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Usabilathon – 2017
By Spencer Kohn

The third annual Usabilathon was held on March 25th at the Fors Marsh Group User Experience Research Lab and offices in Arlington, VA. Nineteen students participated—most graduate students from the HFAC program, along with a few undergraduates from the computer science and psychology programs. During the 12-hour competition, students applied research and development skills acquired via Dr. Furman’s research methods class, as well as skills learned in the four Usabilathon prep series, which covered topics from usability testing to wireframing.

These skills were tested by the project provided by Facebook Inc.: evaluating three social media applications, improving Instagram usability for a targeted re-release in three different cultural markets, and proposing a plan for long-term user testing of the updated app. The competition was tough, but the Red Team—comprised of Jose Calvo, Lisa Baraniecki, Amy Swallow, and Azraf Ullah—won the event with their innovative concept for “Vibe”, a photo sharing and messaging app.

The Usabilathon was made possible thanks to the hard work of our many sponsors and supporters. Our host Fors Marsh Group and project provider Facebook Inc. both worked extremely hard to make this event a success. We received crucial support from our sponsors at MedStar Health, MetroStar Systems, ICF, CSRA, and Perceptronics Solutions, and our four judges—Sara Mastro, Dr. Jen Romano-Bergstrom, Richard Kitchen, and Dr. Susanne Furman—who made the event possible.

The Usabilathon seeks to bring together industry and academia as a platform to showcase and promote the fields of human factors and usability research. This competition serves as an advocate for the HFAC program, while providing another source of practical experience for students. In these regards, the 2017 Usabilathon was a stellar success, and we look forward to planning the next competition for Spring of 2018. If you are interested in learning more about this event, please e-mail us at Usabilathon@gmail.com
New Faculty Interviews with Amanda Harwood

Dr. Yi-Ching Lee

What was the best thing about your previous job?

I got to know about many safety issues in the medical world, how medical scholars think about and their approaches to accidents and problems. I also experienced working with a very diverse group and have established amazing collaborations since then.

What drew you to Mason?

I missed the academic environment, the scholarly stimuli and atmosphere, and interacting with students and creative minds. I was also attracted by the George Mason’s Human Factors and Applied Cognition program’s reputation.

What past project are you most proud of?

I am most proud of a set of projects for which I developed new methodologies and new analytical approaches, including the development of stress induction techniques, dynamic driving scenarios, a data-mining-based feedback mechanism, and the collection of close-to-naturalistic behaviors in a lab setting.

What current or upcoming project are you most excited about?

I am excited about my National Science Foundation (NSF) project – we are aiming to better understand and quantify driving behaviors among ADHD drivers, especially when their medications are irregular.

Tell us something about yourself that our readers might like to know

I enjoy reading novels and taking long walks in my free time. Interested in going for a walk with me? I always have new ideas for papers and proposals after the walks 😊

Dr. Lee can be contacted at ylee65@gmu.edu
Dr. William (Deak) Helton

What was the best thing about your previous job?

The location was nice (South Island, New Zealand). One of the few places you could surf and snowboard in the same day (another would be California). They had fantastic technical support, including dedicated staff that could build things, full-time programmers, and other facilities for us.

What drew you to Mason?

The biggest draw for me was to be close to my family - they’re in Ohio. In regards to Mason specifically, it was the reputation of the human Factors group, really. I already knew Tyler (Shaw) for many, many years. Everyone in the program are pretty cool; it is an excellent team.

What past project are you most proud of?

When I was at Michigan Tech, I was working on this remote scent sampler with dogs, called Remote Explosive Scent Tracing. Instead of bringing the dog to the explosives, you bring the explosives - or really an air sample - to the dog. This removes extraneous resource demands so the dog focuses on the sample. It was a real-world issue and also a bit of a tinkering project.

What current or upcoming project are you most excited about?

This spider vigilance stuff is pretty cool. Jumping spiders actively hunt and have two forward facing eyes that can actually sort of foveate. It sits on this track ball and you display things on a screen and it will respond to a target by turning or orienting to it. We can tell they have a decline in performance. We think it’s vigilance since we’ve ruled out sensory habituation.

