Human Factors and Ergonomics in Health Care

March 26–28, 2018
Boston Marriott Copley Place
Boston, Massachusetts
Forward-thinking research and application for YOU

Immerse yourself in new discoveries and breakthroughs in the field of human factors/ergonomics and benefit from opportunities to partner with colleagues from around the world.

- Attend daily dedicated plenary sessions in critical HF/E areas
- Boost your knowledge with more than 120 technical sessions encompassing hundreds of panels, papers, and posters
- Hear from UX experts during User Experience Day sessions and events
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HFES 2018 allows you to explore, network, and participate in programs presented by a community of trusted peers through:

- Technical Group meetings and receptions
- Networking events for early-career professionals
- Student Career and professional development day
- Mentor/mentee events with professionals from industry and academia

Keep up with the accelerated pace of HF/E research and applications to lead, grow, and bring innovation to your field.

hfes.org
Welcome to the HFES 2018 International Symposium on Human Factors and Ergonomics in Health Care. The symposium offers a unique program of human factors/ergonomics (HF/E) perspectives on health-care human factors, technology, and patient safety, divided among four main tracks:

- Clinical and Consumer Health-Care IT
- Hospital Environments
- Medical and Drug Delivery Devices
- Patient Safety Research and Initiatives

The meeting is designed to enable HF/E professionals to disseminate their science, principles, and best practices to the health-care product and provider communities, and to enable these communities to provide HF/E professionals with the proper context, requirements, and perspectives to better focus future HF/E efforts.

The 2018 program starts with our keynote speaker, Sorrel King. A nationally renowned patient safety advocate, King will focus how to create a culture of patient safety, based on her family’s experience, as a tool to help inspire, educate, and create a call to action.

A panel on Monday from 1:30 to 3:00 p.m. honors the contributions of Robert Wears, MD, a leader in patient safety.

Gold Sponsor Ximedica will host a reception on Tuesday evening following the poster session. All attendees are invited.

We thank our symposium track chairs and their committee members for creating such a diverse and timely program. Special thanks also to our sponsors, exhibitors, advertisers, student volunteers, session chairs, and all the other individuals who supported the effort to produce this symposium.

We hope that this year’s symposium will enable all attendees to reach new heights in applying the perspectives and science of human factors/ergonomics to the future of health care.

Joseph R. Keebler, PhD  
Symposium Chair

Anthony D. (Tony) Andre,  
PhD, CPE  
Symposium Cochair
PROGRAM COMMITTEE

The Program Committee of the 2018 International Symposium on Human Factors and Ergonomics in Health Care consists of experts in a wide variety of domains and organizations.

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“MOBILE HEALTH APPLICATIONS FOR CONSUMERS” STUDENT DESIGN COMPETITION

Richard Holden, Indiana U.-Indianapolis – Chair

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The following companies invite you to visit their exhibits in the Grand Ballroom Foyer from 10:00 a.m. to 6:00 p.m. on Monday and from 8:00 a.m. to 6:00 p.m. on Tuesday.

Table 1

Table 2

Table 3

Table 4

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Table 6

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Table 11

* Proceedings paper available
REGISTRATION & FACILITIES

REGISTRATION DESK LOCATION AND HOURS
Registration is open during the following hours at Registration Desk B:

- Sunday: 7:00 a.m.–6:30 p.m.
- Monday: 7:00 a.m.–5:00 p.m.
- Tuesday: 7:30 a.m.–5:00 p.m.
- Wednesday: 8:00 a.m.–2:00 p.m.

WIFI ACCESS
Complimentary WiFi is provided in the meeting space for HFES attendees. To connect to the Internet, please select the HFES wireless network and enter HCS2018 for the password.

LUNCH AND REFRESHMENT BREAKS
Lunch and refreshment breaks are included in the cost of registration and will take place at the following times and locations:

Refreshment Breaks
Sunday: for workshop attendees only: Salon H; 7:30–8:00 a.m., 10:00–10:30 a.m., and 3:00–3:30 p.m.

Monday–Tuesday: Grand Ballroom Foyer; 8:00–8:30 a.m., 10:00–10:30 a.m., and 3:00–3:30 p.m.

Wednesday: Grand Ballroom Foyer & Back Bay Foyer; 8:00–8:30 a.m., 10:00–10:30 a.m.; and 3:30–3:45 p.m.

Lunch
Monday and Tuesday: Salon G; 12:00–1:30 p.m.

POSTER RECEIPTIONS
Poster receptions will be held from 4:30 to 6:00 p.m. on Monday and Tuesday in Gloucester. All attendees are invited to network and view the posters.

Posters may be set up on Monday and Tuesday between 1:00 and 4:00 p.m. Presenters can enter the poster area at 4:15 p.m. to staff their boards before attendees arrive.

Posters should be removed by 6:30 p.m. on their respective presentation days.

XIMEDICA RECEPTION
A reception sponsored by Ximedica will take place following the Tuesday poster reception from 6:00 to 9:00 p.m. in the 3rd Floor Atrium. Attendees will receive one complimentary drink ticket. Light appetizers will be served.

RESOURCES

HFES MEMBER SERVICES
HFES staff will be present at Registration Desk B to provide information on membership, publications, and services.

JOB NOTICES AND OTHER MATERIALS
Organizations that are offering positions may post a flyer on the corkboard adjacent to Registration Desk B. Attendees who are seeking a job may also post a one-page notice on the board. A materials table is also provided in this area for attendees to place information about events, programs, and other activities of interest to other attendees.

AUDIOVISUAL PREVIEW ROOM
Room MIT has been reserved for presenters who wish to preview their audiovisual materials. Computers will be available for AV preview only. Preview hours are as follows:

- Monday: 8:00 a.m.–5:00 p.m.
- Tuesday: 7:30 a.m.–5:00 p.m.
- Wednesday: 7:30 a.m.–2:00 p.m.

POLICIES

ATTENDEE BADGES
All persons attending any event at the symposium must wear their registration badges. Attendees and guests may register at Registration Desk B.

AUDIOTAPING, PHOTOGRAPHING, AND VIDEOTAPING POLICIES
Attendees are not permitted to take photos or make audiotape or videotape recordings of speakers or their visual aids, or exhibitors and their displays, without prior written permission from HFES and the speakers or exhibitors. Please submit written permission at Registration Desk B.

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SMOKING POLICY
All public areas of the Boston Marriott Copley Place Hotel are non-smoking.

Note: An asterisk (*) to the left of a presentation in this program indicates that a proceedings paper is available. Log in to your HFES account for access or follow this link for more information: http://journals.sagepub.com/toc/hcsa/current.
PROGRAM

SUNDAY, MARCH 25

REGISTRATION SERVICES
7:00 a.m.–6:30 p.m.
Location: Registration Desk B

REFRESHMENT BREAK
7:30–8:00 a.m.
For Workshop Attendees Only
Location: Salon H

PRE-SYMPOSIUM FDA MORNING WORKSHOP:
Validation of Combination Drug Products: An FDA Workshop
(separate registration fees apply)
Sunday, March 25, 8:00 a.m.–12:00 p.m.
Location: Salon H
Chair: Anthony D. (Tony) Andre, Interface Analysis Associates
Presenters: Irene Z. Chan, PharmD, BCPS, CDR, U.S. Public Health Service, Deputy Director, Division of Medication Error Prevention and Analysis, FDA/CDER/OSE/OMEPRM/DMEPA; Nicole Garrison, PharmD, BCPS, Safety Evaluator, Division of Medication Error Prevention and Analysis, FDA/CDER/OSE/OMEPRM/DMEPA

REFRESHMENT BREAK
10:00–10:30 a.m.
For Workshop Attendees Only
Location: Salon H

LUNCH BREAK
12:00–1:15 p.m.

PRE-SYMPOSIUM FDA AFTERNOON
WORKSHOP: Improving the Safety and Effectiveness of Medical Devices Through Human Factors Considerations: An Interactive Workshop
(separate registration fees apply)
Sunday, March 25, 1:30–5:30 p.m.
Location: Salon H
Chair: Anthony D. (Tony) Andre, Interface Analysis Associates

REFRESHMENT BREAK
3:00–3:30 p.m.
For Workshop Attendees Only
Location: Salon H

OPENING NETWORKING RECEPTION
5:30–6:30 p.m.
Location: 3rd Floor Atrium

MONDAY, MARCH 26

REGISTRATION SERVICES
7:00 a.m.–5:00 p.m.
Location: Registration Desk B

REFRESHMENT BREAK
8:00–8:30 a.m.
Location: Grand Ballroom Foyer

OPENING PLENARY SESSION
Monday, March 26, 8:30–10:00 a.m.
Location: Salon F
Chairs: Joseph R. Keebler, Embry-Riddle Aeronautical U.; Anthony D. (Tony) Andre, Interface Analysis Associates
Keynote Address: Josie’s Story: Family-Centered Approaches to Patient Safety, Sorrel King, Patient Safety Advocate

REFRESHMENT BREAK
10:00–10:30 a.m.
Location: Grand Ballroom Foyer

EXHIBITS
10:00 a.m.–6:00 p.m.
Location: Grand Ballroom Foyer

SESSIONS
10:30 a.m.–12:00 p.m.

