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Welcome

I am thrilled to be leading our HFES student chapter this year – I have had a great example from our past-president Ewart de Visser, and I can only hope to live up to his legacy. The Arch Lab has said goodbye to one of its’ valued members, Dr. Chris Kello, as well as several MA and PhD graduates. However, we now have an impressive new class of students, who you can read about later in the newsletter. One of those new students is our editor-in-chief, Andre Garcia, who is keeping the tradition of our biannual newsletter strong. The Arch Lab has enjoyed an impressive amount of involvement from current students as well as alumni and friends of the Arch Lab, which make this more than just a center for research and learning – we are a strong and vibrant community. My goal this year is to foster that community spirit, and to strengthen the ties that bind students, faculty, alumni and friends to the Arch Lab.

One of the main projects for this year is to get our new website up and running. This has been an ongoing project for the past two years, and we are finally to the point where it will be realized. The new website is being built as I write this, and with some work to transfer content, we should be launching it in the spring. One of the features of the new website will be an alumni section, with news and relevant information for our alums. Although the newsletter has served as a good way to communicate with alumni, it only comes out twice a year. We hope to provide more information on a more regular basis using the website.

In closing, I’d like to thank you for taking time out of your busy schedule to keep yourself informed about the current state of the Arch Lab. If you have suggestions on how I can foster more alumni and community interaction, I would welcome your comments at jbarrow1@gmu.edu.

Newsletter Staff

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**A Sit–Down with Susanne Furman, Ph.D.**

By Daniel Roberts

Susanne Furman, Ph.D., is an alumna of the ARCH Lab, and recently served as Adjunct Professor teaching a course in Web Usability during the fall '08 semester. Susanne has worked on usability for several organizations, including IBM and GE, and is currently a Usability Engineer for the United States Department of Health and Human Services (HHS) based in Washington, DC.

**DR: Would you describe what you do at HHS?**

**SF:** I work as a liaison with other operating divisions inside of HHS - HHS is the mother division to places like CDC, NIH, FDA. I'm always available to help them with designs, or other things they may need, such as graphics. I can be involved with building the homepage design, or working on internal projects, such as pandemicflu.gov, or healthit.gov. Anything that might be an initiative of the Secretary of HHS - lots of times we'll build those websites. Also, I construct the information architecture and make sure there's content, build around the content, help to format reports, and develop power point slides to take to the President, because you won't believe what people think are acceptable, even with charts and graphs. I think in this major, you naturally look at it as a user. Lots of things I never thought I'd do, I do.

**DR: How did you get into doing usability over other types of applied psychology?**

**SF:** You know, when I was an undergraduate, I had an Apple (computer), and I had a mouse and I clicked on things. I did statistical analyses, and I would say 'I'd like to see this as a chart, I'd like to see this as a graph, I'd like to see this as a table' and it would bring this to me. Then all of a sudden, I got into a world where there was DOS, and I was like 'where's my mouse?' I don't 'do' function keys, I point and click. So I always wondered why we all couldn't have that interface. The computer human interface has always been an interest area of mine, more so than anything, not that I didn't find anything else fascinating.

And of course here (ARCH Lab) they say you have to pick a specialty area, so I thought 'well, this is kind of cool.' Usability was at it's infancy then, and I didn't really know there were those types of positions. I went from working as a federal government employee being a cooperative appointee, to when I got my degree, trying to get a job as a usability engineer. Now they've branched to information architecture, which is a part of usability, and actually creating content because people forget that all of that has to be usable. You can have a beautiful interface and poor content, or content that people can't even read. So it's all part of having a usable website or a usable web application. I decided that's what I wanted to do and it was kind of a fun job, and we started learning to build high level working prototypes, and usability testing. At IBM I got to do international usability testing, which was a lot of fun, because people from different countries look at [web sites] differently.

**DR: For students who are interested in getting into usability, what other types of classes outside of Human Factors would you recommend?**
SF: Human Factors is big - I would recommend the 508 accessibility class you have here, that would be great. Things are more research based at a University than they are practical, so if you can take those kinds of things, like you take Gestalt psychology and might not ever think that has anything to do with a computer human interface, but it really does, and you can take lots of that stuff and try to apply it. For example color theory – I never really paid a whole lot of attention to color theory – but I wish I would have, because color theory really talks about perception. I would recommended cognition classes and perception classes, and try to get myself some kind of internship somewhere, where you can actually apply those things. What I tried to do in this class (PSYC 734 Usability / Web Guidelines) was to bring in the practical kind of things that you're going to have to do when you get a job.

It's a good idea to learn a lot of the cognitive perceptual things, but then to try to get some of the more practical things like [Adobe] Dreamweaver classes, 508 accessibility classes, and any other class where you can get a little more practical experience because when you get a job, you're going to understand a lot of things, but you're not going to be able to necessarily apply them. But what my Directors have often told me is that what they really like is critical thinking, and I think that in Human Factors and that at George Mason you learn critical thinking and you learn that there's never any right answer, just advantages and disadvantages of doing things different ways.

