MESSAGE FROM THE CHAIR

Welcome to our Fall 2016 issue!

By Jennifer Ockerma, Ph.D.
CEDM Technical Group Chair

Welcome to the fall issue of Cognitia! I hope everyone had a wonderful summer, and could take advantage of the often less structured nature of this time of year to enjoy time with family and friends.

The big news is that we have elected a new Newsletter Editor and Student Awards and Affairs Officer. We had three very qualified candidates for each position and I would like to thank all the candidates for volunteering to take on the effort of being an officer for the CEDM TG. I would also like to thank all the members who took the time to vote (some of you twice! but I caught you and double checked to be sure I only counted each person’s votes once!!).

Our new officers are:

Priya Pennathur as Newsletter Editor, and
Kylie Molinaro as Student Awards and Affairs Officer.

Congratulations to both of them, and once again thank you to all the candidates for accepting their nominations. We will be electing four new officers next summer: TG Chair Elect, Program Chair Elect, Secretary/Treasurer, and Electronic Communications Officer. So please think about whom to nominate, including yourself!

Of course, we owe a big thank you to our outgoing Newsletter Editor, Zarrin Chua (this is her last newsletter, which I imagine makes her both sad and happy), and our outgoing Student Awards and Affairs Officer, Ziho Kang. They both did a terrific job leading important CEDM activities; please thank them if you get the chance. Thank you, Zarrin and Ziho!!

In broader news, due to being scheduled a bit earlier than the last few years, the HFES Annual Meeting is fast approaching. I hope many of you are planning to join us to enjoy the CEDM program put together, with help from many of you, by our Program Chair, Mark Pfaff, and Program Chair Elect, Stephen Gilbert. You can find details on the CEDM sessions in this newsletter.

This year the Annual Meeting is taking place in our nation’s capital (which will be seeing some big changes a few months after our meeting). Having lived in the National Capital Region for much of my life, I encourage you to spend some time to see the many wonderful sights and museums in DC, almost all of them free (well, relatively speaking, you probably have been paying for admission for many years). September is often a really nice time, with most vacationers gone and the weather less reflective of the swamp that DC was built on. If you can’t spare extra days, then think about a night tour, the many memorials are lit and are worth a trip to see. Hope to see many of you soon!!

As always, please let me, or any of the other officers, know if you have any questions, concerns, or suggestions.

Jennifer ※

JOURNAL OF COGNITIVE ENGINEERING & DECISION MAKING

Update from JCEDM: Check out our special issues!

By Amy R. Pritchett, Ph.D.
JCEDM Editor

Visit the CEDM website to view announcements, job postings, newsletters, and more! http://tg.hfes.org/cedm/

Please also visit (and join!) the CEDM-TG on LinkedIn - http://www.linkedin.com/groups?gId=44516&trk=myg_ugrp_ovr
In addition to our recently-published regular papers, we are proud to recommend some special issues to you. In June 2016, JCEDM included a special section on “Future Directions in CEDM”. Members of our Editorial Board were invited to submit short papers on key insights on their minds about CEDM. Their responses capture several luminaries recent thoughts on a range of current topics – Michael McNeese via a recommendation from Mica Endsley on Distributed Cognition, Coty Gonzalez and Joachim Meyer on Integrative Approaches to Decision Making Research, Neelam Naikar and Ben Elix’s Reflections on Cognitive Work Analysis, a design team led by Phil Smith describing their Cognitive Engineering Considerations in the Development of an Information Retrieval System, Dave Woods on The Risks of Autonomy, and a thought piece by myself and Alexandra Coso Strong on her recent observations on Integrating Cognitive Engineering Into Industry Design Teams.

Then, our September and December 2016 issues (and probably our March 2017 issue) are plumb full of papers for a special issue led by Kathy Mosier and Laura Militello on “Extending Naturalistic Decision Making: Reaching Across Domains, Disciplines, and Applications.” This special issue highlights the integration of NDM into multidisciplinary efforts to improve work in complex domains. It also presents examples in which NDM research has had a meaningful impact on our understanding of complex cognitive work and has offered solutions to challenging problems. The seven articles in the September issue span an impressive range of topics. Patterson, Militello, Su, and Sarkar discuss loss of system resilience as a potential unintended consequence of the introduction of new technology in the health care domain. Also working in the health care domain, D. Klein, Woods, G. Klein, and Perry examine decisions on patient safety using the evidence-based medicine framework and identify potential disconnects and ways to strengthen best-practices strategies. Canellas and Feigh tackle the complexities inherent in representing NDM computationally. Other articles also highlight outcomes and applications of NDM research. G. Klein and Borders present an application of the Shadow Box method for scenario-based training of warfighters. NDM has also advanced research and analysis in incident and accident investigation. According to Strauch, changes in the focus of the National Transportation Safety Board accident reports have been prompted and enabled by advances in NDM theory—specifically with respect to a focus on the decision processes of operators.

Finally, two papers highlight new applications of the critical decision method. Boulton and Cole use the CDM to examine and compare the tactical decision-making processes of expert and novice Authorized Firearms Officers during armed confrontations. Cattermole-Terzic, Horberry, and Hassall use CDM interviews to pinpoint key decision points and interagency coordination issues among traffic incident–responding agencies and suggested countermeasures using decision-centered design.

This is just the September issue – more NDM papers are being assembled now into the December issue.

Looking forward, the number one thing the CEDM-TG can do as a community to support JCEDM is to submit more high-quality regular papers to the journal, and then to make them a regular part of your literature reviews and citations. We provide a unique venue within the HFES to publish findings about work in complex environments, and all the methodological messiness that comes with our types of research. But, to grow the journal – to gain an impact factor and an established footing within the Society – we need to show a steady supply of regular papers, and then for them to be cited. For this, we depend on you! ※

Cedm on LinkedIn & Facebook

By Dev Minotra, Ph.D.
CEDM TG Electronic Communications Director

The LinkedIn group of the CEDM Technical Group has a total of 2643 members. This number has not changed much over the last 4 to 8 months. Members are encouraged to invite more colleagues into the LinkedIn group. We also encourage members to post discussion topics, interesting news, job announcements and announcements to elicit participation in surveys. We would especially like to receive news updates about solutions being developed for challenging problems related to intelligent aids, partially automated vehicles, cyber security, situation awareness, work analysis, teamwork, display design and other areas within cognitive engineering and decision making. TG executives will occasionally request individual members to contribute to the discussion forum or they may also share/re-direct content posted in social media by colleagues. To ensure proper usage of the media, TG executives regularly monitor posts and requests to join. They also invite colleagues into the LinkedIn group.

Current trending topics on LinkedIn include:

- Can you tell who is in control? Assessing the detection of Automated and Manual Vehicles on the road

TG also maintains a Facebook page (www.facebook.com/groups/7636301315/) which currently has 252 members. Additionally, the technical group’s website (tg.hfes.org/cedm/) provides regular news updates, job announcements, and access to the newsletter archive. Old announcements and job postings are
Usually removed from the website.

As a reminder, the CEDM-TG listserv is for TG-related announcements only. Discussions should be carried out on LinkedIn or Facebook pages. TG members who are not LinkedIn users but are interested to join can visit - www.linkedin.com/reg/join. Please note that the CEDM-TG does not control enrollment on the listserv and can neither add nor remove recipients. All members of the CEDM-TG are automatically added to the TG mailing list. Those wishing to leave the list must contact HFES Member Services (info@hfes.org). ※

ANNOUNCEMENTS

New Cognitia Editor for 2017-2019
By Zarrin Chua, Ph.D.
Outgoing CEDM Cognitia Editor 2013-2016

It is with great pleasure that I welcome our new Cognitia Editor, Priya Pennathur! I have held this post for the last three years and I am proud to have overseen the diffusion of all things relevant to our TG. Cognitia has added two new columns - a feature article and an industry focus. The feature article is a blog-like post on a topic of the invited author's choice and we have had a range of topics from cybersecurity to team neurodynamics. Thanks to all of our FA authors who have been kind enough to share their experiences and musings with us: Anita D’Amico, Christopher Miller, Ron Stevens, Jamie Gorman, Gary Klein, Robert Hoffman, Laura Militello, and Ron McLeod. The industry focus showcases real-life modern human factors & cognitive engineering problems and how today's industry leaders tackle them. A big thank you to William Elm, president of Resilient Cognitive Solutions, for presenting their Applied Cognitive Systems Engineering process and other exciting work.