CCIT1 – Cognitive Engineering Applications
Clinical and Consumer Health Care IT Track
Monday, March 26, 10:30 a.m.–12:00 p.m.
Location: Exeter Lecture Session
Chair: Plinio Morita, U. of Waterloo
* 1. Decision-Making for Alternative Procedures: Navigating the Tradeoffs Between Clinical Effectiveness, Patient Safety, Financial and Organizational Pressures, and Patient Comfort, Mike Rayo, Chandni Pawar, Elizabeth Sanders, Beth Liston, and Emily Patterson, Ohio State U.

* Proceedings paper available


**HE1 – Electronic Health Records**
Hospital Environments Track
Monday, March 26, 10:30 a.m.–12:00 p.m.
Location: Arlington (Panel) and Suffolk (Lecture)
Panel and Lecture
1. **Panel: Surveillance Methods for EHR Safety Risks: A Panel Discussion**
   Chair: Naveen Muthu, Children’s Hospital of Philadelphia
   Panelists: Evan Orenstein, Children’s Hospital of Philadelphia; Allan Fong and A. Zachary Hettinger, Medstar National Center for Human Factors in Healthcare; Lorraine Possanza, ECRI Inst.
2. **Lecture: Once More, With Feeling: Emotional Design,** Paul Weaver, Cerner
   Chair: Brendan Kennedy, Children’s Mercy Kansas City

**MDD1 – Demystifying HF Considerations – FDA’s 2017 Generics and Interchangeable Biosimilars Guidance Documents**
Medical and Drug-Delivery Devices Track
Monday, March 26, 10:30 a.m.–12:00 p.m.
Location: Salon F
Panel Session
Chairs: Rachel Aronchick and Allison Strochlic, UL-Wiklund
Panelists: Irene Z. Chan, FDA; Brian Holly, Pfizer; Valerie Fenster, Amgen; Lee Wood, medHF; Sherri Biondi, Genentech

* **PSRII – Human Factors Approaches to Improving Health Equity: Where Have We Been and Where Should We Go Next?**
Patient Safety Research and Initiatives Track
Monday, March 26, 10:30 a.m.–12:00 p.m.
Location: Clarendon
Panel Session
Chair: Natalie Benda, MedStar Health
Panelists: Angela Thomas, MedStar Health; Rupa Valdez, U. of Virginia; Enid Montague, DePaul U.; Deliya Wesley, MedStar Health

**PSRII – Human Factors Approaches to Improving Health Equity: Where Have We Been and Where Should We Go Next?**

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**LUNCH (Provided)**
12:00–1:30 p.m.
Location: Salon G

**SESSIONS**
1:30–3:00 p.m.

**CCIT2 – Understanding Work**
Clinical and Consumer Health-Care IT Track
Monday, March 26, 1:30–3:00 p.m.
Location: Exeter
Lecture Session
Chair: Farzan Sasangohar, Texas A&M U.

* 1. **Optimizing Rounds in the ICU: Applying Workflow-Centric Human Factors to the Prototyping of a Decision-Support System,** Sylvain Bruni, Aptima
2. **Clinical Decision Making in a Sea of Displays,** MaryBeth Privitera, HS Design/U. of Cincinnati
* 3. **Improving Discharge Documents to Better Support Care Transitions,** Patrice Tremoulet, Rowan U.; Ramya Krishnan, ECRI Inst.
4. **Characterizing Workflow in Nursing Homes,** Mustafa Ozkaynak, Cynthia Drake, Blaine Reeder, and Peter Ferrarone, U. of Colorado-Anschutz Medical Campus; Barbara Trautner, Baylor College of Medicine; Heidi Wald, U. of Colorado-Anschutz Medical Campus

**HE2 – Hospital Environments**
Hospital Environments Track Monday, March 26, 1:30–3:00 p.m.
Location: Arlington (Panel) and Suffolk (Lecture)
Panel and Lecture Session
1. **Panel: Survival and Success in Clinically Embedded Human Factors Practice**
   Chair: Ken Catchpole, Medical U. of South Carolina
   Panelists: Tara Cohen, Cedars-Sinai Medical Center; Joy Rivera, Children’s Hospital of Wisconsin; Brittany Anderson-Montoya, Carolinas Sinai Medical Center; Shelley Jeffcott, National Health Service Scotland (NHSS)
2. **Lecture: Challenges in Pediatric Hospital Medicine – Transitions From Training and Challenges Within the Workforce,** Sophia Sterner and Lisa Carney, Children’s Mercy Hospital and Clinics; Sonia Chaudhry, Connecticut Children’s Medical Center; Heather Dahlquist, Yale-New Haven Children’s Hospital; Angie Etzenhouser, Children’s Mercy Hospital and Clinics; Alexander Hogan and Beth Natt, Connecticut Children’s Medical Center
   Chair: Raymond Chan, Children’s Mercy Hospitals

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* Proceedings paper available

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2018 International Symposium on Human Factors and Ergonomics in Health Care
MDD2 – Artificial Pancreas Technologies
Medical and Drug-Delivery Devices Track
Monday, March 26, 1:30–3:00 p.m.
Location: Salon F
Lecture Session
Chair: Mike Dunkley, Continuum
1. Designing Across the User Spectrum for the Hybrid-Closed-Loop Artificial Pancreas System, Sandhya Pillalamarri, Insulet Corporation
2. Using a Commercially Available Smartphone as the Primary User Interface for a Class 3 Medical Device, Jaclyn Baron, Bigfoot Biomedical

PSRI2 – The Historic Scientific Contribution of the Late Robert Wears, MD
Patient Safety Research and Initiatives Track
Monday, March 26, 1:30–3:00 p.m.
Location: Clarendon
Panel Session
Chair: Shawna Perry, U. of Florida

REFRESHMENT BREAK
3:00–3:30 p.m.
Location: Grand Ballroom Foyer

SESSIONS
3:30–4:30 p.m.

CCIT3 – Mobile Health Applications for Consumers Student Design Competition
Clinical and Consumer Health-Care IT Track
Monday, March 26, 3:30–4:30 p.m.
Location: Exeter
Lecture/Award Session
Chair: Richard Holden, Indiana U.-Indianapolis
Following presentation of the finalists listed below, the award will be presented.
1. Care Connect, Kristen Webster, Johns Hopkins
2. EasyHealth – An Integrated Health Monitoring and Management App for Seniors, Sommayah Soliman, Harshada Tupe, Mai Chee Vang, and Javy Wang, San Jose State U.
3. RecorDr. – Facilitating Patient Self-Advocacy and Enabling Large-Scale Human Factors Research, Marisa Grayson, Ohio State U.

HE3 – Burnout
Hospital Environments Track
Monday, March 26, 3:30–4:30 p.m.
Location: Arlington
Lecture Session
Chair: Raymond Chan, Children’s Mercy Kansas City
1. How LEAN Can Reduce Provider Stress as Well as Improve Organizational Efficiency, Michael Beck, Penn State Pediatric Hospital Medicine

MDD3 – Increasing Realism in Human Factors Testing
Medical and Drug-Delivery Devices Track
Monday, March 26, 3:30–4:30 p.m.
Location: Salon F
Lecture Session
Chairs: Elizabeth Roche, Ximedica; Molly Story, Sanofi
1. Leveraging AR/VR in Human Factors Research to Increase Realism and Reduce Time and Cost, Laura Chang, Radius Innovation & Development

PSRI3 – Communication
Patient Safety Research and Initiatives Track
Monday, March 26, 3:30–4:30 p.m.
Location: Clarendon
Lecture Session
Chairs: Allen Fong, National Center for Human Factors in Healthcare; Shilo Anders, Vanderbilt U.
1. Identifying and Classifying Communication Failures in Healthcare: Developing Methods to Reduce Communication-Related Incidents, Milisa Manojlovich, Elizabeth Umerfield, and Amir Ghaferi, U. of Michigan; Sarah Krein, Department of Veterans Affairs
2. Neurodynamic and Communication Analysis of Healthcare Teams During Simulation Debriefings, Ron Stevens, UCLA School of Medicine / The Learning Chameleon; Ann Willemsen-Dunlap, Order of Saint Francis Hospital; Jamie Gorman, Georgia Tech; Trystha Galloway, The Learning Chameleon, Inc.; Donald Halpin, Order of Saint Francis Hospital

* Proceedings paper available
3. Information Management Goals and Process Failures During Home Visits for Older Adults Receiving Skilled Home Health Care Services After Hospital Discharge: A Multisite, Qualitative Study, Alicia Arbeaje and Ashley Hughes, Johns Hopkins U.; Nicole Werner, U. of Wisconsin-Madison; Bruce Leff and Ayse Gurses, Johns Hopkins U.

