AREAS OF FUTURE RESEARCH

Human Robot Interaction:
- Design of robot interfaces to support patient medicine delivery and remote doctor-patient consultation.
- Interface design for pharmacist/nurse use of hospital robots in common nursing tasks.

Pilot-Automation Interaction:
- Develop real-time models of pilot behavior for flight error prediction.
- Embedding pilot cognitive models in cockpit automation design tools

Repetitive Stress Injuries:
- Use lab and field research approaches to address lost-time injuries in National Occupational Research Agenda sectors
- Develop an ergonomic checklist/quick guide for hazard recognition, evaluation, and control in maintenance tasks

Driving Situation Awareness:
- Design and evaluate adaptive in-vehicle aiding technologies for driver SA and performance
- Assess the role of driver age and cognitive abilities on performance under hazardous conditions

For more information contact the Ergonomics Lab faculty:

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NC State Ergonomics Laboratory

LAB MISSION
- Develop new knowledge in ergonomics and human performance.
- Develop effective cognitive and physical work technologies.
- Improve quality of life.

OBJECTIVES
Cognitive Ergonomics
- Assess influence of technology on human performance in transportation domains.
- Identify task, environment, and user factors mediating relation of situation awareness and human-machine performance in complex systems.
- Test hypotheses on human cognition in aviation-related tasks using simulation and computational models.

Physical Ergonomics
- Design interventions to reduce repetitive stress injuries.
- Develop biomechanical models and simulations of lifting performance.
- Use virtual reality (VR) to assess role of perception in slips and falls.
- Develop causal models of worker injury.

AVAILABLE STUDENT SUPPORT
- NASA – Research Assistantships
- NSF – Research Assistantships
- The Ergonomics Center of North Carolina – Internships and Research Assistantships
- NIOSH – Trainee Fellowships

CORPORATE AND GOVERNMENT RELATIONSHIPS
- Recipient of cooperate endowment for Safety & Ergonomics (Duke Energy)
- Research partner with local business (Aptima, SA Technologies)
- Federal funding (Army, NASA, NIOSH, NSF, ONR)

Example Cognitive Ergonomics Research Project:
Pilot-Automation Interaction Assessment
Goal:
- To develop an empirical database on cockpit automation to support design of new avionics.

Approach:
- Flight simulator trials using three modes of automation
- Pilot perceptions of workload and physiological state indicators recorded along with flight path control performance measures

Application:
- Identify pilot cognitive workload costs of automation mode transitions in cockpit
- Formulate design principles for cockpit automation.

Example Physical Ergonomics Research Project:
Repetitive Stress Injuries
Goal:
- To implement ergonomic programs at local nuclear power plant.
- Recommend interventions to reduce lost time injuries.

Approach:
- Review of safety information database
- Perform job screening to identify risk factors
- “Deep-dive” analyses on high risk tasks as basis for intervention design
- Lab experimentation to assess interventions

Outcomes:
- Development of new work methods
- Engineering controls for reduction in lost-time injuries

DEGREES AWARDED
- Masters of Industrial Engineering (MIE - non-thesis option)
- Masters of Science (MSIE - thesis option)
- Doctor of Philosophy (PhD)

AVAILABLE COURSES
ISE/PSY 540 - Human Factors in Systems Design
ISE 541 - Occupational Safety Engineering
ISE 544 - Occupational Biomechanics
ISE 712 - Bayesian Decision Analysis for Human Performance
ISE/PSY 740 - Engineering Psychology of HCI
ISE 741 - Systems Safety Engineering
ISE/PSY 743 - Ergonomic Performance Assessment
ISE/PSY 744 - Human Information Processing
ISE/PSY 745 - Human Performance
ISE 794B/PSY 710U - Cognitive Engineering
ISE 794C - Human Reliability Analysis
ISE 796 - Research Practicum (safety/ergonomics)