FAST FACTS
CARILION CLINIC
CENTER FOR HUMAN FACTORS

CARILION CLINIC

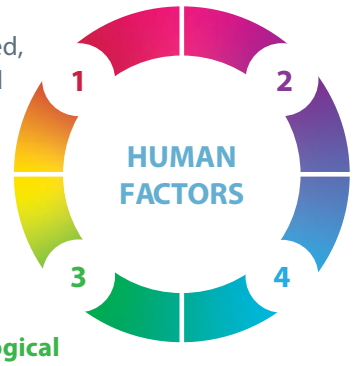
The Carilion Clinic Human Factors Center of Excellence team applies scientific principles from psychology, engineering, and human-centered design to optimize interactions between healthcare professionals, patients, and technology. With goals to improve patient safety, clinical effectiveness, and overall healthcare delivery, the team considers human capabilities and limitations in designing medical systems, processes, and settings. Carilion has one of the nation's largest applied Human Factors teams and is a well-respected leader in the field.

WHY HUMAN FACTORS IS VITAL TO HEALTHCARE

Patients and their care teams are the heart of all healthcare interactions. Surrounding them is a vast, dynamic system of complex information, technology, and resources. Such complexities can overwhelm the team's capacity to care for patients safely and effectively. Humans are, after all, human.

With the exponential growth of technology and artificial intelligence in healthcare colliding with the shortage of healthcare professionals, it is imperative to ensure human limitations, desires, and capacities are considered when developing care pathways and practices.

"Using systems principles and heuristics to make it easy to do the right thing, and hard to do the wrong thing."



1. **Human Technology:** Ensure technology is designed, developed and implemented to meet provider and patient needs
2. **Cognitive Engineering:** Study mental processes such as memory, perception and decision-making
3. **Physiological and Psychological Conditions:** Study physiological factors, fatigue, and mental and emotional states
4. **Physical Environment:** Examine environmental factors to better support clinicians and patients

CENTER OF EXCELLENCE

Human Factors' goal is to design and apply work processes that make it easy to do the right thing and hard to do the wrong thing. Some examples of applied Human Factors work include:

- Proactive Safety: Creating resilient environments and processes that can recover from unexpected circumstances.
- Testing the usability of new tools and technology to understand the potential risks before they affect a patient or clinician.
- Designing spaces so they are safe and intuitive to navigate for everyone.
- Optimizing electronic medical records to minimize the burden on clinicians and provide the correct information on demand.
- Understanding human contributions to errors when they happen to support a just culture and no-blame solutions, ensuring interventions are as strong as possible.
- Combating burnout by systematically understanding workload.
- Performing research when knowledge of human capabilities and limitations still need to be fully understood.

WHO ARE WE

Sarah Parker, PhD

Chair, Health Systems and Implementation Science, Virginia Tech Carilion School of Medicine

BA, Psychology; MA and PhD, Human Factors

Specialty: Implementation, Communcation

15+ Years Healthcare Experience

C. Adam Probst, PhD

Director of Applied Human Factors

BA, Psychology; MA and PhD, Cognitive Engineering; MS Healthcare Leadership and Managerment

Specialty: Patient Safety

Emmanuel Tetteh, PhD

Sr. Human Factors Consultant

BS and MS, Bioengineering; PhD, Human Factors

Specialty: Exoskeleton

Harsh Sanghavi

Sr. Human Factors Consultant

MS, Industrial and Systems Engineering, Aerospace

Specialty: Performance and Aesthetics

Yuhao Peng

Sr. Human Factors Consultant

MS, Industrial Engineering, Statistics

Specialty: Workload, Human-Centered Design

OPTIMIZING TRAUMA BAY DESIGN: A COLLABORATIVE APPROACH

To prepare for the expansion of the Emergency Department in the Crystal Spring Tower at Carilion Roanoke Memorial Hospital, simulation-based testing was used to evaluate how layout changes affect care. The goal was to identify latent safety threats across different high-acuity scenarios with a focus on teamwork, workflows, equipment accessibility, ergonomics, and interactions between healthcare professionals and the environment. In-situ simulations covered stroke, trauma, STEMI, and pediatric emergencies, bringing together frontline clinicians and support teams to observe performance under simulations in the real care environment. This was a joint effort between Simulation, Human Factors, and Emergency Medicine specialties to prevent downstream safety risks before patients ever enter the space.