**POSTER RECEPTION**
4:30–6:00 p.m.
Location: Gloucester

**CCIT-POS1 – Poster Reception**
Clinical and Consumer Health-Care IT Track
Monday, March 26, 4:30–6:00 p.m.
Location: Gloucester

1. Poorly Designed Health Apps Can Do More Harm Than Good, Arathi Sethumadhavan and Adam Shames, Core Human Factors, Inc.

2. Understanding Individual Differences in Use of Historical-Data-Based Decision Support Tools for Time Estimation in Medical Dispatch, Wayne Giang, Canmanie Teresa Ponnambalam, Xiaonian He, and Birsen Donmez, U. of Toronto


5. Utilizing the User Centered Design Process to Build a Novel Interruption Management Tool for Noncritical Tasks in the Emergency Department, Hannah O’Toole, CapTech Consulting; Jessica Howe, Katie Adams, Allan Fong, and Kathryn Kellogg, MedStar Inst. for Innovation

6. Visualizing the Determinants of Health, Edwin Choi, Involution Studios

7. Evaluating the Persuasiveness of a Corporate Wellness Program’s Web-Based Learning Interfaces, L. S. Platt, SUNY Binghamton/UMNSystems; Huiyang Li, SUNY Binghamton; Catherine Bass, Onlife Health

8. Design Thinking, As Applied to New Products in the Physician-Consumer Space, Jack Fleming, athenahealth | Epocrates


10. Qualitatively Assessing Influences on the Medication Management Strategies of Older Adults With Hypertension, Kenneth Blocker and Wendy Rogers, U. of Illinois at Urbana-Champaign

11. The Development of the Healthcare Technology Acceptance Model (H-TAM) for Older Adults: A Conceptual Model, Maurita T. Harris and Wendy A. Rogers, U. of Illinois at Urbana-Champaign


13. Minimizing the Impact of Interoperability Errors on Clinicians, Jolie Dobre and Tippy Carter, CSRA; Jennifer Herout and Amanda Cournoyer, U.S. Department of Veterans Affairs


15. “Too Busy to Tell Where the Alarms Are Coming From”: A Study on the Relationship Between Workload and Alarm Localizability, Judy Edworthy, Scott Reid, Katie Peel, Samantha Cox, Jessica Williams, Chloe Newbury, Joseph Foster, and Martin Farrington, Plymouth U.


School of Medicine, Trinity College; Dagny Barclay and Sabrina Rodriguez, Boston U.

20. Toward the Design of mHealth Technologies to Support Holistic Wellness Among Older Adults, Christina Harrington and Jon Sanford, Georgia Inst. of Technology; Wendy Rogers, U. of Illinois Urbana-Champaign


22. A Framework for Designing an Ergonomic Point of Care (POC) Cart for Medical Documentation Management, Michelle Murphy, Partners Healthcare

23. Design of a Multimodal Interface Solution to Facilitate Nonmedical User Mediation of TBI Screening Using Virtual Reality, Michael Jenkins, David Young, and Arthur Wollocko, Charles River Analytics

HE-POS1 – Poster Reception
Hospital Environments Track
Monday, March 26, 4:30–6:00 p.m.
Location: Gloucester


25. Understanding the Noise: Categorizing the Impact of Clinical Workflow, Behavioral and Environmental Factors on Physiological Sensors, Tracy Kim and Kathryn Kellogg, National Center for Human Factors in Healthcare, MedStar Health; Matthew Nare, California State U.; Joseph Blumenthal and Allan Fong, National Center for Human Factors in Healthcare, MedStar Health


27. The Influence of Spatial Layouts on the Frequency of Usage of Hand Sanitizing Stations in Health-Care Environments, Jun Rong Jeffrey Neo and Rana Sagha Zadeh, Cornell U.; Srisatish Devapatla and Ramesh Vidavalur, Cayuga Medical Center


29. Participatory Redesign of a NICU Feeding Delivery System, Leah Konwinski and Leanne Wendt, Spectrum Health Helen DeVos Children’s Hospital

30. Collaborative Design: Interprofessional Perspectives on Incorporating Human Factors and Simulation in the Design and Renovation of Health-Care Facilities, Jessica Ray and Stephanie Sudikoff, Yale New Haven Health; Ben Smuckler, Shepley Bulfinch; Peter Majewski, Bridgeport Hospital

* 31. Evidence-Based Sourcing: How to Select Health Care Products Using Human Factors Techniques, Helen Fuller, Timothy Arnold, and Tandi Bagian, Veterans Health Administration

32. Bringing the UX Momentum to Health-Care Facilities – Be a Part of It! Shannon Halgren and Jody Solem, Sage Research & Design


* 35. I’m Lost: An Evaluation of An Interactive Wayfinding System, Tyler Duke and Angie Avera, U. of Houston-Clear Lake; Christy Harper, End To End User Research; Andrea Crosser and Spencer Jefferies, U. of Houston-Clear Lake

36. Understanding Medication Reconciliation in the Ambulatory Setting Using a Systems Approach, Leah Konwinski and Emily D’Anna, Spectrum Health Helen DeVos Children’s Hospital

37. Developing and Testing a Pediatric Resuscitation Memory Prompt, Robert Schremmer, Children’s Mercy Hospital

38. Future Scenarios: The Intersection of Design and Story, Ryan Sohlden, Medtronic


40. Developing Evidence-Based Ergonomics Guidelines for Med/Surg Patient Room Design to Meet the Needs of All Occupational Stakeholders, Patients, and Visitors, Steven Lavender, Carolyn Sommerich, Elizabeth Sanders, Kevin Evans, Jing Li, and Emily S. Patterson, Ohio State U.

41. Macrocognition: A Framework for Optimal ICU Design and Interprofessional Team Interactions – From Method to Theory Development – mHCBE, Susan O’Hara, Clemson U.; Emily S. Patterson, Ohio
### MDD-POS1 – Poster Reception
Medical and Drug-Delivery Devices Track
Monday, March 26, 4:30–6:00 p.m.
Location: Gloucester

**3.3.** Broader Your Market: Follow Accessibility Standards, Molly Story, Sanofi; Melissa Lemke, Agilis Consulting Group

**3.4.** Developing and Testing User Interface Requirements, Tara Feuerstein and Kelly Gordon-Vaughn, Farm Design

**3.5.** Overcoming Hospital Access Issues to Benefit Medical Device Design, Natalie Abts and Rebecca Butler, MedStar Inst. for Innovation; Bidisha Roy, MedStar Inst. for Innovation, MedStar Health

**3.6.** Anatomy of a Good Use Error Risk Assessment (UERA), Wende Dewing, Usensus LLC; Elizabeth Volk, Phillips-Medisize, LLC


**3.8.** An Autoinjector Hold Time Formative Study for Immunology Patients, Kevin Cluff and Chuan Li, AbbVie; Bryan Manis, GfK

**3.9.** Challenges and Solutions in Home Care Human Factors, Russell Branaghan, Arizona State U.; Molly Story, Sanofi; Angela Muriset, Shire; Sami Durranri, Fresenius Medical Care; Keith Karn, Human Factors in Context LLC

**3.10.** Anticipating and Addressing Sources of Transfer in the Design Process, Matthew Marber, Limor Hochberg, and Merrick Kossack, UL-Wiklund

**3.11.** Color, Typography, and Composition: Effective Design for Medical Device User Documents, Isabel Campos-Noonan and Kyle Carbone, UL-Wiklund

**3.12.** Maximizing the Benefits of Contextual Inquiry, Chris White, Kinneir Dufort

**3.13.** Expert Elicitation of Use Error Probabilities for Combination Product Risk Assessment, Nicholas Zampa, Biogen

**3.14.** Team Communication: A Persistent Problem Across Hospital Environments, Emily Hildebrand, Research Collective; Matthew Johnson, Children’s Mercy Kansas City; Elizabeth Lazzara, Embry-Riddle Aeronautical U.; Katherine Forsyth, Mayo Clinic

### PSRI-POS1 – Poster Reception
Patient Safety Research and Initiatives Track
Monday, March 26, 4:30–6:00 p.m.
Location: Gloucester

**58.** Identifying and Classifying Flow Disruptions in Perioperative Orthopedic Care, Jordan Hilgers, Embry-Riddle Aeronautical U.; Tracy Litzinger, Flagler College; Timothy Disher, Victoria Lew, Cristina Roy, Allison Larsen, Brett Naleziński, and Albert Boquet, Embry-Riddle Aeronautical U.