I thank the numerous contributors who have taken the time to write up laboratory profiles, call for papers/proposals, JCEDM updates, TG Chair addresses, job postings, electronic communications updates, book reviews, etc. It's no joke - Cognitia really wouldn't have anything to publish if it weren't for you.

Lastly, I thank all of the anonymous readers who have looked through Cognitia's text-only outlines, downloaded the email attachment, read the newsletter online, and participated in reader surveys. I hope you will continue to take the time out of your busy schedules to support us! ※

Semi-regular Cognitia Reader Questionnaire!
By the Cognitia Editor

The purpose of Cognitia is to serve the members of CEDM, primary by dispersing relevant news and information. We’re interested in knowing what you read, why you read, and where we can make improvements. This survey should take just a few minutes of your time and it would help us greatly. Results will be published in the next edition.

http://tinyurl.com/Cognitia

This link will be made available until 7 October 2016. ※

New Student Affairs and Awards Officer for 2017-2018
By Ziho Kang, Ph.D.
Outgoing CEMD Student Affairs and Awards Officer 2015-2016

It was a pleasure to serve the CEDM community, and I deeply thank previous and current CEDM TG editors and staff for their support. Especially, I would like to express my gratitude to the CEDM TG members who volunteered to help with the best student paper review process and the student mentorship program. In 2016, 31 members volunteered to review 25 qualified student papers, and 20 volunteered for the mentoring program. In 2017, 21 volunteered to review 18 papers, and 11 volunteered for the mentoring program. Kudos to all, and the students who strive to be the best!

Cheers,
Ziho ※

RESEARCH NEWS

Riggs Lab at Clemson University
By Sara Riggs, Ph.D.

Dr. Sara Lu Riggs, an assistant professor at Clemson University, is currently recruiting 1-2 PhD students to join the Riggs Lab for Fall 2017. Students will be brought on to support one of two ongoing projects:

1. “Collaboratively Perceiving, Comprehending, and Projecting into the Future: Supporting Team Situational Awareness with Adaptive Collaborative Tactons” which is supported by the National Science Foundation (NSF). For more information about the research project, please visit: https://www.nsf.gov/awardsearch/showAward?AWD_ID=1566346&HistoricalAwards=false

(continued on page 10)
 FEATURE ARTICLE

Implications of styles of thinking for risk awareness and decision making in safety critical operations

By Ron McLeod, Ph.D

Independent Human Factors Consultant (ron@ronmcleod.com)

On 22 January 2014, a railway lookout walked into the path of an oncoming train. The train driver sounded his horn, and the lookout raised an arm in acknowledgement. It was not until about a second before he was struck and killed that the lookout turned and saw the oncoming train. Why would he do that? Why would a trained and experienced operator, who fully understood the risks, and having no desire to cause harm to himself or anyone else, deliberately walk in front of an oncoming train? What was he thinking? Or, more to the point, how was he thinking?

The loss of the Deepwater Horizon drilling platform in the Gulf of Mexico in April 2010, killed 11 workers and led to the largest environmental disaster in US history. The incident created shock waves across industry, government and the general public, not only in the US, but around the world. The direct and indirect costs have been truly staggering: BP reported in July 2016 that fines and payouts associated with the incident had exceeded $61 Billion. Despite BP being one of the world’s largest corporations, it was almost brought to its knees. Many, perhaps most, oil and gas companies know that they would not have survived had the incident happened to them.

The immediate response to the Deepwater Horizon disaster focused on engineering causes and engineering solutions. The industry did however quickly realise that something had gone far wrong with human and organisational factors across the operation: from the design and planning of the well, to the assessment of risk, decision-making, communications and actions taken by the people involved. People that included not only the immediate crew on the platform at the time, but those involved in the months and weeks previously, including those in a range of shore-based support and management roles.

In the six years since Deepwater Horizon, general recognition has gradually set in that the incident was not “caused” by the failure of technical systems. The real “cause” lay in the assessment of risk, judgement and decision making of the individuals and company’s involved in the preceding weeks, days, hours and minutes. As well, as the Chemical Safety Board has demonstrated [1], of unrealistic expectations about the ability of the crew – of any crew - to detect the (weak) signals of what was happening, to understand their significance, and to take the necessary action once the initial kick had occurred. All in the face of much uncertainty and many competing priorities. A situation with characteristics that will be very familiar to the readers of Cognitia.

Deepwater Horizon - as well as BPs incident 5 years earlier at Texas City - had global resonance. The media coverage, financial and legal repercussions and the effects on lives and families were massive by any measure. And when all is said and done, a key element of both incidents – as it is with most major industrial accidents – lay in the awareness and assessment of risk, and the decision making and actions that follow from it, both in real-time by individuals at the operational front-line, and in slow-time, often weeks, months and even years before tragic events unfold, by those in the back-office, away from the front-line. As well – and this, in my opinion, is the biggest issue of all – as unrealistic expectations held by those who design, plan, organise and manage hazardous operations, about how real people will think and behave when performing activities with the potential for loss of control over hazards. That is, in Erik Hollnagel’s words, the difference between “Work-as-Imagined” and “Work-as-Done” [2].
FEATURE ARTICLE

Implications of styles of thinking for risk awareness and decision making in safety critical operations (R. McLeod)

This article is very much an opinion piece. I am going to speculate from the research literature in ways that some may feel goes beyond what is credible. But I will speculate in a way that, I hope, will generate some thought and, hopefully, a little discussion. And perhaps even some proposals for much needed scientific research. The same speculations in the global oil and gas circles where I have made my living in the past decade and more has led many people tasked with dealing with the problem of “human error” to start for the first time to recognise and appreciate the complexities of the human thought processes behind human performance in the front-line.

System 1 thinking and safety
In 2011, Daniel Kahneman wrote his best-selling book “Thinking, fast and slow” [3]. I am going to base most of my speculations in this article around the differences between System 1 and System 2 thinking as Kahneman describes them.

Many psychologists take issue with some of Kaheman’s simplification of the two systems. Though from the point of view of seeking to encourage the industrial world to start to get to grips with the psychology behind human error, such debates are immaterial: Kahneman’s descriptions are more than adequate for the purpose. What it lacks, from this perspective, are examples and descriptions that operationalise the implications of System 1 reasoning errors in situations that are relevant to industrial safety, as opposed to the usually economic decisions and risk judgements that have provided the context for most of the research to-date.

Some readers of Cognitia may feel that Naturalistic Decision Making (NDM1) provides a better approach to these issues. While I have no intent or desire – or indeed the necessary depth of knowledge - to take “sides” in that debate, my attempts to apply NDM thinking to the kind of issues I set out below has not led to much success. The “fast and slow thinking” perspective, by contrast, readily lends itself to Sydney Decker’s principle of seeking to understand local rationality [4]: of trying to get inside the operators’ head and understand how what they did must have made sense to them at the time they made decisions and acted.

Safety management relies on people being trained and competent and in a fit state to work (not fatigued, stressed, etc); people working in an organisational culture that places a high value on safety and that empowers them to intervene or stop work when things are not as expected; and where work systems are designed, laid out and organised to support the tasks people are relied on to perform to a high level of reliability under a wide variety of situations. Critically, safety management at the sharp-end relies on and expects people to pay attention to detail, to check and avoid jumping to conclusions, to avoid complacency (to have a healthy sense of “chronic unease” [5]) and to take care and be sensitive to weak signals of the unexpected.

System 1 thinking, by contrast - a system that is “always on” - has characteristics that are in direct conflict with these safety management expectations: it accepts the first answer it finds, does not see doubt or ambiguity, and does not question or check. These are characteristic of System 2: a system that takes effort, and is “off” unless we apply the effort to turn it “on”. In Kahneman’s words, System 1 is “a system for jumping to conclusions” [3, p.79]. Conclusions that, sometimes, can have disastrous consequences.

