product design + WELL-inspired work environments via movement-based interactive visual augmentation.

Future Work

Use methods from health economics to better understand how the work efficacy of coaches can be improved via interventions into workplaces. Our goals include a cost-effectiveness analysis comparing the productivity gained from the technology to the cost of implementation. This analysis will account for both potential gains from wellness program effectiveness and the increase in productivity from the reallocation of labor

Future Workers

Initial protocol for measuring efficacy of interventions on workers for time-spent sedentary. Working on developing user tests and mental wellness metrics.