**59.** VTE Education and Prevention, Kristen Webster, Elliott Haut, Michael Streiff, Brandyn Lau, Dauryne Shaffer, and Peggy Kraus, Johns Hopkins U.

**60.** A Systems Approach to Designing Safer Opioid Prescribing Processes in Primary Care, Annie Shutt and James Benneyan, Healthcare Systems Engineering Inst. of Northeastern U.

**61.** Evaluating Clinical Decision Support in Emergency Medical Services, Logan Gisick and Barbara Chaparro, Embry-Riddle Aeronautical U.; Tiffany Leverenz and Paul Misasi, Wichita State U.

**62.** Effects of Communication Processes on Handoff Efficiency, Kristen Webster, Johns Hopkins U.; Elizabeth Lazzara and Joseph Keebler, Embry-Riddle Aeronautical U.

**63.** Assessing the Usability and Cognitive Load of an Electronic Safety Dashboard in the Context of Opioid Prescribing: Preliminary Results, Theresa Fuller, Brigham and Women’s Hospital; Pamela M. Neri, Partners Healthcare Information Systems; Demetri Lemosia, Northeastern Healthcare Systems Engineering; Elizabeth Harry and Jeffrey L. Schnipper, Brigham and Women’s Hospital; Erin Joyce, Thomas Martell, and Nicole Nehls, Northeastern Healthcare Systems Engineering; David W. Bates and Anuj K. Dalal, Brigham and Women’s Hospital; James C. Benneyan, Northeastern Healthcare Systems Engineering

**64.** Investigating Drivers of Clinician Workload in the Emergency Department: An Exploratory Study, Natalie Benda, Joseph Blumenthal, Aaron Hettinger, Daniel Hoffman, and Ella Franklin, MedStar Health; David Lavergne, U. at Buffalo, SUNY; Emilie Roth,
65. Using HFACS-Healthcare to Investigate Near-Miss Events During Surgery, Tara Cohen and Sarah Francis, Cedars-Sinai Medical Center; Douglas Wiegmann, U. of Wisconsin-Madison; Bruce Gewertz, Cedars-Sinai Medical Center

66. These Aren’t the Triads You’re Looking For: Updating Clinician Mental Models of Acute Spinal Cord Compression, Christine Jeffries, Danielle Mosby, Rebecca Kowalski, Joseph Blumenthal, and Allan Fong, MedStar Inst. for Innovation; Susan O’Mara, MedStar Washington Hospital Center; Rollin J. Fairbanks and Kristen Miller, MedStar Inst. for Innovation

67. From Safety-I to Safety-II: Using Systems Engineering to Redesign a Hospital Care to Home Care Transition Process, Ashley Holmes and James Benneyan, Northeastern U.


69. It’s Like Scanning the Spoon: Problems and Interventions in Insulin Pen Safety, Susan Harkness Regli, Suzanna Ho, Margaret Yoho, Ilona Lorincz, Rebecca Stamm, Melissa Hibbs, and Terese Kornet, U. of Pennsylvania Health System

70. Examples and Experiences Using FMEA to Design Better Healthcare Processes, Ashley Holmes, Demetri Lemonias, Melissa Cyr, and James Benneyan, Northeastern U.

71. Identifying Improvements in Healthcare System Engineering Models for Chronic Care and Precision Medicine Applications, Michelle Jahn, Siobhan Heiden, and Barrett Caldwell, Purdue U.

72. Now What? Determining and Implementing Solutions Post STS Analysis, Vicki Lewis, Healthcare Safety Strategies, LLC; Andrea Fantegrossi and Jeremiah Schuur, Brigham and Women’s Hospital

73. Translating Error Detection Into Patient Safety Action, Isaac Lynch, UT Southwestern Medical Center

74. The Effects of Occupational Fatigue on Patient Handling Tasks Among Nurses and Patient Handlers, Adam Piper and Lauren Estridge-Zwanzig, South Dakota School of Mines & Technology

75. Usability and Effectiveness of Medial Checklist Designs, Anna Clebone, U. of Chicago; Barbara Burian, NASA Ames Research Center

76. A Mixed-Methods Approach to Tailoring Evidence-Based Guidance for Antibiotic Stewardship to a Hospital, Emily S. Patterson, Courtney Dewart, Kurt Stevenson, Mark Lustberg, and Erin Hade, Ohio State U.; Nirav Shah, Northshore U. Health System; Courtney Hebert, Ohio State U.


78. Examining the Event Review Process From a Patient Safety Professional’s Point of View at MedStar Health, Jessica Howe, Andrew Stets, and Kathryn Kellogg, MedStar Health

79. Biomechanical Characterization of the Hand Touch Corrective Behavior in the Frail Elderly During Bed Egress, Dorothy Taylor, Andrew Merryweather, and Janice Morse, U. of Utah

80. Improved Usability of a Multi-Infusion Setup Using a Centralized Control Interface, Frank Doesburg, U. Medical Center Groningen

81. Simulation as a Tool to Support Adaptive Capacity at the Frontline, Mary Patterson, Children’s National Medical Center; Ellen Deutsch, ECRI/ Pennsylvania Safety Authority


84. An Objective Method to Pain Measurement Based on Physiological Signals, Yingzi Lin, Northeastern U.; Yan Xiao, U. of Texas at Arlington; Li Wang and Anas Abou Allaban, Northeastern U.; Richard Dutton, US Anesthesia Partners; Michael Ramsay, Baylor U. Medical Center; Richard Urman, Brigham and Women’s Hospital
TUESDAY, MARCH 27

REGISTRATION SERVICES
7:00 a.m.–5:00 p.m.
Location: Registration Desk B

REFRESHMENT BREAK
8:00–8:30 a.m.
Location: Grand Ballroom Foyer

EXHIBITS
8:00 a.m.–6:00 p.m.
Location: Grand Ballroom Foyer

SESSIONS
8:30–10:00 a.m.

CCIT4 – Addressing Alarm Fatigue and Information Overload
Clinical and Consumer Health-Care IT Track
Tuesday, March 27, 8:30–10:00 a.m.
Location: Exeter
Lecture Session
Chair: Wayne Giang, U. of Toronto

1. Updating an International Medical Device Standard: A Process for Audible Alarms, Judy Edworthy, Plymouth U.; Richard McNeer, Christopher Bennett, and Roman Dudaryk, U. of Miami
2. Combating Alarm Fatigue in Medicine, Trent Bryson, UT Southwestern
3. EHR Copy and Paste: What Have We Learned and What Can We Do? Lana Lowry and Mala Ramaiah, National Inst. of Standards and Technology

HE4 – Systems Engineering
Hospital Environments Track
Tuesday, March 27, 8:30–10:00 a.m.
Location: Arlington
Panel Session

   Chair: Russell Branaghan, Arizona State U. & Research Collective
   Panelists: Anthony D. (Tony) Andre, Interface Analysis Associates; Stephanie Seraphina, Intuitive Surgical, Inc.; Emily Hildebrand, Research Collective; Hanniebey Wiyor, FDA
2. Resilience Engineering: Evidence in the Health Care Setting
   Chair: Renaldo C. Blocker, Mayo Clinic
   Panelists: Katherine L. Forsyth, Mayo Clinic; Elizabeth A. Lay, Applied Resilience; Shawna J. Perry, U. of Florida-Jacksonville

MDD4 – Human Factors in Design Process
Medical and Drug-Delivery Devices Track
Tuesday, March 27, 8:30–10:00 a.m.
Location: Salon F
Lecture Session
Chairs: Audra Wright, Halyard Health; Keith Karn, Human Factors in Context LLC

* 1. Making Human Factors Affordable for Medical Device and Global Health Start-Ups, Elizabeth Johansen, Spark Health Design, LLC
    3. Fast Thinking, Slow Thinking, and Good Design: Are We Doing Enough to Apply the Learnings From Behavioral Economics to Medical Device Design? Elizabeth Roche, Ximedica