1 Editor's note: For more on NDM and its potential evolution, check out "Naturalistic Decision Making + Macro cognition "(G. Klein, R. Hoffman, L. Militello) in the 2016 Summer issue of Cognitia!
I’m going to take a quick look at two examples of where System 1 thinking, and the biases and irrationalities that are associated with it, can provide insight into why people may have made the decisions and acted as they did in highly hazardous situations. (As far as I am aware, there is only a very small literature exploring the implications of System 1 thinking on industrial safety. I’ve written about it extensively in my book [6]. An article in the Society of Petroleum Engineer’s journal ‘Oil and Gas Facilities’ [7] discusses an example where a valve was left in the wrong position, and considers the impact of various biases on the use of Risk Assessment Matrices to estimate risk. If readers of Cognitia are aware of others who have explored the implications of System 1 reasoning errors on industrial safety, I would be very pleased to know about them).

So how was the railway lookout thinking?
Let’s start with the case of the railway lookout at the start of this article. Fig. 1 illustrates the situation a few moments prior to the incident. I posed the question “how was he thinking?” It seems to me likely that he was thinking using System 1: when he first saw the train approaching, he formed a judgement that the train would continue into the station on the same track. And, having made that judgement, he had no doubt and did not consider an alternative: the possibility that the train – as, in fact, it did – change track onto the line closer to him. His System 1 jumped to a conclusion about the future path of the train into the station: a conclusion about which he had no doubt, and that formed the basis for his subsequent actions and the fatal consequences that followed. If he had any doubt at all, he would surely have at least looked in the direction of the train before approaching the track. But System 1, Kahneman tells us, does not have doubt.

System 1 thinking at Formosa Chemicals
On April 23, 2004, an operator cleaning a reactor vessel at the Formosa Plastics Corporation, at Illiopolis, Illinois, in the USA unintentionally approached the wrong reactor. Not realizing the mistake, he opened a valve at the bottom of the reactor causing a large quantity of hot chemicals under pressure to spill onto the floor. In order to open the valve, he had overridden a safety interlock specifically designed to prevent the valve opening when the reactor was under pressure. The spilled chemicals exploded, killing five workers and seriously injuring three others. Most of the reactor facility and an adjacent warehouse were destroyed. The local community had to be evacuated from their homes for two days.

I’m sure many readers of Cognitia will, as I have, made extensive use of the US Chemical Safety Board's investigation report [8] and excellent supporting animation for training purposes. The key question is to seek to understand why an experienced operator, who must have known the nature of the hazardous materials involved in the process, would act as he did, leading to the deaths not only of himself, but of four of his colleagues.

An explanation, I suggest, can again be found in terms of System 1 thinking. Having arrived at the wrong reactor (itself likely due to a 180° spatial re-orientation when going downstairs from the top to the bottom level of the reactor building), and having nothing to draw his attention to the fact that the reactor was involved in a reaction (why not?) You might well
ask), the operator had no doubt. In terms of reasoning errors, he was caught up in a situation of commitment bias: he can have had no doubt that he was working on the right reactor. And his System 1 was able to quickly offer an explanation for the fact that the valve did not open (it is thought he concluded that the valve was faulty). Lack of doubt, failure to go to the effort to question an unexpected event, and effortlessly finding a seemingly rational explanation for that event are all completely consistent with System 1 thinking.

The challenge
Catastrophic incidents at Bhopal, Seveso and other chemical plants have repeatedly demonstrated the enormous consequences for society and the environment that can arise from leaks from chemical plants. BASF is the world’s largest chemicals company. The company recently reported that “operational” causes — i.e. “human error” - continues to be the largest source of process safety incidents [9]. And the most frequent type of error concerned manual valves being left in the wrong state (open instead of closed), flanges not being properly secured, or incorrect gaskets being fitted.

Many of the “human errors” involved in industrial incidents involve (relatively) “simple” tasks – identifying the route a train is going to take, working on the wrong equipment, operating valves and securing flanges, reading pressure gauges, and deciding whether it is necessary to change the settings on a control panel. These are a long way from the sophisticated highly cognitive, automated and adaptive systems that are the subject of so much of our current research in Human Factors and applied psychology. Though it is the context in which those apparently “simple” tasks need to be performed that makes them complex and error-prone. Simply describing that context as being the presence of “Performance Shaping Factors” doesn’t begin to capture the psychological, technical, social and even emotional complexity of the situations. More importantly, it is the unrealistic – and usually unchallenged - expectations held by organisations about the abilities of people to carry out such “simple” tasks to the levels of consistency and reliability they rely on that can be such a threat.

What continues to surprise and disappoint me is how little interest the research community – or perhaps it is the government agencies that largely fund them – seems to have in these kind of tasks and the operational situations they are performed in. Situations that can have global resonance, not only affecting the lives, welfare, living standards and pensions of millions of people but with the potential to do such harm to the environment. And which all, at their heart, involve the awareness and assessment of risk and decision making in real-time by individuals faced with uncertainty and ambiguity, under operational stresses and usually with conflicting goals.

Industry has for many years sought to simplify, even on occasion to trivialise, human error. Approaches for investigating and managing it have been sought that can be applied by those with no special skills or knowledge and minimal training. The reality is that human performance – whether reliable or not – is complex. Real progress in improving industrial safety is not going to be achieved until those responsible for safety management start to recognise that complexity and approach it with a degree of technical rigour and respect similar to that given to other engineering disciplines. And that state will not be achieved until the academics and researchers - as well as the government agencies that fund them – who are the guardians of such a rich knowledge base start to engage with and support industry in understanding these issues and finding practical approaches to managing them.

To conclude, my central proposal is that many of the human errors that occur in safety critical operations can be understood as System 1 reasoning errors. Effort and research is needed both:
1. to operationalize System 1 reasoning errors in ways that are meaningful to understanding human error in the performance of safety critical tasks; and,
FEATURE ARTICLE

Implications of styles of thinking for risk awareness and decision making in safety critical operations (R. McLeod)

2. to identify approaches that can be applied to overcome System1 reasoning errors in safety critical situations: approaches that are effective in breaking into System 1 thinking, and engaging System 2 when critical decisions and risk assessments have to be made.

Have questions or want to continue the discussion? Check out the LinkedIn discussion on this topic!

https://www.linkedin.com/groups/44516/44516-6179008507476570114

References

4. Dekker S. The field guide to understanding human error. Ashgate; 2006

Dr. Ron McLeod has more than 30 years of applied industrial and commercial experience. He holds a degree in Psychology, an MSc in Ergonomics and a Ph.D in Engineering and Applied Science. Until early 2014 Ron was Global Discipline Lead for Human Factors Engineering (HFE) within Royal Dutch Shell. Ron has published scientific papers in a range of peer reviewed journals, has worked on many cross-industry committees and has authored or contributed to numerous industry best-practice guides. He holds a position as Honorary Professor of Engineering Psychology at Heriot-Watt University, and has recently been made a Visiting Professor at Loughborough University. He has been appointed by the Society of Petroleum Engineers as a Distinguished Lecturer for their 2016-17 lecture series. Ron’s first book, "Designing for Human Reliability: Human Factors Engineering for the Oil, Gas and Process Industries" was published by Elsevier in 2015. Ron is a member of HFES and sits on the Council as a Trustee of the Chartered Institute of Ergonomics and Human Factors.

This article was first featured in the Fall 2016 (Vol 22, No 3) edition of Cognitia, the newsletter of the HFES Cognitive Engineering and Decision Making (CEDM) Technical Group.