Tell us something about yourself that our readers might like to know

I’ve had an interesting background as far as places I’ve lived. For example, I grew up in a place called Dutch Harbor, Alaska which is very remote - the nearest McDonalds was a 3 hour jet plane ride away.

Dr. Helton can be contacted at whelton@gmu.edu
Dr. Martin Wiener

What was the best thing about your previous job?

Most recently, I held an AAAS Science & Technology Policy fellowship with the National Science Foundation. It’s a unique program that temporarily places PhD’s in the government. I worked on big data and analytics. I liked working with the different people all focused on advancing science across the country.

What drew you to Mason?

George Mason is close to home. I was already familiar with the school, having worked here before. I missed George Mason’s collaborative environment. Many universities are competitive and closed off. Here at George Mason, I feel like we draw on our shared strengths.

What past project are you most proud of?

I’m very passionate about open data and resource sharing in both neuroscience and psychology. While I was at the NSF I helped organize a workshop on the topic. It was wonderful to see 50+ people - from both human and animal research - in one room all discussing how to bring more openness to the field. (Want more? Click here for the related Neuron paper)

What current or upcoming project are you most excited about?

Right now, I’m working with Wil Joiner in the bioengineering department. We are looking at how people make decisions using a robotic arm. Participants have to select their choice by moving the robotic arm to the target. It’s really fascinating seeing the path the arm takes and how people can change their minds.

Tell us something about yourself that our readers might like to know

I’m new faculty, and I don’t have much of a lab. I am, however, very interested in working with students, especially with the TMS [Transcranial Magnetic Stimulation] equipment. We have such a wealth of equipment and it’s underutilized. I’m happy to chat with anyone about any brain stimulation ideas they have.

Dr. Wiener can be contacted at mwiener@gmu.edu
Editorials

Data Visualization: Keep it Simple, Stupid

By Sam Monfort

I’ve heard that English is a powerful language because it can express complicated ideas with only a handful of words. A study on language translation found that, on average, translating something into English from another language shortened the number and length of words by around 10%.

Data visualization, like English, is powerful for its ability to communicate ideas succinctly. As cognitive scientists, we know that our audience has a limited capacity for processing information. They say that a picture is worth a thousand words, so translating our findings into visual form communicates meaning while preserving the cognitive resources of the audience.

But graphs, like language, can be abused. We’ve all had that sentence: the one we work tirelessly to perfect, fusing clauses together with commas and semicolons like we’re making Frankenstein’s monster. But in the end, maybe it would’ve been better had we stuck with writing two separate sentences. Or maybe it wasn’t the best idea to scrape out “pedagogical” from the thesaurus.

1 http://www.globalization-group.com/
I’ve learned recently that just because you can put something on a page, doesn’t mean you should. Take a look at this regrettable Frankenstein I stitched together last month.

Yeah, there’s a lot there, but turning a page and seeing that graph is like having an airbag explode on your face. Visualizing data should strike a careful balance between presenting data simply and presenting it completely. In the end, a reader should be able to digest a graph faster than they can read text describing the same effect. So, let’s think about graphing like playing chubby bunny: after a while, you should really stop cramming more in there.

**Cognitive Behavioral Neuroscience Techniques: Noninvasive Brain Stimulation**

*By Martin Weiner*

Noninvasive brain stimulation (NIBS) is a technique rapidly being adopted in cognitive neuroscience. The advantage of NIBS is the ability to investigate the necessity or sufficiency of parts of the brain in a given function. Moreover, new and refined methods being developed with NIBS now allow us to determine how the stimulation of one part of the brain impacts activity at sites distal from the stimulated region, impacting networks of brain regions, otherwise known as the “connectome”.

Two methods of NIBS are available at Mason, both of which are capable of asking very different questions about how the brain works. Transcranial Magnetic Stimulation (TMS) is a method wherein electricity passed through a coil of wire generates a magnetic field, which bypasses the scalp, via electromagnetic induction, to generate another electric field within the brain. TMS has the advantage of being both spatially and temporally specific, by stimulating a region on the order of 1cm³ for 10ms.
Further, TMS may be repetitively administered in a variety of patterns, each of which can impact neural tissue in different ways, such as by exciting or inhibiting the underlying region. By combining TMS with an MRI scan, investigators can pinpoint the exact site of interest within the brain, allowing researchers to generate well-formed anatomical hypotheses.

