

Christopher Blackledge

Education

Master of Science in Industrial Engineering, Human Factors and Ergonomics

Mississippi State University, Starkville, MS. December 2011

Bachelor of Science in Biomedical Engineering

Mississippi State University, Starkville, MS. December 2006

Employment

Human Factors Consultant

PHS Concepts

Houston, TX. April 2013-Present

- Review designs for human factors and safety requirements compliance
- Promote client HFE initiatives during project design and construction phases

Casualty Risk Consultant

Aon Risk Solutions, Global Risk Consulting

Houston, TX. May 2012-March 2013

- Supported engineering projects with human factors expertise
- Trained design teams on integration of human factors principles in product development

Lead Human Factors Engineer

MEI Technologies Inc., Commercial Human Factors Engineering

Houston, TX. June 2011-May 2012

- Developed Human Factors capabilities for new and expanding markets
- Provided engineering support for commercial and industrial clients

Human Factors Engineer II

MEI Technologies Inc., Anthropometry and Biomechanics Facility

NASA Johnson Space Center, Houston, TX. June 2009-June 2011

- Collected and analyzed anthropometric and biomechanics data for hardware design
- Lead and participated in project teams to solve complex human factors design problems

Graduate Research Assistant

Center for Advanced Vehicular Systems (CAVS), Human Performance Laboratory

Mississippi State, MS. November 2006-June 2009

- Collected and analyzed motion capture data
- Participated in design and implementation of laboratory experiments

Military Police Team Leader, Sergeant E-5

Mississippi Army National Guard, Brandon, MS. February 2000-2008

- Led a combat effective team during overseas operations
- Conducted unit-wide training on military police field operations

Project and Research Experience

Wheatstone Liquid Natural Gas Facility, Western Australia (Bechtel / Chevron)

Provide human factors and industrial safety support. Train international vendors on human factors requirements and methods to incorporate safety in their design. Review

design drawings and models for human factors requirements compliance. Develop human factors implementation plans using multiple client and international standards.

Space Suit Architecture Evaluation (NASA)

Lead an engineering project to assess the ability of space suit hardware to perform the ingress and egress of a vehicle seat and restraint system, as part of a larger evaluation to down select space suit architecture. Worked with a multi-contract team to design project objectives and schedule. Collected human factors data to examine the impact of different suit designs on ingress and egress task approach.

Human Factors Risk Assessment Documentation (NASA)

Participated in an overarching review of space related human factors risks and knowledge gaps for future research. Authored physical human factors risk and risk-mitigation documentation. Co-authored a chapter of the NASA Human Research Program Evidence Book on physical human factors related knowledge and risks.

Abort Switch Cover Accommodation Analysis (NASA)

Analytically calculated the accommodated portion of a user population for an abort switch cover prototype design. Recommended design changes to bring the prototype into requirements compliance.

Hand Controller Mount Adjustment Determination (NASA)

Brainstormed modeling techniques to assess adjustment required for a hand controller mounting design. Led an engineering team to create a plan for evaluating an integrated hardware system. Participated in testing to validate human modeling methods.

Initial Characteristics Evaluation of Space Suit Systems (NASA)

Reviewed test objectives and provided subject matter expert input for space suit testing methods. Collected anthropometric data and provided test subject population information. Observed integrated space suit testing and provided ergonomic focused input for human, space suit, and vehicle integration issues. Wrote and reviewed sections of a multi contractor test report.

Ergonomic Analysis of Lunar Habitat Workstation (NASA)

Ergonomically evaluated an adjustable medical workstation for a lunar habitat prototype. Provided recommendations to increase user accommodation and efficient use of space.

Determination of Anthropometric Variation Due to Space Suits (NASA)

Created a testing environment to simulate vehicle-to-suit interface interactions. Collected suited and unsuited data in various postures. Calculated posture and suit induced anthropometric variations used for ergonomic assessment of vehicle and suit hardware.

Development of Anthropometric Analysis Process Document (NASA)

Participated in the authorship and review of a document detailing the anthropometric data collection and analysis processes used by the Anthropometry and Biomechanics Facility at the NASA Johnson Space Center.

Human-to-Hardware Clearance Accommodation Analysis (NASA)

Used mathematical modeling to assess critical clearances between operators and vehicle hardware elements for the user population. Built a testing mockup and collected anthropometric data to validate the modeling method. Identified vehicle hardware fit problems and presented results as evidence for safety required design changes.