### Tuesday, 20 September 2016

**CE1 – Improving Communication Systems**  
_Cosponsored with Communications TG_

**Chair:** Harry E. Blanchard  
- **Jessica Parker, Christopher Best, Gregory Funke, Adam Strang, & Kaye Marion:** “An investigation of coding schemes for sample entropy analysis of communications data”  
- **Kimberly Preusse & Christina Gipson:** “Dispatching Information in 911 Teams: A Case Study”  
- **Mustafa Demir, Nathan McNeese, Nancy Cooke, & Christopher Myers:** “The Synthetic Teammate as a Team Player in Command-and-Control Teams”  
- **Gaea Payton:** “Telephony Speech-To-Text: An Adequate Analog to Internet Protocol Caption Telephone Services”

### Wednesday, 21 September 2016

**CE1 – User Interface Design for Unmanned Systems**  
_Cosponsored with Aerospace TG_

**Chair:** Amy Pritchett  
**Co-chair:** Joey CY So  
- **Elizabeth Mersch, Kyle Behymer, Gloria Calhoun, Heath Ruff, & Jared Dewey:** “Game-Based Delegation Interface Design for Unmanned Vehicles: Color Coding and Icon Row Assignment”  
- **Samuel Levulis, So Young Kim, & Pat DeLucia:** “Effects of Touch, Voice, and Multimodal Input on Multiple-UAV Monitoring During Simulated Manned-Unmanned Teaming in a Military Helicopter”  
- **Dorrit Billman, Shu-Chieh Wu, & Chengcheng Fan:** “Representing Work for Device Design and Evaluation Using Biclustering”  
- **Beth DePass, Beth DePass, Emilie Roth, Ron Scott, Jonathon Harter, & Jeffrey Wampler:** “The Role of Operationally Distinct Options in Supporting Joint Human-Automation Planning”  
- **James Walliser, Ewart de Visser, Tyler Shaw:** “Application of a System-Wide Trust Strategy When Supervising Multiple Autonomous Agents”

**CE2 – Teamwork**

**Chair:** Frank Hannigan  
**Co-chair:** Nathan McNeese  
- **Michael McNeese & Nathan McNeese:** “Intelligent Teamwork: A History, Framework, and Lessons Learned”  
- **Deitlind Cymek, Sandy Jahn, & Dietrich Manzey:** “Monitoring and cross-checking automation: Do four eyes see more than two?”  
- **Timothy Neville, Paul Salmon, & Gemma Read:** “Towards a model for measuring teamwork in Australian Rules Football Officials”  
- **Matthew-Donald Sangster, Wayne Gray, & David Mendonça:** “Big Data Meets Team Expertise in a Dynamic Task Environment”

**CE3 – From Cognitive Theory to Operational Transition: Finding a Path Across the Valley of Death**  
_Discussion Panel chaired by Wayne Zachary, Wayne Zachary, Stephen Fiore, Jeffrey Morrison, Josey Wales, & Christopher Wickens_

**Chair:** Laura Militello  
**Co-chair:** Nathan Lau  
- **Matylda Gerber, Matylda Gerber, B. L. William Wong, & Neesha Kodagoda:** “How Analysts Think: Intuition, Leap of Faith and Insight”  
- **B. L. William Wong & Neesha Kodagoda:** “How Analysts Think: Anchoring, Laddering and Associations”  
- **Mark Pfaff, Jill Drury, Gary Klein, & Crystal Boston-Clay:** “Modeling Knowledge Using a Crowd of Experts”  
- **Nathan Bos, Celeste Paul, Russ Burtner, Dustin Arendt, John Gersh, Ariel Greenberg, Christine Piatko, Scott Sperling, & Jason Spaletta:** “Effects of gain/loss framing in cyber defense decision-making”

**CE4 – Expert Decision Making**

**Chair:** Laura Militello  
**Co-chair:** Nathan Lau  
- **Matylda Gerber, Matylda Gerber, B. L. William Wong, & Neesha Kodagoda:** “How Analysts Think: Intuition, Leap of Faith and Insight”  
- **B. L. William Wong & Neesha Kodagoda:** “How Analysts Think: Anchoring, Laddering and Associations”  
- **Mark Pfaff, Jill Drury, Gary Klein, & Crystal Boston-Clay:** “Modeling Knowledge Using a Crowd of Experts”  
- **Nathan Bos, Celeste Paul, Russ Burtner, Dustin Arendt, John Gersh, Ariel Greenberg, Christine Piatko, Scott Sperling, & Jason Spaletta:** “Effects of gain/loss framing in cyber defense decision-making”

**CE5 – Is Functional Near-Infrared Spectroscopy (fNIRS) Appropriate for Your Research?**  
_Discussion Panel chaired by Ranjana Mehta, Hasan Ayaz, Ryan McKendrick, Kurtulus Izzetoglu, Ben Willems, & Matthias Ziegler_

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**Wednesday, 21 September 2016 (3:30 – 5:00 PM / 15:30 – 17:00) CEDM Technical Group Meeting**  
_Technical Group news and administrative affairs, best student paper awards, networking! Food and drinks will be provided._
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<td>8:30 – 10:00</td>
<td><strong>CE6 – Trust in Automation</strong></td>
<td>Chair: Linda Pierce</td>
<td>Co-chair: Jing Chen</td>
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<td>Xi Jessie Yang, Christopher Wickens, &amp; Katja Hölttä-Otto: “How human operators adjust trust in automation: Contrast effect and hindsight bias”</td>
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<td>Ryan Wohleber, Gloria Calhoun, Gregory Funke, Heath Ruff, C.-Y. Peter Chiu, Jinchao Lin, &amp; Gerald Matthews: “The Impact of Automation Reliability and Operator Fatigue on Performance and Reliance”</td>
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<td>Melissa Smith, M. Mowafak Allaham, &amp; Eva Wiese: “Trust in automated agents is modulated by the combined influence of agent and task type”</td>
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<td>Carl Pearson, Allaire Welk, &amp; Christopher Mayhorn: “In Automation we Trust? Identifying Varying Levels of Trust in Human and Automated Information Sources”</td>
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<td>8:30 – 10:00</td>
<td><strong>CE7 – Cyberspace Operations and the People Who Perform Them</strong></td>
<td>Discussion Panel chaired by LTC Stoney Trent, Robert Hoffman, Tony Leota, Robert Frost, &amp; Danielle Gonzalez</td>
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<td>8:30 – 10:00</td>
<td><strong>CE8 – Approaches to Context Based Proactive Decision Support</strong></td>
<td>Chair: Wayne Zachary</td>
<td>Co-chair: Alicia Fernandes</td>
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<td>Wayne Zachary &amp; Eric Vorm: “Approaches to Context-Based Proactive Decision Support”</td>
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<td>Joanna Brown, Sylvain Bruni, Joseph Bennett, Connie Fournelle, Christopher Hanna, Lisa Lucia, Danielle Ward, &amp; Benjamin Woodward: “Characterizing Mission and User Context for Proactive Decision Support”</td>
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<td>Catherine Inibhanu &amp; Scott Langevin: “Adaptive Visualization of Complex Networks with FocalPoint: A Context Aware Level of Detail Recommender System”</td>
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<td>13:30 – 15:00</td>
<td><strong>CE9 – Interruptions and Workload</strong></td>
<td>Chair: Birsen Donmez</td>
<td>Co-chair: Alicia Fernandes</td>
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<td>Birsen Donmez, Nicole Werner, &amp; Deborah Boehm-Davis: “Are Individuals Sensitive to Changes in Performance when Interrupted?”</td>
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<td>Chiara Santamoura &amp; Penelope Sanderson: “Conducting Comparaarable Research in Representative Worlds: An Interruptions Case Study”</td>
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<td>Julia Wright, Julia Wright, Jessie Chen, Michael Barnes, &amp; Peter Hancock: “Agent Reasoning Transparency’s Effect on Operator Workload”</td>
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<td>Nathan Aguiar, Kevin Zish, J. Malcolm McCurry, &amp; J. Gregory Trafton: “Interruptions Reduce Performance Across All Levels of Signal Detection When Estimations of Confidence are Highest”</td>
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<td>13:30 – 15:00</td>
<td><strong>CE10 – Simulations and Microworlds</strong></td>
<td>Chair: Susan Kirschenbaum</td>
<td>Co-chair: Shelby Long</td>
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<td>Susan Kirschenbaum &amp; Shelby Long: “Experienced drivers are quicker to achieve situation awareness than inexperienced drivers in situations of transfer of control within a Level 3 autonomous environment.”</td>
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<td>Francois Vachon, Benoît Vallières, Joel Suss, Jean-Denis Thériault, &amp; Sébastien Tremblay: “The CSSS Microworld: A Gateway to Understanding and Improving CCTV Security Surveillance”</td>
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<td>Wayne Giang, Lavinia Hui, Birsen Donmez, Mahvareh Aghhari, &amp; Russel D. MacDonald: “Dispatch Decision Making in an Air Medical Transport System”</td>
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<td>Katherine Walker, David Woods, &amp; Michael Rayo: “Multiple Systemic Contributors versus Root Cause: Learning from a NASA Near Miss”</td>
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<td>15:30 – 17:00</td>
<td><strong>CE11 – Is Interacting with Machines Like Interacting With People? Politeness in Machine-Human and Human-Human Interaction</strong></td>
<td>Discussion Panel chaired by Joachim Meyer, Chris Miller, Peter Hancock, Michael Dorneich, &amp; Ewart de Viessser</td>
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Friday, 23 September 2016