PSRI4 – Root Cause Analysis: The HFE Practitioner’s Journey from Individual Blame to System Fixes
Patient Safety Research and Initiatives Track
Tuesday, March 27, 8:30–10:00 a.m.
Location: Clarendon
Panel Session
Chair: A. Joy Rivera, Children’s Hospital of Wisconsin
Panelists: Adjhaporn Khunlertkit, Bumrungrad International Hospital; Andrea Cooks, Cincinnati Children’s Hospital Medical Center; Shaoqing Yin, KK Women’s & Children’s Hospital, Singapore; Jessica L. Howe and Kathryn M. Kellogg, National Center for Human Factors in Healthcare, MedStar Inst. for Innovation; Mary Patterson, Children’s National Medical Center; Ellen S. Deutsch, Pennsylvania Patient Safety Authority and Children’s Hospital of Philadelphia; Joseph R. Keebler, Elizabeth Lazzara, and Elizabeth Blickensderfer, Embry-Riddle Aeronautical U.; Thomas D. Looke, Florida Hospital

REFRESHMENT BREAK
10:00–10:30 a.m.
Location: Grand Ballroom Foyer

SESSIONS
10:30 a.m.–12:00 p.m.

CCIT5 – eHealth and mHealth
Clinical and Consumer Health-Care IT Track
Tuesday, March 27, 10:30 a.m.–12:00 p.m.
Location: Exeter
Lecture Session
Chair: Ashley Hughes, U. of Illinois

1. Evaluating Provider Use and Perceptions of a New Electronic Clinical Decision Support Mobile
Application for Febrile Infant Decisions, Tiffany Leverenz, Wichita State U.; Sarah Fouquet, Ellen Kerns, and Russell McCulloh, Children’s Mercy Kansas City

2. **Nursing Student Remote Performance Assessment Using a Novel Smartphone Application**, Uwe Reischl and Olga Salinas, Boise State U.; Ron Oberleitner, Behavior Imaging, Inc.; Budimir Mijovic, U. of Zagreb

3. **Commercialization of mHealth & eHealth Technology in Canada**, Dia Rahman, U. of Waterloo; Eman Alanazi, Saudi Electronic U.; Plinio Morita, U. of Waterloo

**HE5 – Interruptions and Environments**
Hospital Environments Track
Tuesday, March 27, 10:30 a.m.–12:00 p.m.
Location: Arlington
Lecture Session
Chair: Matt Johnson, Children’s Mercy Kansas City

1. **Interruptions Increase Time and Decrease Accuracy of Chest Radiograph Interpretation**, Rachel Wynn and Jessica Howe, MedStar Health Research Inst.; Linda Kelahan, Georgetown U. Medical Center; Allan Fong, MedStar Health Research Inst.; Ross Filice, Georgetown U. Medical Center; Raj Ratwani, MedStar Health Research Inst.

2. **Perceptions of Interruptions in the Emergency Department**, Katherine Forsyth, Hunter Hawthorne, and Renaldo Blocker, Mayo Clinic

3. **Optimizing Electronic Medical Record User Experience: A Human Factors Approach to Hardware Assessment and Design for Inpatient and Emergency Units**, Catherine Dulude (Campbell), Children’s Hospital of Eastern Ontario (CHEO) & Ottawa Children’s Treatment Centre (OCTC); Chantal Trudel, Carleton U.; W. James King, Karen Macaulay, and Jennifer Gillert, Children’s Hospital of Eastern Ontario (CHEO) & Ottawa Children’s Treatment Centre (OCTC); Leilla Czunyi and Sanaz Hafezi, Carleton U.

**MDD5 – User Research in Device Design**
Medical and Drug-Delivery Devices Track
Tuesday, March 27, 10:30 a.m.–12:00 p.m.
Location: Salon F
Lecture Session
Chair: Sami Durrani, Fresenius Medical Care; Susan McDonald, Ximedica

1. **Tracking the User Over Time: How to Effectively Design for a Longitudinal Study and Best Practices for Observing in the Operating Room**, Kristyn Berry and Laurie Reed, Farm Lunds & Kolsay


3. **Contextual Inquiry That Doesn’t Break the Bank**, Lindsay Carrabine and Peter Sneeringer, Design Science

**PSRI5 – Optimizing Team Performance and Resource Level in Diverse Health-Care Contexts: From Surgery in Rwanda to Medical Event Management in Deep Space**
Patient Safety Research and Initiatives Track
Tuesday, March 27, 10:30 a.m.–12:00 p.m.
Location: Clarendon Panel Session
Chair: Steven Yule, Harvard Medical School/Brigham and Women’s Hospital
Panelists: Thoralf Sundt III, Harvard Medical School/ Massachusetts General Hospital; Roger Dias, David Meguerdichian, and Jamie Robertson, Harvard Medical School/Brigham and Women’s Hospital; and David Musson, Northern Ontario School of Medicine

**LUNCH (Provided)**
12:00–1:30 p.m.
Location: Salon G

**CCIT6 – New Paradigms for Care Provision Using HIT**
Clinical and Consumer Health-Care IT Track
Tuesday, March 27, 1:30–3:00 p.m.
Location: Exeter
Lecture Session
Chair: Kristen Miller, Medstar

1. **How I Learned to Stop Worrying & Love My Robot Doctor**, Juhan Sonin, MIT | goinvo

2. **Information Technology Gaps in Primary Care Management of Chronic Pain**, Shilo Anders, Vanderbilt U. Medical Center; Laura G. Militello, Applied Decision Science; Sarah M. Downs, Indiana U.; Robert W. Hurley, Wake Forest School of Medicine; Robert L. Cook, U. of Florida; Elizabeth C. Danielson and Christopher A. Harle, Indiana U.

3. **Role of Human Supervisors in Smarter Cold Chains**, Luca Bertuccelli, Sensitech

4. **Personal Health Records Buck Traditional Medical Culture**, Melinda Jenkins and Melinda Jenkins, Rutgers U.
HE6 – Decision Making
Hospital Environments Track
Tuesday, March 27, 1:30–3:00 p.m.
Location: Arlington
Panel Session
1. It Takes a Village: Development, Dissemination, and Adoption of a Pediatric Decision Support Tool
Chair: Sarah Fouquet, Children’s Mercy Kansas City
Panelists: Angela Cunningham, Robert Schremmer, and Ellen Kerns, Children’s Mercy Kansas City
2. Macrocognition in the Health Care Built Environment: A New Model for Emergency Response Extending Macrocognition Results in the Inpatient Setting to the Mexico 2017 Earthquake Disaster
Chair: Susan O’Hara, Clemson U.
Panelists: Nathan J. McNeese, Clemson U.; Robin Toft Klar, New York U.; Laura Chavira-Razo, National Inst. of Public Health Mexico; Zafiro Andrade-Romo, National Inst. of Public Health Mexico

MDD6 – Usability Testing
Medical and Drug-Delivery Devices Track
Tuesday, March 27, 1:30–3:00 p.m.
Location: Salon F
Lecture Session
Chairs: Korey Johnson, Bold Insight Inc.; Evan Edwards, Kaleo, Inc.
1. Testing in Medical Device Acquisition: Beyond Usability, Jason Flint, Aaron Nelson, and Dana Miletic, Air Force Medical Evaluation Support Activity
2. Order Effect When Comparing Usability of Two Telehealth Remote Monitoring Solutions, Juuso Leinonen and Erin Sparnon, ECRI Inst.; Patrice Tremoulet, Rowan U.
3. Can We Combine Human Factors Validation and Clinical Testing to Save Time & Resources? Shannon Clark and Denise Forkey, UserWise, Inc.

PSRI6 – The Patient in Patient Safety: Starting the Conversation
Patient Safety Research and Initiatives Track
Tuesday, March 27, 1:30–3:00 p.m.
Location: Clarendon
Panel Session
Chairs: Richard Holden, Indiana U.-Indianapolis; Rupa Valdez, U. of Virginia; Elizabeth Papautsky, U. of Illinois at Chicago
Panelists: Jeffery Belden, U. of Missouri School of Medicine; Naveen Muthu, Children’s Hospital of Philadelphia; Jenna Marquard, U. of Massachusetts Amherst; Robin Mickelson, Vanderbilt U.; Matthew Weinger, Vanderbilt U. Medical Center

REFRESHMENT BREAK
3:00–3:30 p.m.
Location: Grand Ballroom Foyer
SESSIONS
3:30–4:30 p.m.