DR: Can you comment on the differences between usability tests and research, in your experience does industry take established usability research into account?

SF: They do. In the private sector, not as much as government, there's always the need to get the product out the door. So, they have a team, and they'll have maybe an information architect, a database architect, some development people, the project team and subject matter experts, and they'll bring in a usability person if they're a smart company. They don't want to hear about research, they want you to tell them how to do something; they want you to give them a design and be able to work with the rest of the team to come up with a design that's functional. They expect you to understand that research, they don't necessarily say, 'what research supports your design.'

Lots of times you can supplement your design, or critique a design [using past research] and say this is really why you don't want to do this, this is a disadvantage of what you're doing.

Usability tests – a lot people say 'well that's research,' and it's not. A usability test is an interface that you look at, compare if the task that you think people come to your web site or web application [to complete] are the ones that they're coming there to complete, and then you look to see how your interface facilitates that, and if people can find information. Which is really not research, if you took multiple interface designs, and you presented them to a randomized group of individuals, and then compared them through statistical analysis, then it becomes research. But most companies don't have time to come up with four or five research designs, they want one and they want to see if those tasks are facilitated.

DR: Are there any websites that you think are particularly good or bad?

SF: You know, there's actually a website you can go to that basically tells you the worst websites and the best websites, and sometimes when I go look to see what these award winning web-sites are, I'm like 'oh my god, these are horrible.' A good website is one that is always trying to improve things – off the top of my head I don't know any, I know lots of bad ones. CDC has a bad website, FDA has a bad website design, HHS is trying to improve what they have but even so it has its limitations.

IBM's intranet, which you won't be able to see, is a phenomenal design, it comes in as one of the top ten designs, and they've kept it as simple as they can and they've made it a portal to get to other information, so that's a really good one although you'll never see what it looks like unless you become an IBM employee. If you look at GE, GE has a phenomenal website, it's not hard to find out what GE does and how to get to the different things that GE does. IBM has a fairly good [external] website although they have a lot of products. Federal Government – there's not really a whole lot of good Federal Government websites out there so I can't really even come up with one, and most of them are going down a bad road with the way they're doing their interface designs. I'd have to say probably one of my favorite designs is the GE one, followed by IBM, and not because I worked there. What's appealing about the IBM website is it's very simple, and it's the appealing images that they use to get your attention, because it's really rather boring to have a top branding bar with navigation and that's about it.

There are not many good federal government websites out there, but they're in their infancy, as compared to the private sector, because they're just learning how you actually build your information architecture around tasks, what people are coming to find, rather than 'here's our org chart,' and 'here's who we are.' The Federal Government is just a little bit behind but they really are trying to come into a new model where they have customers and the customers are the taxpayers who are trying to find information.
George Mason’s fall 2008 incoming class brings new energy, fresh ideas, ambition, and dedication to the HFAC program. With such a diverse group of students from a variety of backgrounds, experience, and research interests, and with many new students breaking ground on their research as early as the summer before they began, the Human Factors and Applied Cognition program at George Mason University has a bright future for many years to come.

Alyssa Andrews is a first year student in the Human Factors and Applied Cognition M.A. program. She graduated from George Mason University in May 2008 with a B.S. in psychology. She is originally from the Chicago, Illinois area but moved to Fredericksburg, Virginia when she was eleven years old. Her research interests include memory, attention, and the neuronal basis for memory and attention. Currently, she is working with Professors Raja Parasuraman and Pamela Greenwood on research involving the genetics of cognition in middle aged adults.

Kelley Baker is a first year master’s student in the Human Factors/Applied Cognition program. She grew up in the New Orleans area, but has lived in Northern Virginia for quite a while. She received a B.S. in Chemical Engineering from Rice University. When she finishes her master’s degree, she would like to return to work somewhere that she can use both her engineering background and human factors. Currently she is working with Dr. Debbie Boehm-Davis on research for the FAA.

Jennifer Chen is a first year Masters student in the Human Factors and Applied Cognition program at George Mason University. Her undergraduate education took place at University of Pennsylvania where she majored in Biological Basis of Behavior and minored in Consumer psychology. She is interested in usability and human-computer interaction. She is currently working on attention and perception research under Matt Peterson and James Thompson.

Ellen Clarke is a first year Masters student in the Human Factors and Applied Cognition psychology program. She graduated in May 2008 from the distinguished majors program at the University of Virginia with a B.A. in psychology and a minor in biology. Her current research interests include the incorporation of functional genetics with behavioral research to aid our understanding of cognitive aging, as well as the effects of fear and ability on perception and navigation. She is advised by Professor Raja Parasuraman and also works closely with Professor Pamela Greenwood.