8:30–10:00
CE12 – Attention and Alerts
Chair: Sylvain Bruni  Co-chair: Jung Kim
- Cindy Chamberland, Helen Hodgetts, Benoît Vallières, Francois Vachon, & Sébastien Tremblay: “Pip and Pop: When Auditory Alarms Facilitate Visual Change Detection in Dynamic Settings”
- Benjamin Clegg & Christopher Wickens: “The Relationship Between Individual Differences in Switching Performance and Task Engagement”
- Julie Prinet, Yuzhi Wan, & Nadine Sarter: “Tactile spatial guidance for collision avoidance in NextGen flight operations”
- Julie Prinet, Alexander Mize, & Nadine Sarter: “Triggering and Detecting Attentional Narrowing in Controlled Environments”
- Rebecca Wiczorek & Joachim Meyer: “Asymmetric effects of false positive and false negative indications on the verification of alerts in different risk conditions”

8:30 – 10:00  CE13 – Matters of Ethics, Trust, and Potential Liability for Autonomous Systems
Discussion Panel chaired by Chris Brill, James Bliss, Peter Hancock, Dietrich Manzey, Joachim Meyer, & Alizon Vredenburgh

10:30 – 12:00
CE14 – Prediction and Decision Making
Chair: Joel Suss  Co-chair: Matylda Ludwiki Gerber
- Christopher Wickens, Nathan Herdener, Charles Smith, & Benjamin Clegg: “Purchasing Information to Reduce Uncertainty in Prediction.”
- David LaVergne, Judith Tiferes, Michael Jenkins, Geoff Gross, & Ann Bisantz: “Linguistic Estimations of Human Attributes”
- Nicholas Hertz & Eva Wiese: “Influence of Agent Type and Task Ambiguity on Conformity in Social Decision Making”
- Yeti Li, Catherine Burns, & Rui Hu: “Representing Stages and Levels of Automation on a Decision Ladder: The Case of Automated Financial Trading”

(continued from page 3)

2. “Realizing Improved Patient Care Through Human-Centered Design in the OR” which is supported by the Agency for Healthcare Research and Quality (AHRQ). For more information about the research project, please visit: http://newsstand.clemson.edu/mediarelations/clemson-researchers-receive-hhs-grant-to-design-safer-smarter-hospital-operating-room/.

Interested students can contact Dr. Riggs at: sriggs@clemson.edu. The Clemson PhD application deadline is January 1, 2017. The Riggs Lab will be present at the HFES conference in Washington D.C so feel free to ask Dr. Riggs or one of her students questions in person.

The Riggs lab

The Riggs Lab has ongoing research in the areas of: (1) multimodal interface design, (2) adaptive interfaces, and (3) cognitive processing limitations. The lab currently has fully functional UAV and anesthesia simulations, and an automated driving simulation is under development. For more information on the Riggs Lab, please visit: http://sriggs.people.clemson.edu/
Mike Rayo joining Cognitive Systems Engineering Laboratory (C/S/E/L) at The Ohio State University
By Mike Rayo, Ph.D.

In Fall 2016, I am joining the Cognitive Systems Engineering program at Ohio State as an Assistant Professor in Integrated Systems Engineering and Translational Data Analytics and a Co-director of the Cognitive Systems Engineering Laboratory (C/S/E/L). I have a background in human factors engineering, resilience engineering, visual analytics and software engineering. Prior to taking this position, I worked as a Senior Researcher in C/S/E/L and was Owner and President of Cogenisys, a Human Factors Engineering consultancy.

My current work focuses on how the design of cognitive tools, including data visualizations, decision support and threshold alarm systems, fit into multi-agent teaming architectures that contribute to adaptive and maladaptive behaviors of the system.

It fits into the overall goal of C/S/E/L, which is to foster a deep understanding of the intersection between people, technology, and work to allow systems to gracefully extend past the boundaries of their initial design (and the understanding of their designers!). I am currently plying my trade in the domains of healthcare, power generation, and the military, looking at how technology agents can be better team players in detecting hazardous patient conditions, assisting decisions in medical ordering, detecting potential issues in regional power grids, and improving expertise in intelligence analysis. As the newest faculty member in the lab, I am actively searching for students and research collaborators. We are anticipating some interesting training and collaboration opportunities in the near future, as we are applying a cognitive systems perspective to the enormously popular fields of data analytics and autonomous technologies.

Email: rayo.3@osu.edu
ResearchGate: www.researchgate.net/profile/Michael_Rayo
Website: /discovery.osu.edu/tda/faculty/members/mike-rayo
LinkedIn: www.linkedin.com/in/mike-rayo-phd-0113061
Twitter: @DocRayo

CALL FOR PROPOSALS & PAPERS

Call for Papers
IEEE Transactions on Human-Machine Systems
“Golden Jubilee Anniversary Issue of Transactions on Man-Machine Systems”

The present Transactions on Human-Machine Systems (THMS) finds its origins in several previous titles, including parts of the Transactions on Systems, Man, and Cybernetics (between 1971-1995 and 1998-2012) and the Transactions on Man-Machine Systems (T-MMS; from 1968-1970). As some may recall, the latter title actually preceded the Systems, Man & Cybernetics Society (SMCS) within IEEE and was a product of the IEEE Group on Systems Science and Cybernetics. For many researchers working in the area of human-automation interaction, the T-MMS served as an outlet for high-quality scholarship. Over the years, several articles appearing in the issues of T-MMS have been cited as seminal works in the following areas:

- human-adaptive manual control
- human-computer coordination in multitasking scenarios
- participatory modes of human control of dynamic systems and failure detection
- human monitoring behavior in supervisory control
- human decision-making and workload in supervisory control scenarios
- modeling of human-machine interaction
- models of allocation of human and computer in supervisory control.

Given the pedigree of the current Transactions (THMS), including the T-MMS line dating back to 1968, in 2018 we will publish a Golden Jubilee Anniversary Issue. This issue seeks to recognize and celebrate 50 yrs. of human-machine systems research appearing in archival publications of the IEEE as well as the contributions of early figures in human-automation interaction research, including (but not limited to) George A. Bekey, James C. Bliss, Jaime R. Carbonell, Renwick E. Curry, William R. Ferrell, Gunnar Johannsen, David L. Kleinman, Duane T. McRuer, Neville Moray, Raymond S. Nickerson, William B. Rouse, John W. Senders, Thomas B. Sheridan, and Laurence R. Young.