In contrast to TMS, transcranial electrical stimulation (tES) is a more spatially coarse technique, wherein weak electrical current is sent through electrodes applied to the scalp. tES may be administered in direct (DC) or alternate current (AC) modes. For the former, tDCS offers researchers the ability to stimulate broader regions of the cortex than would be possible with TMS. For the latter, tACS allows researchers to specify the frequency of stimulation; the strength of this technique is that the causal contribution of brain-specific oscillation frequencies may be investigated. tACS has been rapidly growing in prominence in cognitive neuroscience research for this ability, in which the role of various frequencies can be causally addressed. By combining tES with current source modeling methods, the electrical field generated within neural tissue by a particular electrode configuration can be simulated, thus allowing researchers the ability to measure the distribution of current across the cortex and within regions of interest. By combining this technique with individual anatomical scans, custom montages can be determined for each subject to maximally stimulate a given area. Finally, NIBS methods, including TMS and tES can be combined with other imaging methods, such as fMRI and EEG, thus greatly increasing the investigatory power these techniques offer for understanding and impacting brain function.
Where Are They Now? Checking in With Recent Graduates

Melissa Smith
User Experience Researcher at YouTube

Life has been pretty crazy since graduating last year! I am a user experience researcher for the YouTube main app (aka mobile app and desktop site). Specifically, I'm conducting research on the video watch page. (Have you tried double-tapping to fast forward/rewind a Youtube video in the mobile app yet? That's one of the first things I got to research when I joined last summer!) One of the best things about this job is being able to ask all the questions I've always had about Google products and get actual answers about them. One of the things I miss most about grad school is getting to do research for research-sake and not having to necessarily tie it to a product. Outside of work, I am still actively volunteering with FIRST Robotics, dancing ballet, and actively exploring the San Francisco area.

Cyrus Foroughi
Post-Doc at U.S. Naval Research Laboratory

I am currently completing a one-year post-doc at the U.S. Naval Research Laboratory (NRL) in DC. As many of you know, my personal interests are mostly experimental research-oriented (as opposed to user-experience for example). Thus, working at NRL is a perfect fit for me because it is a pure research institution. I completed a summer internship (NREIP) with this lab and liked their work so I decided to stay on. If you are interested in seeing how other research labs work, definitely apply in the Fall (and email me about it). Our lab historically takes 2-3 people per summer. Oh, it pays well too!

Most of my work involves better understanding how pilots control unmanned aerial vehicles (UAVs). More specifically, we are running a bunch of experiments to better understand how workload, fatigue, and boredom affect operator performance, and how automation and task allocation affect performance. We also use physiological measures (mainly eye-tracking) to better capture attention and workload in real-time. For example, pupillometry has been a great proxy for workload in our work. Although this work is applied, we have been doing some more basic research as well. For example, investigating how pupils change in response to learning.
Ryan McKendrick  
*Cognitive Scientist at Northrup Grumman Corporation*

After successfully defending my thesis on curvilinear hemodynamics associated with cognitive load states I was recruited by Northrop Grumman Corporation. They flew me and my family to California where I could start being an adult (because grad students are still just overgrown children right?). Currently I’m doing fun things like giving research grants to GMU, and leading research at the intersections of human augmentation, autonomous systems, and advanced data analytics. It’s a pretty sweet gig, except when it’s not (i.e. corporate management is evil… j/k… maybe).

Those who knew me well in Grad school could tell you I never intended to accept an industry position. Further, those who knew me before Grad school could tell you I never intended to live in California. Thus leading to my advice to the current students; don’t assume to know where you will end up when Grad school is over. Ensure you know how to conduct research, real research. Ensure you are a master statistician. Ensure you read the literature… a lot. Ensure you write and can write a lot (Thanks Raja). Finally, learn to sell yourself (i.e. skill and ideas). It’s very rare you will sell yourself too hard, and even rarer that someone else will sell you as much as you need. Follow these suggestions and its likely you will end up where you need to be.

