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Education TG Sessions

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From the Editor

By Michael Rupp, Ph.D.

Hello everyone. Thank you for reading our HFES Student Newsletter. We hope you enjoy reading this newsletter and that it functions as a helpful resource for students.

In this edition, we wanted to shine a light on the accomplishment’s HF students have made, from everyday successes to published research. This includes interviews from the award winner and finalists of the Alphonse Chapanis student award from last year and interviews from recent grads who have taken the next steps on their careers in post-doctorate positions. In this issue and always, we wanted to support the future of HFES. Readers please send us what you have been proud of, and we can include those in future editions.

Before we get to the newsletter, Brittany and I have one more thing for y’all. We have been excited to be your student newsletter editors for the last 4 years. In each issue, we have been able to discuss all of your successes through your educational careers, which has been an amazing part of the job. However, as I am no longer a student and Brittany is finishing her dissertation, we wanted to announce this will be our last issue as editors. In order for the newsletter to grow and thrive, it is our honor to hand the torch over to the next generation of HF students.

Please welcome Ian Robertson as the next student editor! Ian Robertson is a fourth year Ph.D. student in human factors at Rice University. At Rice, he focuses on usability and trust in autonomous vehicles. When not in lab, he enjoys cycling, playing games, reading, and exploring Houston breweries. Brittany and I are excited to have him succeed us in the newsletter, and we know he will do an amazing job. Please join us in welcoming him to the newsletter!
HFES Meeting Information

October 28- November 1, 2019
Sheraton Grand Seattle, Seattle, Washington

Reserve a Spot for the Mentor/Mentee Lunch
Lunches to assist students, early-career professionals, and those in career transition to develop mentoring relationships with established professionals in the field. The luncheons will be held during the lunch breaks on Tuesday, Wednesday, and Thursday, October 29-31. Complimentary lunch will be provided to attendees. Apply here: https://ucf.qualtrics.com/jfe/form/SV_292n0hgmfUjor3v Email questions to Baron C. Summers at baronsc@gmail.com

Apply to Participate in the Student Leadership Development Workshop During UX Day
Are you a student interested in UX? If selected, you will work on a UX challenge with a professional in the society who will serve as your mentor. The goal of this activity is to transfer valuable industry experience from a seasoned practitioner to future industry leaders while establishing a valuable long-term networking relationship that is intended to persist beyond the conference itself. Apply here: https://forms.gle/SYZc955nuZXQiXRv5 Email questions to Adrien Hensley at henslfd4@gmail.com or Amal Ponathil at aponath@g.clemson.edu

Attend Special Session, “Diversity, Inclusion and Social Justice: A Practical Primer!”
This session will be held on Tuesday, October 29 from 4 – 5:30pm. This session builds off of three previous panels organized by the HFES Diversity Committee. Last year’s session concluded with several questions seeking practical, concrete advice and suggestions, so this year we present an alternative format session that will function as a group of mini-workshops: two focused on research, one on broadening participation in HFE and one of inclusive excellence within HFE training and education. Session attendees will develop “how to” knowledge and leave with a network of likeminded peers, colleagues and potential collaborators, and will also have the opportunity to participate in a short survey to guide our future work (Halloween candy is likely to make an appearance!). Check out https://hfss.ise.illinois.edu/research/diversity-and-inclusion-in-human-factors-ergonomics/ for more details.

2019 Education Technical Group Sessions

Tuesday, October 29th
• E1: 11:00 AM – 12:30 PM – Discussion Panel: Understanding Different Career Paths for Human Factors/Ergonomics Engineers
• E2: 4:00 PM – 5:30 PM – Discussion Panel: Moving Forward from the Mid-Career: Path Options and Strategies for Mid-Career Academics

Wednesday, October 30th
• E3: 11:00 AM – 12:30 PM – Discussion Panel: A Human Factors Engineering Education Perspective on Data Science, Machine Learning and Automation

Thursday, October 31st
• E4: 8:00 AM – 9:00 AM – Lectures
• The Interface Design of a Collaborative Computer Science Learning Environment for Elementary Aged Students
• Human Factors Capstone Research at the United States Air Force Academy
• Performance Analysis: Feedback Checklist Versus Traditional Grading