All submissions to the Golden Jubilee Anniversary Issue are expected to be review papers with formatted lengths of between 15-20 published pages. Specific topics of interest include:

- State-of-the-art in manual control of complex machine systems
- State-of-the-art in human-in-the-loop fault detection and diagnosis systems
• State-of-the-art in decision support systems for human multitasking performance
• State-of-the-art in supervisory control interface design
• State-of-the-art in human workload modeling in supervisory control
• State-of-the-art in adaptively automated systems for human control
• State-of-the-art in human-automation interaction modeling

Important Dates:
Review paper submission due date: December 31, 2016
Initial decision notification: March 15, 2017
Revised manuscript due date: May 15, 2017
Final decision notification: August 1, 2017
Final version of the manuscript due: September 30, 2017

Manuscripts should be submitted at: http://mc.manuscriptcentral.com/thms. All submissions must include a cover letter with the statement, “Submitted for Golden Jubilee Anniversary Issue.” For detailed submission information, please see the “Information for Authors” at: http://www.ieeesmc.org/publications/transactions-on-human-machine-systems/information-for-authors

Editor:
David B. Kaber, North Carolina State University. All enquiries about the special issue should be sent to: dbkaber@ncsu.edu ※

Call for Proposals
19th International Symposium on Aviation Psychology
Dayton, Ohio, USA ● May 8-11, 2017

The 19th International Symposium on Aviation Psychology will be held in Dayton, Ohio, May 8-11, 2017. Proposals are sought for posters, papers, symposia, and panels. Any topic related to the field of aviation psychology is welcomed. Topics on human performance problems and opportunities within aerospace systems, and design solutions that best utilize human capabilities for creating safe and efficient aviation systems are all appropriate.

Examples include maximizing human performance through interface design or ensuring the physical environment's safety, improving automation effectiveness by closing the loop with the human's cognitive state, analysis of aviation accidents, improving human performance by training and selection, and optimizing system design by employing cognitive engineering and validating the systems in test and evaluation.

Any basic or applied research domain that generalizes from or to the aviation domain will be considered. The deadline for proposal submissions is October 7, 2016. Please visit http://isap.wright.edu for more information. Contact isap2017@isap.wright.edu for any questions.

John Flach (Symposium Chair), Michael Vidulich and Pamela Tsang (Program Co-Chairs) ※

EMPLOYMENT OPPORTUNITIES

POST DOCTORATE OPENINGS

Research Associate / Post Doctorate (30 Sept 2016)
College of Computing and Informatics
Drexel University (Philadelphia, PA, USA)
Page 15

Post-doctoral Research Fellow (Full Time)
National Center for Human Factors in Healthcare (Washington DC / Baltimore areas, USA)
Page 22 (visit page 20 for general information)

Post-doctoral Research Fellow (Full Time)
Industrial & Systems Engineering
Texas A&M University (College Station, TX, USA)
Page 16

FACULTY OPENINGS

Tenure Track Assistant Professor (1 Nov 2016)
Department of Psychology
New Mexico State University (Las Cruces, NM, USA)
Page 17

Tenure Track Assistant / Associate Professor (1 Nov 2016)
Industrial and Systems Engineering, College of Engineering
University of Wisconsin
Page 18

INDUSTRY OPENINGS

National Center for Human Factors in Healthcare (Washington DC / Baltimore areas) has a series of openings. Please visit page 23 for overall information about the group:

Senior Usability Specialist (Full Time), pg 20
Usability Assistant (Full Time), pg 20
Senior Research Scientist (Full Time), pg 20
Research Assistant (Full Time), pg 21
Cognitia Volume 22, No. 3, Fall 2016

Newsletter of the Cognitive Engineering and Decision Making Technical Group

Cognitia is published by the CEDM-TG of the Human Factors and Ergonomics Society. For membership information, see the HFES website at hfes.org.

TG Officers
Technical Group Chair: Jennifer Ockerman
Principal Cognitive Systems Engineer
Johns Hopkins University Applied Physics Laboratory
Laurel, MD, USA

Technical Group Chair Elect: Karen Feigh
Associate Professor, School of Aerospace Engineering
Georgia Institute of Technology, Atlanta, GA, USA

Program Chair: Mark S. Pfaff
Lead Human Centered Engineer
The MITRE Corporation, Bedford, MA, USA

Program Chair Elect: Stephen B. Gilbert
Assistant Professor, Industrial & Manufacturing Systems Engineering
Iowa State University, Ames, IA, USA

Secretary & Treasurer: Michael Dorneich
Associate Professor, Industrial & Manufacturing Systems Engineering
Iowa State University, Ames, IA, USA

Newsletter Editor: Zarrin Chua
Research Engineer, Aeronautical Human-Computer Interaction
Ecole Nationale de l'Aviation Civile
Toulouse, France

Electronic Communications Director: Dev Minotra
Post-Doctoral Fellow, Systems Design Engineering
University of Waterloo, Waterloo, Ontario, Canada

Student Awards and Affairs Officer: Ziho Kang
Assistant Professor, School of Industrial and Systems Engineering
University of Oklahoma, Norman, OK, USA

For previous editions of this newsletter, please visit
http://tg.hfes.org/cedm/newsletter.htm

Questions? Comments? Suggestions? Submissions?
Please contact us at http://tinyurl.com/CognitiaTalk2us
**Position:** Research Associate\Post Doc at the College of Computing and Informatics, Drexel University, Philadelphia, PA

Drexel University’s College of Computing and Informatics is seeking applications for a Research Associate\Post Doctoral Researcher. The position is funded by the Agency for Healthcare Research and Quality (AHRQ). The purpose of the funded study is: 1) to understand the information requirements, decision-making needs, and workflow of homecare nurses in the admission and care planning processes, and 2) to examine if/how health information technology supports the nurses. The applicant will participate in data collection with three homecare agencies and will support analyzing the data, developing recommendations, and disseminating the results.

**Duration:** This two-year position has an immediate starting date. This full-time research position includes full benefits with a possibility of renewal for a third year.

**Responsibilities:** The applicant will be responsible for: a) data collection in the home setting and at the home care agency, b) qualitative data analysis, c) participation in drafting of recommendations, d) participation in drafting of manuscripts, and e) management of study logistics including organization, administration, and data collection. Data collection will take place in patients’ homes and in office settings. Travel to the data collection sites requires a driver’s license. Travel related costs will be reimbursed.

**Qualifications:** The ideal applicant will have a Ph.D. in human factors, systems engineering, human-computer interaction, information science, psychology, or a related area. The ideal applicant will have a strong background in qualitative methods (including focus groups, observation, interview, and assisted recall methods) as well as experience or interest in thematic coding. The ideal applicant will have a strong background in usability methods (including cognitive walkthrough, heuristic evaluation, and key stoke level modeling). All applicants should demonstrate technical skills in statistics, writing abilities, and good communication skills. All applicants must have a valid driver license.

**Application Materials:** Applicants should send: Cover letter, C.V., contact information for 3 references, research statement (1-2 pages), and a list of relevant publications. Please submit these materials as a single PDF file. For full consideration, all application materials must be received by September 30, 2016.

Please submit the electronic document using DrexelJobs www.drexeljobs.com/applicants/Central?quickFind=81048
Use the Apply for this Posting button. It will ask you to set up an account and then you can submit your materials.

Please also send the application materials to Ellen J. Bass at ejb96@drexel.edu.

Review of applications will begin immediately.
Position: Post-doctoral Fellow  
Start Date: September-December 2016

The Applied Cognitive Ergonomics laboratory (ACE-Lab) in the Department of Industrial and Systems Engineering at the Texas A&M University (TAMU) is seeking a Postdoctoral Fellow. A highly motivated individual with strong background in Health Care Human Factors research is sought to join our active group engaged in basic, translational and clinical human factors research. ACE-Lab is a young, highly interactive, and collaborative research group where interdisciplinary research approaches are utilized to help improve personnel performance and human-system interaction in complex safety-critical systems. Candidate will work on award-winning projects involving the design and evaluation of sensor-based performance monitoring systems in several Health care domains.

Texas A&M University is one of a select few institutions in the nation to hold triple federal designation as a Land-Grant, Sea-Grant and Space-Grant university. It consistently ranks among the country's top engineering schools. Department of Industrial and Systems Engineering at TAMU has consistently ranked among the top 10 programs in the country.

Qualifications: Interested candidates should have obtained a Ph.D. degree with a strong background in in a Health Care domain. The ideal candidate will have proven talent to work independently with excellent interpersonal and communication skills.