CCIT7 – Distributed Cognition for Improving Cancer Care Coordination
Clinical and Consumer Health-Care IT Track
Tuesday, March 27, 3:30–4:30 p.m.
Location: Exeter
Panel Session
Chair: Brian Hazlehurst, Kaiser Permanente Northwest
Panelists: Gurvaneet Randhawa, National Cancer Inst.; Yan Xiao, U. of Texas at Arlington; Paul Gorman, Oregon Health & Science U.

HE7 – Research
Hospital Environments Track
Tuesday, March 27, 3:30–4:30 p.m.
Location: Arlington
Lecture Session
Chair: Bryant Foster, Research Collective
1. Making the Most of Rapid Field Research: A Case Study in Acute Care, Derek Dumolo and Adrienne Jones, Cambridge Consultants
2. Examining Different Task-Based Layouts of an Anesthesia Workstation Based on Task Relationships and Task Sequencing, Katherina Jurewicz and David Neyens, Clemson U.

MDD7 – Latest Advances in Human Factors for Surgical Robots
Medical and Drug-Delivery Devices Track
Tuesday, March 27, 3:30–4:30 p.m.
Location: Salon F
Panel Session
Chair: Beth Loring, Loring Human Factors, LLC
Panelists: Robert J. Stephens, Medtronic; Tara Feuerstein, Farm; Kate Knudsen, Intuitive Surgical

PSRI7 – Topics in Trauma
Patient Safety Research and Initiatives Track
Tuesday, March 27, 3:30–4:30 p.m.
Location: Clarendon
Lecture Session
Chairs: Ashley Hughes, U. of Illinois at Chicago; Natalie Benda, National Center for Human Factors in Healthcare
1. Multilevel, Multidiscipline, and Temporally Diverse Handoffs in Traumatic Brain Injury Rehabilitation, Siobhan Heiden and Barrett Caldwell, Purdue U.

* Proceedings paper available
2. Methodology for Systematically Developing Data-Driven Interventions in Trauma Care, Victoria Lew, Embry-Riddle Aeronautical U.; Tracy Litzinger, Flager College; Timothy Disher, Embry-Riddle Aeronautical U.; Tara Cohen, Cedars-Sinai Medical Center; Jennifer Cabrera, Embry-Riddle Aeronautical U.; Kevin Captain, Florida Hospital; Albert Boquet, Embry-Riddle Aeronautical U.

3. Trauma Resuscitation Using In Situ Simulation Team Training (TRUST): Identifying Latent Safety Threats via a Human Factors Informed Framework Analysis of Video Recordings, Mark Fan, North York General Hospital; Andrew Petrosoniak, St. Michael’s Hospital; Sonia Pinkney, U. Health Network; Christopher Hicks and Kari White, St. Michael’s Hospital; Ana Paula Siquiera Silva Almeida, Universidade Federal de Itajuba’; Douglas Campbell, Melissa McGowan, and Alice Gray, St. Michael’s Hospital; Rodrigo Almeida, Universidade Federal de Itajuba’; Patricia Trbovich, North York General Hospital

POSTER RECEPTION
4:30–6:00 p.m.
Location: Gloucester

CCIT-POS2 – Poster Reception
Clinical and Consumer Health-Care IT Track
Tuesday, March 27, 4:30–6:00 p.m.
Location: Gloucester

* 1. Modeling the Problem Space of Smartphone-Assisted Insulin Dose Self-Titration Interventions Targeting Patients With Type 2 Diabetes: A Human Factors Approach, Hamzah Ibrahim, Claremont Graduate U.


4. Virtual Environments as a Rehabilitation Intervention for Topographical Disorientation in Memory-Impaired Individuals: A Scoping Review, David Gafni, U. of Toronto


8. Supporting Older Adults’ Trust in Care Providers: Same for a Human or Robot Care Provider? Rachel Stuck, Georgia Inst. of Technology; Wendy Rogers, U. of Urbana-Champaign

* 9. Use and Acceptance of Mobile Technologies in Health Care, Sarahfaye Dolman, MedStar Health Research Inst.; Kristen Miller, MedStar Health System; Susan Smola, Christiana Care Health System; Rebecca Kowalski, U. of Delaware


11. Patient Perception of Interactive Mobile Health Care Apps: A Regression Analysis, Emily Anania, Mattie Milner, Nathan Walters, and Stephen Rice, Embry-Riddle Aeronautical U.

12. EHR-Supported Activities for VTE Prophylaxis: A Case Study, Megan Salwei, Peter Kleinschmidt, Ann Hundt, Peter Hoonakker, Brian Patterson, and Pascale Carayon, U. of Wisconsin-Madison

13. A Paradigm Shift: Design and Testing of an Innovative Computerized Provider Order Entry System, Pamela Neri Garabedian, Partners HealthCare System, Inc.; Isabella Newbury and Alejandro Salazar, Brigham and Women’s Hospital; Kevin Kron and Katherine Forsythe, Partners HealthCare System, Inc.; Aaron W. Nathan, Brigham and Women’s Hospital; Samuel Karmiy, Partners HealthCare System, Inc.; Sara Myers, Brigham and Women’s Hospital; Lynn A. Volk, Partners HealthCare System, Inc.; Mary G. Amato, Massachusetts College of Pharmacy and Health Sciences; Adam Wright, Brigham and Women’s Hospital; Tewodros Eguale and Sarah McCord, Massachusetts College of Pharmacy and Health Sciences: Rosa Rodriguez Monguio, David W. Bates, and Gordon D. Schiff, Brigham and Women’s Hospital
14. Involving Patients to Improve Documentation Accuracy: A New EHR Screen Design, Onur Asan, Bradley Crotty, and Jeanne Tyszka, Medical College of Wisconsin

15. Designing Effective Dashboards for Healthcare Providers, Patients, and Family Caregivers to Patients With Diabetes, Jennifer Teves, Veritas Technologies; Barbara Chaparro and Alex Chaparro, Embry-Riddle Aeronautical U.


19. Using a Narrative Format and Sociotechnical Systems Approach to Perform a User-Centered Problem Analysis of the HIT in Present-Day Clinical Environments, Kurt Ruark, Danielle Hoover, and Jennifer Herout, VHA


21. All Hands on Deck: Health IT Usability and Safety Challenges During Medication Reconciliation, Lana Lowry and Mala Ramaiah, National Inst. for Standards and Technology; Danielle Mosby, Kristen Miller, Bidisha Roy, and Raj Ratwani, National Center for Human Factors in Healthcare, MedStar Health

HE-POS2 – Poster Reception
Hospital Environments Track
Tuesday, March 27, 4:30–6:00 p.m.
Location: Gloucester

22. Participatory Redesign of an Online Catalog for Laboratory Testing, Leah Konwinski and Hayley Goward, Spectrum Health Helen DeVos Children’s Hospital

23. Establishing the Key Nontechnical Skills in Gastrointestinal Endoscopy: A Qualitative Study, Charlotte Hitchins, Plymouth Hospitals NHS Trust; Judy Edworthy and Julie Griffin, Plymouth U.; Magdalena Metzner and Catherine Ward, Plymouth Hospitals NHS Trust

24. ShadowBox Training to Advance Nursing Expertise: A Demonstration Project, Helen Altman Klein, MacroCognition LLC; Emily Newsome, ShadowBox LLC

25. Designing Wayfinding Systems for Hospitals, Christy Harper, End to End User Research; Angie Avera, U. of Houston-Clear Lake; Andrea Crosser, End to End User Research; Tyler Duke, U. of Houston-Clear Lake; Spencer Jeffries, End to End User Research

26. The Pediatric Psychosocial Environment: How Psychosocial Risk Factors Are Associated With MSD Pain and Functional Consequences, Francesca Macaluso, Nancy Daraishe, Lauren Summerville, and Maurizio Macaluso, Cincinnati Children’s Hospital Medical Center

27. Use Preferences for Continuous Cardiac and Respiratory Monitoring Systems in Hospitals: A Survey of Patients and Family Caregivers, Emily S. Patterson, Chris Hritz, Liya Gebru, Kashvi Patel, Todd Yamokoski, and Susan Moffatt-Bruce, Ohio State U.