Friday November 1st
• E5: 8:00 AM – 10:00 AM – Discussion Panel: Networking: The Good, the Bad, and the Ugly An Interactive Discussion Panel on Networking
• E6: 10:30 AM – 12:00 PM – Discussion Panel: Instructional Technology in HFE: Systems & Strategies for Promoting Learning and Teaching
Post-Doc FAQs

Post-doctoral research positions are the expected next step after receiving a doctorate for many disciplines. Human factors is often cited as having a high employment outlook, so the desire to complete a post-doc after graduation is often minimal in our field. However, post-doc positions in human factors do exist, and they can serve as a vehicle for getting your foot in the door and gaining additional experience relevant to a more competitive position. Despite being valuable, post-docs are rarely discussed. This article presents questions that we believe our readers would be interested in asking to three professionals who have completed a post-doc.

This year’s HFES annual meeting will have an on-site career center, where you can apply for post-docs and internships in human factors. This is a great opportunity for you to talk to recruiters and gain more information about the positions available to you. There is also an online career center offered by HFES:

https://careercenter.hfes.org/jobs

Dr. Eric Robinson is completing his post-doc at the Navy Medical Research Unit-Dayton in Dayton, OH.

How did you find out about your post-doc?

I don’t have a true post-doc. I started working at NAMRU-D in 2011 as a research assistant while I was still in graduate school. I took on more responsibility as I got closer to graduation and gained more experience, and eventually they hired me as a civilian principal investigator in 2016. I graduated in 2017, and I stayed at NAMRU-D.

Why did you choose that school/company or PI/Lab?

I initially applied for a job at NAMRU-D because I needed funding for my studies. However, I’ve stayed this long because I enjoy the work and I enjoy the people I work with. Working for the Navy provides opportunities to do things and see things that would be very difficult to get anywhere else. It’s very satisfying to work on applied problems. Particularly in a medical lab like ours, it’s nice to feel like I’ve contributed something that can help keep pilots safe (even if only in a small way).
How did your post-doc differ from a grad school?

There’s definitely more individual responsibility. I don’t have an advisor or official mentor that can guide me or critique my work. It’s up to me to design and execute studies using my best judgment. On the one hand it can be stressful, but on the other hand I have more autonomy and I get to work with very little direct instruction from others.

What were some of the challenges you faced?

My background is in human factors psychology, but I work in an aeromedical research lab. I’ve had to learn about physiology, software engineering, etc. to design better studies and to collaborate more effectively with colleagues from other disciplines.

The applied setting is also different from the academic setting because I have to work in a variety of areas. I’ve studied hypoxia, spatial disorientation, fatigue, team coordination, and others. The variety is interesting and I enjoy working on the different projects, but it can be difficult to develop a deep expertise in any one area. I think in a more academic environment I’d be able to focus more narrowly on subject areas and become more specialized.

I also had a lot to learn about how different government funding agencies operate and how to manage research funding. Nothing in my graduate training taught me how to do that.

Workload can be an issue at times. I run multiple projects at any given time, so it can be difficult to make time to read or work on manuscripts. Unlike an academic setting, peer-reviewed publications aren’t heavily emphasized at a military lab. We present at conferences and prepare technical reports, but we aren’t necessarily rewarded or punished based on how many journal articles we produce. We certainly aren’t discouraged from publishing, but we have to make time for it a bit more than in other settings.

What do you do in your position?

I’m a principal investigator, so I’m responsible for conducting research studies at every step along the process from proposal to report. I manage a research team that may include programmers, other researchers, and/or research assistants depending on the project. I make sure the study funds are used correctly and within specified timelines. I also generate reports for the study sponsors and present our findings at conferences or briefings.

How did the post-doc contribute to your goals?

My position has taught me a lot about project management, and it’s forced me to be adaptable and work in multiple domains. As a result I think I could move to almost any applied lab and feel comfortable relatively quickly.