To apply, please send your curriculum vitae and summary of research interests to Dr. Farzan Sasangohar: sasangohar@tamu.edu.

The Texas A&M University is an Equal Opportunity/Affirmative Action Employer. All qualified applicants are encouraged to apply and will receive consideration for employment free from discrimination on the basis of race, creed, color, national origin, age, sex, pregnancy, sexual orientation, gender identity, genetic information, religion, associational preference, status as a qualified individual with a disability, or status as a protected veteran. Applicants' credentials are subject to verification.
The Department of Psychology at New Mexico State University invites applications for a tenure-track, assistant professor position in Engineering Psychology/Human Factors starting in Fall 2017. NMSU is the nation's only Land Grant institution that is also classified as both a Hispanic Serving Institution and a Carnegie High Research Activity Institution.

We are looking for a candidate whose research interests fall within the domains of Human Factors, Engineering Psychology, or User Experience (UX) Research. We are especially interested in candidates with a background in human/computer interaction, healthcare human factors, aviation psychology, environmental psychology, or risk assessment. We are looking for a candidate with a record of applying for external funding whose program of research will make a significant impact in their specialty area. Our faculty and graduate students have active research interests in social, cognitive, and engineering psychology. Candidates who can demonstrate clear connections to one or more of these areas of research or the potential for creative cross-disciplinary collaboration within and across departments are preferred.

The successful candidate will value collegiality and service to their department/institution and will have the demonstrated capability to teach graduate and undergraduate courses in engineering psychology, human/computer interaction, statistics, and research methods, and will serve as a research mentor to undergraduate and graduate students. A Ph.D. in Psychology or related field with an emphasis in applied cognition, engineering psychology, human factors, or user experience research is required (in hand by hire date).

The deadline for applications is November 1, 2016, after which new applications will not be considered. Please submit a current curriculum vitae, letters describing research and teaching interests, relevant reprints or preprints of completed research, unofficial transcripts of the highest degree earned, and three letters of recommendation via https://jobs.nmsu.edu/postings/25985. New Mexico State University is an Equal Opportunity/Affirmative Action Employer. Offer of employment is contingent upon verification of applicable credentials, criminal and other background information.

APPLICATION INFORMATION
Contact: Justin MacDonald, jmacd@nmsu.edu
Online App. Form: https://jobs.nmsu.edu/postings/25985
Position Opening at the University of Wisconsin-Madison College of Engineering for:

Assistant/Associate/Professor; Industrial and Systems Engineering

Please see full position description, requirements, and application instructions in the official position vacancy listing: http://www.ohr.wisc.edu/Weblisting/External/PVLSummaryApply.aspx?pvl_num=87470

Minimum number of years and type of relevant work experience:
Applicants should have an outstanding academic record, exceptional potential for creative research, and a commitment to both undergraduate and graduate education. Appointment to this tenure-track or tenured position requires the PhD degree.

Principal duties:
The Department of Industrial and Systems Engineering at the University of Wisconsin-Madison invites applicants for a tenure-track or tenured faculty position beginning August 2017 or later to complement our existing research programs in health systems engineering, manufacturing and production systems, decision sciences/operations research, and human factors.

At this time, we are specifically interested in candidates who can contribute to our department's vision of building, analyzing, and leveraging smart, interconnected systems in important practical domains, including manufacturing and health care.

Areas of interest include but are not limited to algorithms and applications for data analytics and optimization; smart manufacturing and systems automation; human-systems integration; and automation and systems engineering approaches in health care, such as decision making and patient flow across multiple care environments.

Applicants should have an outstanding academic record, exceptional potential for creative research, and a commitment to both undergraduate and graduate education in industrial and systems engineering. Applicants are expected to create and maintain a strong program of research, provide classroom and individual instruction for undergraduate and graduate degree-seeking students, and contribute to the intellectual and academic life of the department. University and professional service will be expected as appropriate.
They will be expected to maintain a world-class extramurally funded graduate research program on technological problems that are relevant to the needs of the profession and of society. They will also teach courses and contribute to the education and professional development of undergraduate and graduate students, and engage in department, college, university, community and professional service activities as appropriate.

**How to Apply:** In order to apply, applications must be submitted online at [https://uwjobapply.wisc.edu/Apply.aspx?pvl=87470](https://uwjobapply.wisc.edu/Apply.aspx?pvl=87470)

You will be asked to upload two documents. In the first upload, please submit a letter of application and in the second upload, please submit the following in a single document: curriculum vitae, teaching and research statements, and the names of at least three references who are well-respected authorities in the field.

**THE DEADLINE FOR ENSURING FULL CONSIDERATION IS NOVEMBER 1, 2016,** but positions will remain open and applications may be considered until the position is filled.

**NOTE:** Please indicate in writing if you request that your identity be kept confidential. If you do not indicate your preference to remain confidential, the University may be required to disclose your identity and application materials. The identity of finalists and successful candidates will be revealed upon request.

**Questions about the position can be directed to:**

Jeff Linderoth, Chair ISyE Faculty Search Committee  
1513 University Avenue  
Room 3270  
Madison, WI 53706  
Fax: N/A ; Email: linderoth@wisc.edu
Senior Usability Specialist (Full Time)

The Usability Services team in the National Center for Human Factors in Healthcare is seeking a talented, energetic, personable, and passionate candidate with significant experience in device usability for a Senior Usability Specialist role.

A Masters degree or PhD is required in human factors engineering, human/computer interaction, human factors psychology, or a very closely related field such as applied psychology or industrial and systems engineering. Degrees in related fields such as biomedical engineering will be considered with significant experience in human factors or usability work. The ideal candidate will have at least two years’ experience post advanced degree. Direct experience in usability testing and evaluation of medical devices, knowledge of FDA requirements is strongly preferred.

The Senior Usability Specialist will be responsible for:

- designing and leading the execution of formative and summative usability studies
- developing study protocols, test preparation, and participant recruitment
- quantitative and qualitative data collection, data analysis, interpretation of results
- preparation of technical reports

This position reports directly to the Director, Usability Services, of the National Center for Human Factors in Healthcare. For consideration, please send your CV to jobs@medicalhfe.org and clearly identify Senior Usability Specialist as the position for which you are applying. Please email us to learn more or to refer a candidate.

Usability Assistant (Full Time)

The Usability Services team in the National Center for Human Factors in Healthcare is seeking a talented, energetic, personable, and passionate candidate with a strong interest in medical device usability.

Bachelor’s degree is required in human factors engineering, human/computer interaction, human factors psychology, or a very closely related field such as applied psychology or industrial and systems engineering. Degrees in related fields such as biomedical engineering will be considered with coursework in human factors or usability.

The Usability Assistant will work closely with Center faculty members and will be responsible for:

- Recruiting study participants and supporting execution of studies
- Collecting research data and supporting data analysis
- Assisting with report writing and dissemination
- Performing other usability support activity such as transcription of audio recordings or coding of data

This position reports directly to the Director, Usability Services, of the National Center for Human Factors in Healthcare. For consideration, please send your CV to jobs@medicalhfe.org and clearly identify Usability Assistant as the position for which you are applying. Please email us to learn more or to refer a candidate.

Senior Research Scientist (Full Time)

The National Center for Human Factors in Healthcare is recruiting a Senior Research Scientist to join our growing team. We are seeking an exceptional principal investigator level researcher, with a PhD (or equivalent) in human factors engineering (or a closely related field such as Industrial & Systems Engineering, Cognitive Psychology, Industrial/Organizational Psychology, or Safety Engineering). The National Center for Human Factors in Healthcare is a group of human factors engineers, cognitive psychologists, usability specialists, and clinical experts embedded
within the innovation arm of MedStar Health, a $5B healthcare delivery organization with 30,000 employees, 20 diversified healthcare companies and 10 hospitals in the Washington DC & Baltimore region. The ideal candidate is a recognized expert in their area of focus. We encourage all to apply and are particularly interested in focus areas such as teamwork, leadership, performance measurement, and decision making. The candidate should have experience writing proposals to attract external funding, executing grant funded work, and disseminating research results through journal publications and presentations.