28. Information Exchange in the Operating Room: Task Analysis and Multimodal Design Concepts, Noemi Bitterman, Techninon

29. Preliminary Analysis of Surgeon Body Posture and Musculoskeletal Risk Based on Patient Positioning During Microsurgical Breast Reconstruction, Jordyn Koenig, Amro Abdelrahman, Chris Curry, Anita Mohan, Valerie Lemaíne, Shelley Noland, M. Susan Hallbeck, and Bethany Lowndes, Mayo Clinic

30. Use of Friction-Reducing Devices to Reduce the Spine Loads During Repositioning of Patients, Susan Kotowski and Kermit Davis, U. of Cincinnati


32. Cardiac Arrhythmia Simulations for Comparing Remote Telemetry Monitoring Systems, Noa Segall, Duke U. Medical Center; Ron’Nisha Franklin, North Carolina State Veterans Home; Melanie Wright, Trinity Health and Saint Alphonsus Health System

33. A Work Systems Analysis of Sterile Processing, Myrtede Alfred, Medical U. of South Carolina; Emily Huffer, Kevin Taafe, and Lawrence Fremdendall, Clemson U.; Ken Catchpole, Medical U. of South Carolina

34. Impact of Interruptions on Mental Demand and Reaction Time by Clinician Role, Anna R. Linden, St. Olaf College; Hunter J. Hawthorne and
Katherine L. Forsyth, Mayo Clinic; Blake Young, U. of Minnesota-Rochester; Renaldo C. Blocker, Mayo Clinic

35. Patterns of Resilience and Brittleness in Hospital-Based Emergency Care During Hurricane Harvey, Changwon Son, Vu Hoang Le, S. Camille Peres, and Farzan Sasangohar, Texas A&M U.

36. A Systems Approach to Sharps Disposal Safety in a Malawian Hospital, Morven Millar and Evridiki Fioratou, U. of Dundee; Emma Thomson, Malawi College of Medicine

37. Identifying Higher Ergonomic Risk During a Simulation Task, Christopher Curry, Amro Abdelrahman, Bethany Lowndes, Melissa Morrow, and M. Susan Hallbeck, Mayo Clinic

38. The Patient's World in Critical Care: People, Spaces, and Processes of Family's Interactions, Umnesalmah Abdulbaseer and Elizabeth Papautsky, U. of Illinois at Chicago

39. Workflow Analysis of Interprofessional Medical Education in the Clinical Learning Environments to Improve Learning Outcomes and Patient Safety, Catarina Smith, Nicole Nehls, Adam Schleis, and Margo Jacobsen, Northeastern U.; Peter Bates, Robert Bing-You, Thomas Van der Kloot, and Paul Han, Maine Medical Center; Awatef Ergai and James Benneyan, Northeastern U.

40. Effects of Workflow Interruptions on ED Providers' Stress: An Observational Study on ED Physicians and Nurses, Matthias Weigl and Anna Schneider, U. Hospital of LMU Munich

41. Thematic Issues in Analysis and Visualization of Hospital Emergency Department Patient Flow, Benjamin Bauchwitz, Spencer Lynn, and Peter Weyhrauch, Charles River Analytics; Raj Ratwani, Danielle Mosby, and Jessica Howe, National Center for Human Factors in Healthcare, MedStar Health; James Niehaus, Charles River Analytics

42. Outpatient Clinic Patient Exam Room – Provider Preferences, Carolyn Sommerich, Steven Lavender, Kevin Evans, and Elizabeth Sanders, Ohio State U.

MDD-POS2 – Poster Reception
Medical and Drug-Delivery Devices Track
Tuesday, March 27, 4:30–6:00 p.m.
Location: Gloucester

43. Applying Heuristics for Early Formative Evaluation: A New Structured Approach for Device User Interface Assessment, Carolin A. Ruf, Katrin Rapp, and Florian Schauderna, Sanofi-Aventis Deutschland GmbH; Molly F. Story, Sanofi

44. How to Integrate Human Factors Engineering With Complaint Management, Shannon Clark, UserWise, Inc.

45. Leveraging Efficiencies and Avoiding Pitfalls When Coupling a Human Factors Study With a Clinical Trial, Cynthia Warman and Ross Lenzen, Ximedica

46. Case Study: Is This the Solution You Are Looking for? A Cross-Functional Approach to Development and Evaluation of a Label-Based Mitigation, Young J. Chun, Angela Muriset, and Bharat Arora, Shire

47. How Can Human Factors Studies Conducted by a Medical Device Manufacturer Provide More Value for Pharmaceutical Companies to Succeed in their Combination Product Validations? Karen Guerrero, Luc Marticou, and Sarah Baer, Becton Dickinson


49. Factors Affecting Consumers’ Acceptance of Robotic Dentists, Mattie Milner, Emily Anania, Nadine Ragbir, Matthew Pierce, Nathan Walters, and Stephen Rice, Embry-Riddle Aeronautical U.

50. KeyS: How to Design Beyond a Happy Flow, Beant Kaur Dhillon and Jon Pluyter, Philips

51. A Usability Perspective on Current Industry Practice of Reprocessing for Medical Device Development, Tara Daugherty and Robert Stephens, Medtronic

52. Investigating the HbA1c Assessment Methods for a Smart and Connected Diabetes System, Alexa Gutierrez and Farzan Sasangohar, Texas A&M U.; Khalid Qaraqe, Texas A&M-Qatar; Mark Lawley, Texas A&M U.

53. Pay No Attention to That Research Team Behind the One-Way Mirror: How to Transport Participants Into Simulations, Samantha Sye, Jennifer Soosaar, and Marc Egeth, Core Human Factors, Inc.

54. Employing Remote Usability Testing Methods to Conduct Summative Usability Testing, Michael Jenkins, UL-Wiklund; Eric Smith, Ivenix; Erin Davis, UL-Wiklund

PSRI-POS2 – Poster Reception
Patient Safety Research and Initiatives Track
Tuesday, March 27, 4:30-6:00 p.m.
Location: Gloucester

55. Usability Design for Multiple Clinical End-Users: An Evaluation of Medication Labels, Matthew N. Jesso, Carilion Clinic; Sarah Henrickson Parker, Virginia Tech Carillon Research Inst.

56. Preventing Accidental Falls of the Newborn in Hospitals: A Review of Systematic Implementation of Evidence-Based Practices and Ergonomic Devices That Support Parent/Infant Skin-to-Skin Behaviors in Hospital Settings, Yamile Jackson,
57. Mobile Technology to Assess Balance During Sit-to-Stand Manuever Among Older Adults at Risk for Falling, Deanna Gray-Miceli, Florida Atlantic U.; William Craelius and Kang Li, Rutgers U.

58. Evaluating Situation Awareness During a Simulated Active-Shooter Mass Casualty Incident: Lessons Learned, Tiffany Levrenz and Paul Misasi, Wichita State U.; Barbara Chaparro, Embry-Riddle Aeronautical U.

59. First Human Factors Based Selection of Technology in the Spanish Healthcare System- EValTec, Laura Herrero, IDIVAL; Elena Rojo Santos, Hospital virtual Valdecilla; Marina Cano Iglesias, IDIVAL; Juan Pedraja Vidal, Hospital virtual Valdecilla; Lourdes Escobar Hoyos, Hospital Universitario Marqués de Valdecilla; José María Maestre, Hospital virtual Valdecilla; Carmen Sánchez Juan and Lorenzo Alonso Vega, Servicio Cántabro de Salud; Manuel Gómez Fleitas, Hospital Universitario Marqués de Valdecilla; Ignasi Maspsons Molins, IDIVAL; Natalie Abts, Natalie Benda, and Lawrence Wolpert, MedStar Inst. for Innovation, MedStar Health; Ignacio del Moral Vicente-Mazariégos, Hospital virtual Valdecilla; Galo Peralta Fernández, IDIVAL.

60. Developing Predictive Models of Flow Disruption Effect on Bypass Time in Cardiovascular Operating Rooms, Timothy Disher, Jordan Hilgers, Albert Boquet, and William MacKunis, Embry-Riddle Aeronautical U.


63. Increasing the Use of Evidence-Based Practices in Stroke Rehabilitation, Joseph LaFfoon and Dan Nathan-Roberts, San Jose State U.


68. Optimization of EHR Clinical Data Visualization to Improve Clinical Accuracy and Patient Safety, Vishal Patel, Christiana Care; Grace Tran, MedStar Health.

69. Time to Recognizing Out-of-Hospital Cardiac Arrest, Omer Yafe and Oren Wacht, Ben-Gurion U. of the Negev; Eli Yafe, Magen-David-Adom; Tzillah Sinuany-Shteren and Yuval Bitan, Ben-Gurion U. of the Negev.

70. Hybrid Usability Methods: Practical Techniques for Evaluating Health Information Technology in an Operational Setting, Blake Lesselhoft and Kathleen Adams, VA Portland Health Care System; Ginnifer Mastarone, Oregon Health & Science U.; Stephanie Tallett, VA Portland Health Care System.