My job has reinforced that I enjoy applied work and that the Navy or DoD is a great environment for researching interesting problems. When I started my graduate training I wanted to maybe start my own research company or perhaps eventually be a director or program manager. After seeing the administrative side of research more closely, I’d like to stay in a PI role as long as possible. I’ve spoken to several people in more senior administrative roles who say they miss actively doing research. I enjoy being in the lab more than I enjoy handling finances or other administrative requirements, and I’d like to do that as long as possible.
What advice do you have for students?

I didn’t get the typical post-doc experience, but I would say try to find something that will let you get a taste of what your goals really look like in practice. I thought I wanted to be a program manager, but found out that isn’t what I really enjoy based on the interactions and experiences I’ve had here. I’d also say don’t do a post-doc just because you feel like you should. If you need a lot of publications or want to go into an academic setting, a post-doc may be ideal for you. On the other hand, a post-doc wasn’t really necessary for me to start my current role.

Are there any opportunities where you work now?

We don’t have true post-doc positions, but we have some potential opportunities. We can take people straight out of graduate school to start working as contractors. The government also has the SMART Scholar program that pays for a portion of graduate school in exchange for service after graduation. Through educational agreements we also collaborate with faculty at Ohio State University and Case Western Reserve, and some of their post-docs have worked with us through their mentors’ collaboration with us.

You can learn more about the laboratories at NAMRU-D on our websites:

Webpage:

LinkedIn:
- https://www.linkedin.com/company/naval-medical-research-unit-dayton/

Facebook:
- https://www.facebook.com/navalmedicalresearchunitdayton

Dr. Claudia Ziegler

completed her post-doc at Rice University in Houston, TX during 2014-2018.

How did you find out about your post-doc?

My former Ph.D. advisor, Dr. Philip Kortum, and dissertation committee member, Dr. Dan Wallach, were awarded an NSF grant to research and develop a new end-to-end, secure voting system in the spring of 2014. Since this was a direct extension of my dissertation work, they encouraged me to consider applying for the postdoc position that would be funded by this grant. At the time, I believe I was the only person—or one of the very few—that had been rigorously studying the usability of e2e voting systems, so my expertise was needed.

Why did you choose that school/company or PI/Lab?

I wanted to do system/product development with integrated human factors research, so the project was what ultimately won me over when making my decision. It also helped that both of the (male) PIs are outstanding researchers in their fields and supportive of women in research. At the time, I had a baby and toddler at home, so I wanted to ensure that I would be able to meet both the demands of work and my children. It was nice being able to leave work to take care of a sick child, and the PIs knew I would still get the work done and did not make me feel bad.

Unfortunately, that is not always the case across all work environments.
How did your post-doc differ from a grad school?

I went home every night at 5:00 pm and did not have to think about work, unless we had a pressing deadline or something unexpected came up that needed to be addressed right away. I also did not experience the pressure and stress of being a graduate student.

What were some of the challenges you faced?

Because I loved what I did, I did not like knowing that my job was going to end after four years and I would have to find something else. On the other hand, not many people know they will have a job for four years as long as their work is strong.

It was a bit isolating at times. I was not a grad student anymore, and at the time, there were no other postdocs to get to know. I was also not a faculty member—even though my supervisors and faculty colleagues treated me as an equal and with great respect.

What does a typical week look like in your position?

I worked 8:00 am to 5:00 pm, five days a week. My days were spent doing things like designing research studies, leading/training/overseeing students who were collecting the data in the lab, working on the design of the system components, analyzing data, writing papers for publication, and meeting with our interdisciplinary team. I also presented research at conferences on a regular basis.

How did the post-doc contribute to your goals?

It helped me because I was able to conduct research and publish it. Having additional publications and design experience has certainly helped me get work. During that period, I also started to get more involved in HFES at the national- and local levels, serve as an ad hoc reviewer for journals, and gain valuable leadership experience.

What advice do you have for students?

Unless you really want to go into industry immediately after grad school, a postdoc is a great way to get to know other faculty and gain additional research experience. It also helped me to figure out that I really wanted to be a researcher.

Dr. Michael Rupp completed his post-doc at The University of California, Riverside during 2017 – 2019.