Mass Properties Modeling of Space Suit Components (NASA)

Used 3-D body scans, CAD software, and mathematical models to estimate the mass properties of suited humans in various seated postures. Created reports that provided data to structural design engineers for modeling space vehicle load dynamics. Wrote a conference paper detailing the novel method used to estimate mass properties based on body scans and space suit component properties data.

Design Analysis Cycle Verification Testing of Space Vehicle Hardware (NASA)

Collected suited and unsuited anthropometric, range of motion, and clearance data inside space vehicle mockups to assess requirements compliance of various hardware components. Processed CAD model and human factors data. Wrote reports that fed future vehicle design cycle iterations.

Ergonomic Assessment of Personal Body Armor (CAVS)

Designed experimental testing protocols for an ergonomic study on the performance effect of police body armor. Collected motion capture and biometric data. Analyzed and prepared data for presentation.

Spatial Training Research in Virtual Environments II (CAVS)

Supervised a team of researchers during laboratory and field experiments on the transfer of virtual spatial knowledge to real world scenarios. Managed the logistical functions for human research participants and laboratory equipment during a multi-location research study. Wrote and presented reports on experimental results.

Spatial Training Research in Virtual Environments (CAVS)

Investigated how virtual environments can be used to transfer spatial knowledge to law enforcement for high stress situations. Employed human factors tools to evaluate mental workload during experimental tasks. Acted as a role player for tactical team scenarios.

Virtual Soldier Research: Reach Envelope and Lift Study (CAVS)

Designed motion capture marker set and biomechanical measurement techniques. Built a testing apparatus for measuring a multiple posture reach envelope. Interacted with research participants and supervised the collection of motion capture data. Trained researchers in the use of motion capture and ergonomic assessment equipment.

Thermography to Measure Mental Workload during Driving Simulator Tasks (CAVS)

Consulted on the physiological responses to stress and workload and the result on facial blood flow. Assembled testing equipment for experimental procedures. Revised and edited research reports on the use of facial temperature for workload measurement.

Professional Affiliations

- Human Factors and Ergonomics Society 2008-Present
- Society for Automotive Engineers 2007-2009

Activities/Honors

MEIT STAR Award 2010, MEIT Award of Excellence, Open Water SCUBA Certification, Army Accommodation Medal, Army Achievement Medal (3), National Defense Medal, Eagle Scout Recognition, President's Scholar.

Publications

Blackledge, C. (Dec 2011). A Motion Capture Based Analysis of the Effects of Body Armor on Shooting Posture. Thesis. Mississippi State University

Blackledge, C., Margerum, S., Ferrer, M., Morency, R., Rajulu, S. (Jul 2010). Modeling the Impact of Space Suit Components and Anthropometry on the Center of Mass of a Seated Crewmember. Proceedings of 1st International Conference on Applied Digital Human Modeling. Miami, Florida.

Blackledge, C., Carruth, D., Babski-Reeves, K., Close, D., & Wilhelm, M. (2009). Effects of Body Armor Design on Upper Body Range of Motion. Human Factors and Ergonomics Society Annual Meeting Proceedings. Vol. 53, Number 14, pp. 907-911(5).

Close, D., Babski-Reeves, K., Carruth, D., Blackledge, C., & Wilhelm, M. (2009). Assessment of body armor design impacts on user perceptions. Human Factors and Ergonomics Society Annual Meeting Proceedings. Vol. 53, Number 14, pp. 912-916(5).

Blackledge, C., Patnaik, S., & Carruth, D. (Jul 2008). Spatial training research in virtual environments. Proceedings of Applied Human Factors & Ergonomics International 2008. Las Vegas, Nevada.

Thomas, M., McGinley, J., Carruth, D., & Blackledge, C. (Jun 2007). Cross-Validation of an Infrared Motion Capture System and an Electromechanical Motion Capture Device. Proceedings of the Society of Automotive Engineers Digital 2007 Human Modeling Conference. Seattle, Washington.

Technical Skills

- Anthropometry measurement tools
- Biometrics EMG
- Biometrics goniometer system
- Ergonomic assessment tools
- FARO Arm and Faro ScanArm 3-D
- FSA Pressure mapping system
- Human Solutions 3-D body scanner
- MiKron thermography camera
- Motion Analysis and VICON motion capture system
- Workload and Cognitive assessment tools (NASA-TLX, SWAT, CTA, etc.)

Computer Skills

- AutoCAD
- AutoVue
- MATLAB
- Microsoft Office Suite
- MiniTab
- Noraxon Telemetry EMG
- Polyworks
- RAMSIS Digital Human Modeling
- Rapidform
- Siemens PLM Jack Digital Human Modeling
- SmartPlant Review