74. Designing High-Reliability Processes for Coordinating Perioperative Care for Medically Complex Children, Joseph Salem and James Benneyan, Northeastern U.

75. Innovative Approaches to Consult Tracking Within the Veterans Health Administration, Kathleen Adams, VA Portland Health Care System; Ginnifer Mastarone, Oregon Health & Science U.; Victoria Church and Blake Lesselhoft, VA Portland Health Care System.


77. Creativity in Practice: The Role of Human Factors for Innovating Patient Safety, Sara Albolino, Giulia.
1. **The Evaluation of Tactile Technology for Continuous Informing Displays in Anesthesia**, Kylie Gomes and Sara Ridges, Clemson U.

2. **Evaluating Combat Medic Training**, Laura G. Militello and Christen E. Sushereba, Unveil; Simon Fernandez, David Bahner, and Emily S. Patterson, Ohio State U.

### HE8 – Potpourri

**Hospital Environments Track**  
**Wednesday, March 28, 8:30–10:00 a.m.**  
**Location: Arlington**  
**Panel Session**

1. **Inpatient Multidisciplinary Rounds for Medically Complex Pediatric Patients as an Example of Teamwork in Healthcare Settings**  
   Chair: Irina Trifonova, Children’s Mercy Hospital Kansas City  
   Panelists: Troy Richardson, Leah Jones, and Raymond Chan, Children’s Mercy Hospital Kansas City

2. **The Challenges and Rewards of Surgical Ergonomics**  
   Chair: M. Susan Hallbeck, Mayo Clinic  
   Panelists: Kristin Chrouser, U. of Minnesota Medical College; Victor Paquet, U. at Buffalo, SUNY; Ladin Yurteri-Kaplan, Columbia U. Medical Center; Bethany Lowndes, Mayo Clinic

### MDD8 – Emerging Innovations

**Medical and Drug-Delivery Devices Track**  
**Wednesday, March 28, 8:30–10:00 a.m.**  
**Location: Salon F**

#### Lecture Session

1. **Assessing Medical Device Usability With Eye-Tracking**, Jordan Hilgers, Embry-Riddle Aeronautical U.; Kevin Ten Brink, Intuitive Surgical Inc.

2. **Human Factors Engineering in Development of Implantable Medical Devices**, Jayme Coates and Maria Jensen, iO life science

3. **Instructions for Use Development Using Heat Maps**, Katrin Rapp and Molly Story, Sanofi
2. Lecture: Emergency Usability Lab: Testing Usability of Products in Self-Care Emergencies, Peter Rasche, Katharina Schäfer, Sabine Theis, Christina Bröhl, Matthias Wille, and Alexander Mertens, Institut of Industrial Engineering and Ergonomics

REFRESHMENT BREAK
10:00–10:30 a.m.
Location: Grand Ballroom Foyer/Back Bay Foyer

SESSIONS
10:30 a.m.–12:00 p.m.

CCIT9 – UX and Usability
Clinical and Consumer Health-Care IT Track
Wednesday, March 28, 10:30 a.m.–12:00 p.m.
Location: Exeter
Lecture Session
Chair: Janey Barnes, User-View Inc.
1. UX Strategies for Health Information Systems: UX of Medicare, Elizabeth Rosenzweig, Bentley U.
2. Safeuristics! Do Heuristic Violation Severity Ratings Correlate With Patient Safety Severity Ratings for a Native EHR Mobile Application? Sarah Fouquet, Y. Raymond Chan, and Ellen Kerns, Children’s Mercy Hospital Kansas City; Barbara Chaparro, Embry-Riddle Aeronautical U.; Tiffany Leverenz, Wichita State U.
4. How Much Time (and Effort) Does a Timeline Save? Usability Testing of a Patient Asthma History Timeline, Dean Karavite, Jeritt Thayer, Jeritt Thayer, Daria Ferro, and Joseph Zore, Children’s Hospital of Philadelphia

HE9 – User Experience and Teams
Hospital Environments Track
Wednesday, March 28, 10:30 a.m.–12:00 p.m.
Location: Arlington
Lecture Session
Chair: Emily Hildebrand, Research Collective
* 1. Engineering the Future of Sepsis Care: An Application of Fuzzy Logic Cognitive Mapping for Sepsis Diagnosis, Kristen Miller, Danielle Mosby, and Joseph Blumenthal, MedStar Health; Kendall McKenzie, North Carolina State U.; Muge Capan and Ryan Arnold, Christiana Care Health System; Rebecca Kowalski, MedStar Health; F. Jacob Seagull, U. of Michigan; Ken Catchpole, Medical U. of South Carolina; Ella Franklin, MedStar Health; Russell Branaghan, Arizona State U.

MDD9 – FDA CDRH / CDER Panel: Medical Device Human Factors
Medical and Drug-Delivery Devices Track
Wednesday, March 28, 10:30 a.m.–12:00 p.m.
Location: Salon F
Panel Session
Chair: Anthony D. (Tony) Andre, Interface Analysis Associates
1. CDER Panelists: Irene Z. Chan, PharmD, BCPS, CDR, U.S. Public Health Service, Deputy Director, Division of Medication Error Prevention and Analysis, FDA/CDER/OSE/OMEPRM/DMEPA; Nicole Garrison, PharmD, BCPS, Safety Evaluator, Division of Medication Error Prevention and Analysis, FDA/CDER/OSE/OMEPRM/DMEPA; Xin Feng, Human Factors Reviewer, Human Factors Pre-market Evaluation Team, FDA/CDRH/DAGRID/HFPMET; Rita Lin, Human Factors Reviewer, Human Factors Pre-market Evaluation Team, FDA/CDRH/DAGRID/HFPMET

PSRI9 – Patient Safety Potpourri II
Patient Safety Research and Initiatives Track
Wednesday, March 28, 10:30 a.m.–12:00 p.m.
Location: Clarendon
Lecture Session
Chairs: Rebecca Butler, National Center for Human Factors in Healthcare; Ella Franklin, National Center for Human Factors in Healthcare
1. Co-Designing a Mobile Application for Patient Engagement: From Pain Points to Lessons Learned, Sylvain Bruni, Aiptima
* 2. Are Patient Admission Handoffs From ED to MICU PARfect? Imade Ihianle, Shirley Burton, and Joanna Abraham, U. of Illinois

* Proceedings paper available
* 3. **FUTURES: Forecasting the Unexpected Transfer to Upgraded REsources in Sepsis**, Rebecca Kowalski and Kristen Miller, MedStar Health; Muge Capan, Christiana Care Health System; Danielle Mosby, MedStar Health; Ryan Arnold, Christiana Care Health System

* 4. **How Nurses Identify Hospitalized Patients on Their Personal Notes: Findings From Analyzing “Brains” Headers With Multiple Raters**, Ritesh Sarkhel, Jacob Socha, Susan Moffatt-Bruce, Simon Fernandez, Kashvi Patel, Arnav Nandi, Austin Mount-Campbell, and Emily S. Patterson, Ohio State U.

**POST-SYMPOSIUM WORKSHOPS**
(Separate registration fees apply)

**CANCELED – Workshop 1: How to Design Effective Safety Information for Medical Devices**

**Workshop 2: Innovation, Not Just Evaluation: Leveraging Human Factors Tools to Inspire Innovation**
Wednesday, March 28, 1:00–6:00 p.m.
Location: Cambridge Consultants, Boston, MA, transportation provided
Presenters: Karen Unterman and Serge Roux, Cambridge Consultants

**Workshop 3: You’re Not Done Yet – Conducting a Residual Risk Analysis After a Summative Usability Test**
Wednesday, March 28, 1:30–5:30 p.m.
Location: Clarendon
Presenters: Michael Wiklund, Erin Davis, and Andrea Dwyer, UL-Wiklund

**Workshop 4: A Human Factors Approach to Root Cause Analysis**
Wednesday, March 28, 1:30–5:30 p.m.
Location: Dartmouth
Presenters: Brittany Anderson-Montoya, Carolinas HealthCare System; Ken Catchpole, Medical U. South Carolina; T. Robert Turner, Anne Arundel Medical Center

**REFRESHMENT BREAK**
3:30–3:45 p.m.
Location: Back Bay Foyer
For Workshop Attendees Only

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* Proceedings paper available
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4. Create Your Test Plan
5. Perform the Usability Test
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7. Real-Life Example 1: Corporate Web Portal
9. Some Parting Advice

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