How did you find out about your post-doc?

When I was getting close to graduating, I looked at several career options. With this I looked at several sources such as the HFES Career Center, Psych Jobs Wiki, job boards from different professional societies like APA, APS, etc. I ended up seeing my postdoc job on the APS Postdoc Exchange. The posting talked about studying cognitive changes with age which was similar to the work I was doing with my graduate advisor, so I emailed to ask if the job was still open. That led to my interview.

Why did you pursue a post-doc?

The primary factor was getting more experience looking at physiological measures and programming which were skills I had been interested in for a while.
My graduate work had been in human factors and aging, so it looked like a good fit to continue that research. I also looked at location, having the opportunity to explore something new, personality of my new supervisor, the skills required. Because post-docs can be temporary, they can be a good opportunity to try out new skills or live somewhere new without too much commitment.

**What was the interview process like?**

After I emailed the Lab PI, we exchanged a few emails about the position and my skills including sending in my CV. Then we scheduled a Skype Interview and a Skype Interview with the other students/researchers in the lab. Finally, I had a 2-day in person interview. Here, I gave a job talk and met with other researchers in the department and collaborators. We talked about what research we would start with if I were to join.

**How did your post-doc differ from a grad school?**

The experience was a lot different from graduate school. First, you don’t have to take classes and your focus is 100% research, but it is more than that. I was expected to be an expert and a leader in taking ownership in moving the research along. While this is what I did in graduate school the expectation was always that you are a student and still learning while as a postdoc you are a lead researcher and have to take more initiative. Next, working at a university was strange because you are not a student and not faculty, but something in between. I really wasn’t sure where I fit within the lab and the university as a whole, which was a little strange.

**What were some of the challenges you faced?**

My biggest challenge was working in a field I did not have a lot of experience with. My background is in human factors, but the lab I was working at was more of a basic science cognitive neuroscience lab. This required me to learn a lot more about the brain, MRI, neurological differences due to age than I had gotten during graduate school. While this was challenging it was also exciting and I learned a lot during my time in the lab. Other challenges were learning what my role was in the lab and university and how I could contribute to research overall while still being a neophyte in cognitive neuroscience.

**What surprised you about the experience?**

While the research was far different from what I was studying in graduate school a lot of the techniques were applicable. I was surprised with how much I learned in terms of writing and programming that I can apply to any research I do in the future. I was also surprised about how little time I spent creating new studies versus analyzing existing data and how long it would take to run a single analysis. I would spend an entire week running a single analysis.

**What advice do you have for students?**

I would ask them to consider why they want to do a post-doc to make sure they maximize their experience. It’s a good position to learn new skills, explore new research topics, and to gain more research experience. I would also say to remember that a post-doc is a temporary job so you need to maximize what you get out of it since you will not have enough time if you do not hit the ground running. I would also recommend getting to know the other post-docs in your lab and in other labs. These are people that could become great research collaborators.
Research Corner

For this edition of the research corner, The ETG Student Newsletter wanted to highlight recent award finalists and winners for the Alphonse Chapanis Best Student Paper Award. Congratulations to David Azari for winning the award and Josh Domeyer and Dengbo He for being finalists for the prestigious award.

Can Surgical Performance for Varying Experience be Measured from Hand Motions?
By David Azari

As an eight-year-old, I decided to test (and soon would reject) the hypothesis that flying was simply a matter of effort (sorry, parents). After the surgery, and still to this day, one of my arms remains almost an inch longer than the other. Having recently graduated from the University of Wisconsin-Madison (UW), where I had the chance to work with excellent surgeons and researchers, I am reminded how grateful I am for the skill of those who ably stitched me back together – just as I am for the professionals who refused, acknowledging they weren’t yet experienced enough.

What does expert surgery look like, and how do you know? This was a question I was eager to take on as a graduate student, and lucky enough to investigate in collaboration with the surgical staff at UW Hospital and as a member of the UW Ergonomics and Biomechanics Lab, run by Dr. Robert Radwin.