The Senior Research Scientist will be responsible for:

- Establishing a core area of research that is relevant to improving the safety, quality and efficiency of healthcare
- Leading small and large scale research studies from start to finish with assistance from Center research staff
- Disseminating findings at national conferences and through journal publications
- Implementing safety innovations in the applied setting through collaboration, both within and outside MedStar
- Serving as an internal expert in their respective research area to advise MedStar Health staff
- Providing instructional lectures in their area of expertise to medical students, graduate students, nurses, physicians, and healthcare leaders

While this position is geared towards mid to senior career candidates, exceptional junior candidates will be considered. Prior healthcare experience is not required; this position is open to candidates from different domains (e.g. aviation, defense etc) who are passionate about applying human factors and system safety methods to healthcare. Salary will be commensurate with experience.

This position reports directly to the Director of the National Center for Human Factors in Healthcare and will work closely with the Scientific Director. Qualified candidates will be eligible for academic appointment at the Georgetown University School of Medicine. For consideration, please send your CV to jobs@medicalhfe.org, or email us to learn more or to refer a candidate.

Research Assistant (Full Time)

The National Center for Human Factors in Healthcare has a position open for a full time research assistant: Bachelor’s degree required, research experience and background or knowledge in human factors, safety engineering, or related field are desirable but not required. The Center’s mission is to apply human factors engineering principles and methods to healthcare with a focus on improving safety, efficiency, and reliability in the healthcare/medical field.

The Research Assistant will work closely with Center faculty members and will be responsible for:

- Recruiting study participants and supporting execution of studies
- Collecting research data and supporting data analysis
- Assisting with report writing and dissemination
- Maintaining and updating databases
- Performing literature reviews
- Assisting with grant preparation
- Performing other research support activity such as transcription of audio recordings or coding of data
- Supporting the creation and submission of institutional review board documents

Research scope includes a wide range of human factors methods, including observation in clinical environments, eye tracking studies, data coding, and usability evaluation. We seek individuals who are self-motivated and able to
work with minimal supervision, yet enjoy working as part of a close team. If you are interested in working with a team of researchers at the forefront of medical human factors, please email us at jobs@medicalhfe.org. More information about the center is available at www.MedicalHumanFactors.net.

Minimum Qualifications

Education: Bachelor's (recent completion of degree preferred) in Human Factors Engineering, Applied Psychology, Biomedical Engineering or a related field.

Experience: Approximately one to two years of experience in human factors research is preferred. Healthcare experience not required. Must have familiarity (or be able to quickly gain familiarity) with medical terminology and expertise in Word, Excel, Powerpoint, and internet research skills.

Research Fellow (Full Time)

The National Center for Human Factors in Healthcare is recruiting a post-doctoral Research Fellow to join our growing team. We are seeking an exceptional researcher, with a Ph.D. (or equivalent) in informatics, computer science, or human factors engineering (or a closely related field such as Industrial & Systems Engineering, Cognitive Psychology, Industrial/Organizational Psychology, or Safety Engineering). The National Center for Human Factors in Healthcare is a group of human factors engineers, cognitive psychologists, usability specialists, and clinical experts embedded within the innovation arm of MedStar Health, a $5B healthcare delivery organization with 30,000 employees, 20 diversified healthcare companies and 10 hospitals in the Washington DC & Baltimore region. The ideal candidate is a developing expert in their area of focus. We encourage all to apply and are particularly interested in candidates with informatics and data analytics expertise. The candidate should have knowledge and skills to develop a research project with their mentor, successfully execute that project, and disseminate the research results through journal publications and presentations.

The Research Fellow will be responsible for:

- Establishing a core research project that is relevant to improving the safety, quality and efficiency of healthcare
- Leading the execution of that project from start to finish with assistance from Center research staff and a mentor
- Disseminating findings at national conferences and through journal publications
- Implementing safety innovations in the applied setting through collaboration, both within and outside MedStar
- Serving as an internal expert in their respective research area to advise MedStar Health staff

This position is open to candidates that are recent graduates as well those that may be looking to transition to healthcare. Prior healthcare experience is not required; this position is open to candidates from different domains (e.g. aviation, defense, etc.) who are passionate about applying human factors and system safety methods to healthcare. This position is for a one year term with the high likelihood of extension.

This position reports directly to the Scientific Director of the National Center for Human Factors in Healthcare. For consideration, please send your CV to jobs@medicalhfe.org and clearly identify Research Fellow as the position for which you are applying. Please email us to learn more or to refer a candidate.
Description of the Environment

About the National Center for Human Factors in Healthcare

Located in Washington, DC, the National Center for Human Factors in Healthcare brings together human factors engineers, psychologists, industrial systems engineers, health services researchers, and clinicians to conduct basic safety science and applied research to improve healthcare safety, efficiency, and reliability. A part of the MedStar Institute for Innovation (MI2) and the MedStar Health Research Institute (MHRI), the Center’s home and “research lab” is MedStar Health, academically affiliated with Georgetown University School of Medicine, and includes 10 hospitals and more than 20 health-related companies in more than 120 locations. As an academic and applied research center, the Center’s existence within MedStar Health provides unusual access to frontline, end-user subject groups in both simulated and actual healthcare operational environments. Topic areas are broad, ranging from usability to cognitive systems engineering, teamwork and communication, human-computer interaction, system safety engineering, and sociotechnical systems approaches. The center is supported by consulting contracts, research grants, and by MedStar Health’s commitment to safety. For more information, see www.MedicalHumanFactors.net.

About SiTEL

The Simulation Training & Education Lab (MedStar SiTEL) is the education and training technology group of MedStar Health. MedStar SiTEL is made up of 85 talented individuals working in five primary areas, including clinical simulation, digital media services (virtual simulation and video production), instructional design, software development, and clinical education. MedStar SiTEL maintains its custom developed learning management system (which serves all of MedStar Health as well as outside clients), and operates 5 simulation facilities, including 6500 SF newly renovated center in Washington DC, and a 5500 SF center in Baltimore, MD. More information is available at www.SiTEL.org.

About the MedStar Institute for Innovation

MedStar SiTEL and the National Center for Human Factors in Healthcare are both part of the MedStar Institute for Innovation (MI2), whose mission is to catalyze and create innovation that advances health. The mantra of MI2 is “Think Differently.” The founding premise is that the pursuit of the remarkable will always be trumped by the tyranny of the daily, unless there exists a countervailing energy for seeing and doing further. The MedStar Institute for Innovation focuses on learning, simulation training, information infrastructure, human factors engineering, the built environment, technology commercialization and inventor services, and processes and systems of care delivery.

MedStar Health Research Institute (MHRI)

MedStar Health Research Institute (MHRI) provides a robust research support infrastructure to MedStar Health, including a centralized IRB (covering all hospitals), grants management, biostatisticians, proposal support, and other research support services. MHRI is in the top 20% in total funding received from the National Institutes of Health of all U.S. institutions, with over $35M in sponsored research per year. MedStar Health is part of the NIH-sponsored Georgetown-Howard Universities Center for Clinical and Translational Science (CTSA) research collaborative. Learn more at www.MedStarResearch.org.

About MedStar Health

MedStar Health is the largest integrated health system in the mid-Atlantic region with 10 hospitals and 250 non-acute care facilities in the DC and Maryland region. MedStar Health represents a microcosm of the American healthcare system, representing the broadest possible spectrum of hospitals and patient populations. MedStar has one of the largest graduate medical education programs in the country training over 1,100 medical residents annually. The ten hospitals include large tertiary care/academic medical center hospitals, small community
hospitals, and a university hospital (MedStar Georgetown University Hospital); inner city, suburban, and rural hospitals; teaching hospitals and hospitals staffed only by private attending physicians; and large, medium, and small-sized hospitals. MedStar Health has 30,000 associates, 3,500 licensed beds, 6,000 affiliated physicians, 175,000 annual inpatient admissions, and 1.6 million annual outpatient visits. MedStar Health’s six teaching hospitals have a total of 1100 resident physicians, one of the ten largest graduate medical education organizations in the US. Visit www.MedStarHealth.org.