Ben Ruggeburg  
*UX Researcher at GEICO*

While at GMU, I was given an internship opportunity with GEICO and was offered a full-time position upon graduation. At GEICO, I use my research skills to discover problems people have with buying, using, and learning about insurance. I’ve been able to use methods learned from GMU such as task analysis, ethnographic research, surveying, and user testing. But I haven’t stopped learning. In the fast-paced industry world, I’ve had to adapt to conducting research in remote and often unmoderated conditions. Next, I’ll be moving to Chicago to coach 30 different product teams on how to create user-focused experiences.
2016-2017 Events

Secret Santa and Holiday Bakeoff

New Student Orientation and Happy Hour
Human Factors and Ergonomics Society Annual Conference
Publications, Proceedings, Presentations, and Awards

Journal publications


**Conference proceedings**


**Posters**

Esser, E., & Peterson, M.S. (November 2016) Effects of Anxiety on Attentional Disengagement from Neutral Faces of Other Races. 24th Annual Workshop on Object Perception & Memory, Boston, MA.


**Grants**

Dani Barragan: 2016 ISOES Best Student Paper Award

Melissa Scheldrup: Undergraduate Research Scholars Program (USRP) grant. Mentor. Predicting an individual's skill acquisition from cognitive ability and neural activation, 2016-2017


Yi-Ching Lee: "Diagnostic Driving: Real time driver condition detection through analysis of driving behavior,” Sponsored by National Science Foundation, Smart and Connected Health program, collaboration with Drexel University and University of Central Florida

**Books and Book Chapters**


**Other**

HFES Bulletin article: HFES Promotes HF/E at USA Science and Engineering Festival by Melissa Scheldrup and Gary Orr [http://www.hfes.org/web/HFESBulletin/May2016USASEF.html](http://www.hfes.org/web/HFESBulletin/May2016USASEF.html)
Dani Barragan: Elected by President Cabrera to serve on the OSCAR Student Scholarly Activities Committee

Debbie Boehm-Davis: Member, Intelligence Science and Technology Experts Group (ISTEG), a group developed by the National Academies of Sciences, Engineering, and Medicine to support the Office of the Director of National Intelligence, 2015 - present

Debbie Boehm-Davis: Member, Organization of Scientific Area Committees Human Factors Committee, National Institute of Standards and Technology, 2014 - present
About the Archie
The Archie Newsletter is put together by graduate students in the George Mason University Human Factors and Applied Cognition Program (HFAC). The Archie is intended to be published twice a year, after the Fall and Spring semesters for each academic year and is distributed to the Faculty, Students, and Alumni of the HFAC program.

If you are interested in contributing to the next edition of the Archie or have any questions or comments please contact Amanda Harwood (aharwood@gmu.edu) or visit the Human Factors and Applied Cognition Website (http://humanfactors.gmu.edu/).

About the Program
The graduate program in Human Factors and Applied Cognition (HFAC) provides instruction and research training (MA and PhD) for students wishing to pursue careers in the academic, public, and private sectors. A certificate program in usability is also offered. Across all areas, a strong emphasis is placed on students developing a good understanding of cognitive theory, acquiring advanced methodological and statistical skills, and learning how to apply these tools to real-world human factors problems. The program is accredited by the Human Factors and Ergonomics Society.

The program emphasizes three primary areas: human factors, applied cognition, and neuroergonomics.

For Alumni
We’d love to hear from our alumni and what they’ve been doing since graduation! Please keep us informed about your movements, and we’d always love to have contributions in the form of announcements, articles, or visits!

Acknowledgements
A special thanks to all of our contributors for the current issue:

Editors:  Contributors:
Amanda Harwood  Dr. Yi-Ching Lee
Bridget Lewis  Dr. William (Deak) Helton
             Dr. Martin Wiener
             Ben Ruggeburg
             Cyrus Foroughi
             Melissa Smith
             Ryan McKendrick
             Sam Monfort
             Spencer Kohn
             All those who sent in Publications, Proceedings, Presentations, etc