Most surgical evaluations are subjective, but there is a growing emphasis on using “surgical data science” to help develop objective standards. Figuring out how to consistently and automatically measure surgical performance could help facilitate training, assessment, aptitude testing, placement, remediation, and timing of professional transition or retirement.

To explore this idea, we built software to identify and track hand motions for complex tasks, and I went on the hunt for three things: (1) measurable and objective differences in hand movement from clinicians with a range of experience, (2) a way to use computer vision to automatically recognize attributes of superior performance, and (3) evidence to support generalization and extrapolation of performance scores into open surgery.

During last year’s annual meeting, I presented work where I recruited clinicians of various experience to have their hands recorded as they performed a common suturing task. Each participant rated their performance along a series of scales, as did an expert panel. These ratings served as ground truth to train machine learning algorithms to identify how fluid, efficient, gentle, and coordinated a surgeon was. The best prediction models were for fluidity and efficiency of movement, and translated reasonably well to the open surgical room, where irregular postures, errors, and contextual changes to handle friable tissue provided a good testing ground for the various models.

We also noticed that while attending surgeons completed the task more quickly, they accelerated less frequently, accelerated less overall, and generally moved their non-dominant hands slower while tying.
Clinicians also balanced workload differently: medical students and residents exhibited differences in speed and acceleration for dominant hands, while resident

Real time video capture of surgical motion without sensors or markers represents a great opportunity to automatically segment, process, and assess performance before patients are put at risk. The performance attributes mentioned here, among many others, could be wrapped up into a formative assessment feedback tool; able to capture, analyze, and display objective performance measures for standard training tasks. It was a compelling dissertation and research topic, and I look forward to continuing this!

**Characterizing Driver Trust in Vehicle Control Algorithm Parameters**

*By Josh Domeyer*

Josh Domeyer is a PhD student in Industrial and Systems Engineering at the University of Wisconsin-Madison. His research focuses on the interaction between vehicle automation and people and the use of unique methods to understand this interaction. Specifically, he is interested in how kinematics can be used to communicate vehicle intent to pedestrians. This topic piqued his interest while reading literature on how robot behaviors can be communicative and can influence feelings of trust and politeness. He is interested in the topic because many on road interactions are social. Taking these interactions into account in design may be essential to the success of automated vehicles.

His work that was recently nominated for the Chapanis Best Student Paper Award, "Characterizing Driver Trust in Vehicle Control Algorithm Parameters", follows this line of research by using Bayesian methods to estimate how vehicle behavior affects trust of the rider. Bayesian methods allow for a researcher to estimate probabilities and define prior distributions based on previous studies. This technique allows a researcher to build upon previous studies without the need to include all research conditions.

When Josh learned about this tool, he became interested in linking several studies that had been conducted in the Cognitive Systems Laboratory and develop a way to estimate how vehicle behavior affects trust. He believes that the method may help studies with smaller sample sizes be more efficient.

**Anticipatory Driving in Automated Vehicles**

*By Dengbo He*

As a fan of new technologies and with a background in vehicle engineering, I am always excited about the advances in vehicle automation. However, recent automated-driving crashes remind us that automation is never a panacea: it can bring lots of benefits but may also lead to catastrophic results if designed inappropriately. This is the reason why I focus my research on driver-automation coordination: a rapidly expanding area that needs
further research. Until a self-driving vehicle is capable of taking full responsibility, the driver’s task will increasingly transform into the monitoring of, and coordination with, vehicle automation while being exposed to several information sources, both related and unrelated to the driving task. Current state-of-the-art systems, e.g., Tesla Autopilot, require drivers to visually monitor the driving environment and the automation, while at the same time anticipate how a given situation may evolve, in order to intervene in a timely manner when necessary. However, drivers are not always able to step in when the automation fails to perform its tasks. Research is needed to better support the coordination between the driver and the automated vehicle functions.

Although advancements in sensor, computation, and control technologies have made automated vehicles a reality, vehicle technologies usually take two to five decades to saturate their potential market, and currently, SAE level-2 or 3 automation is the state-of-the-art vehicle-automation technology. For these levels, if drivers can anticipate how a given situation may evolve, they would have a higher chance of building up their situation awareness and intervening in time when an action is necessary. Anticipatory driving behaviors are known to develop with driving experience and can increase safety margins in non-automated vehicles. However, we have limited knowledge of anticipatory driving behaviors in automated vehicles, especially when distraction engagement becomes increasingly prevalent as drivers no longer need to monitor the environment at a rate similar to non-automated vehicles. I am interested in understanding and supporting anticipatory driving behaviors in automated vehicles.

As the first step in my PhD research, we conducted a driving simulator experiment investigating the effect of visual-manual distraction on anticipatory driving in non-automated vehicles. The findings were reported in a 2018 HFES conference proceeding paper, which was nominated as one of the three finalists for the Alphonse Chapanis Student Paper Award. The results from this experiment will be compared with the results from my following experiments that have been conducted in simulated SAE Level-2 automated vehicles with adaptive cruise control and lane keeping systems working simultaneously. The objective is to assess anticipatory driving in automated vehicles for both novice and experienced drivers when distraction is involved. As a final step, we will investigate ways of supporting anticipatory driving in automated vehicles, in order to help drivers, act safer in critical situations even when they are being distracted from driving, again, with both novice and experienced drivers considered. The long-term objective of my research is to improve our understanding of driver behaviors in automated vehicles and provide guidance on designing in-vehicle interfaces to support automated driving.
Student Chapter Spotlight

Human Factors is for Everyone: How the Purdue University Student Chapter Promotes Undergraduate Involvement

By Isis Chong & Jackie Cha

Purdue University has a rich history of human factors research that spans over 100 years, which was introduced by Frank and Lillian Gilbreth at the start of the 20th century. Since its founding in 1993, our student chapter has aimed to continue to reflect the interdisciplinary culture created decades ago.

Arguably, our chapter’s greatest strength is its interdisciplinary nature: our co-presidents and co-advisors are from both psychology and industrial engineering. Similarly, our members are housed in disciplines that span engineering and social sciences (e.g., biomedical engineering, aviation, computer graphics technology). Although we showcase a diverse membership base, two years ago, we realized that we were failing to include a group that could benefit immensely from involvement in the society: undergraduates. The members of our chapter were previously primarily graduate students, and little emphasis was placed on undergraduates. Since this realization, our chapter has worked to transform our operations to become more inclusive. In what follows, we highlight our efforts to ensure that the study of human factors is within reach of all students.

We have promoted undergraduate participation in three critical ways. First, we now participate in both formal and informal recruitment efforts, including setting up informational tables with other
undergraduate student organizations throughout the academic year. Although this involvement seems intuitive, we had previously directed recruitment efforts to graduate students but not to those just beginning to shape their careers. Outside of attending undergraduate research fairs to disseminate information, we have actively advertised in undergraduate courses across disciplines.

Second, our chapter took note of what undergraduates look for in student organizations. Informal polling made clear to us that undergraduates are most interested in volunteering in the community and receiving mentoring from more senior students. To better cater to undergraduate interests, our chapter has become involved in several K-12 outreach activities. These activities included Purdue’s Space Day, an all-day event during which students learn about aeronautics and aviation and participate in hands-on activities. Additionally, we partnered with Purdue’s College Mentors for Kids, a program that connects school-aged children to college students to teach them about different disciplines. Beyond volunteering, we have begun to hold workshops for undergraduates centered around professional development and research.

Lastly, and most importantly, our chapter now makes a concerted effort to encourage undergraduates to join our executive board. In the last two years, we have had six undergraduates serve as officers whereas in the two years before that, we only had one. By taking a more active role in our chapter, undergraduates have gained a say in determining how our chapter functions and how the chapter will continue to grow in the coming years.

Our efforts aimed at increasing undergraduate participation have been successful. We encourage other chapters to also reflect upon what population(s) they could better serve. The diversity that has been introduced into our chapter has allowed us to grow and develop in ways that we did not expect. Through our efforts, our chapter has been able to expand the reach of the human factors discipline. For more information about the Purdue Chapter please visit: https://hfespurdue.wordpress.com/join-us/
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