Andre Garcia is a first year Ph.D. student in the Human Factors Applied Cognitive Psychology program. He was born in Mayaguez, Puerto Rico and grew up in Miami, Florida. He earned his A.A. from Miami-Dade College and his B.A. from the University of Central Florida. His current research deals with mental rotation, visual-spatial cognition, perspective taking, and human-computer interaction under the tutelage of Dr. Maria Kozhevnikov.
Allie Jacobs is a first year student in the Human Factors / Applied Cognition Masters Program. She is currently working under Professor Greg Trafton. Her research involves cognitive robotics and human-robot interaction. She received her BS in Anthropology and Electrical Engineering from MIT.

Jeanne Liu is a first year in the Human Factors program. She has been working in market research for years now and has worked in both qualitative and quantitative research. She spent a few years at USATODAY.com and is currently working on the User Research Team at Marriott.com. She usually spends her spare time with her Mini Dachshund pup.

Ryan McGarry received his B.S. in Psychology in the spring semester of 2008 and is currently working on his master's degree here at GMU. His work as a graduate student is focused on analyzing structural MRI data for cortical thickness and collecting cognitive data from the same participants for the purpose of Alzheimer's research.

Erik Nelson is a first year Ph.D. student in the Human Factors and Applied Cognition program. He received his BS in cognitive psychology at the University of Kansas. There, his research was focused on the perceived importance and risk perceptions of text messaging and talking on a cellular phone while driving. At GMU, he is looking forward to continuing research in the area of transportation human factors with Chris Monk.

Dan Roberts is a first year M.A. student in the HFAC Psychology program, interested in perception, cognition, and information display. He earned a B.A. in Psychology from American University in 2005 – before entering the HFAC program, he was a research assistant at Skidmore College in Saratoga Springs, NY and an information assistant within the research library of the General Electric Global Research Center in Niskayuna, NY.

Jenny Sousk is a first year Masters student in the Human Factors and Applied Cognitive Psychology Program at George Mason University. She comes to the program with research experience in interruptions and color perception, as well as cognitive-based behavioral research with non-human primates. Her other interests include environmental health, foreign languages and foreign cultures, and she hopes to combine these with her newly discovered interests in usability and task analysis.
By Jane Barrow

September 9-10, 2008 – several Arch Lab members trekked off to the University of Maryland, College Park for a 2-day boot camp on Event-Related Potential technique, given by the inimitable Steve Luck. With the growing amount of research in the Arch Lab utilizing ERP information to help understand visual, auditory, and executive cognition, it was helpful to get a refresher on the optimal technique. We were fortunate enough to also get an interview with Dr. Luck to share with the rest of the community.

**JB:** You’ve talked a lot about ERPs during this workshop, but also about science in general, and about how important it is to do good science. Why did you become a scientist?

**SL:** I became a scientist because I had a really great role model. I became a psychology major during my first year of college with the intention to become a clinical psychologist because that is all I knew about psychology. The person who taught the first part of my introductory psychology course was a really animated and interesting behaviorist. He talking about behavior and conditioning in animals, and it sounded so cool to me that within about three weeks, I said, “That’s what I want to do.” And I did.

**JB:** This next question is getting back to ERPs. Why do you think that it is important to study ERPs? What does it add to the scientific community?

**SL:** For many questions, ERPs are the clearest way to get at the answers. When you want to answer a question that requires temporal resolution of better than a couple hundred milliseconds, ERPs are the best technique, and often times they are the only technique that can be used to give you the answer that you seek. They can also be used when you want to monitor what the brain is doing and the behavioral response isn’t telling you what you want to know. This could be because you can’t get a behavioral response, or because another brain scanning technique isn’t possible in the particular situation – in these cases, ERPs are the only way you can answer your question. I would say ERPs, are very useful in answering a small slice of questions. fMRI allows you to address a broader set of issues than ERPs, but there are many times when you can’t use an fMRI, such as studies involving infants. When you need ERPs, you really need ERPs.

**JB:** What do you think about researchers who are starting to do experiments involving fMRI and ERPs? Do you think that this is a good method?

**SL:** Well, the holy grail of cognitive neuroscience is to find a technique that is non-invasive, has good temporal resolution, and has good spatial resolution. For a long time, people have thought that if we just combine ERPs and fMRI, we would have that holy grail. As it turns out, they are a lot harder to combine than you would think. I actually have a paper that talks about this. In some cases, you can have the same effect for the ERPs and the fMRI, in other cases, you can have an effect for one and not the other and in still more cases, the effects can even go in opposite directions. So it’s hard to know when it is appropriate to use the fMRI to help you map the spatial location of the ERP. They often times won’t go along with each other. There are cases where people have combined the two techniques to do really good research, but that isn’t very common because it’s really hard to do.
JB: Where do you see the future of ERP research? What is the most exciting area that you see ERPs moving into?

SL: One area where ERPs are being used a lot more nowadays is in the area of cognitive control, executive function, and action. These are all interrelated – they’re all frontal lobe aspects of cognition. ERPs weren’t used very much to study this area until about 10 years ago, and since then, there has been a huge amount of growth. I’m pleased because I think that ERPs can be really useful in this area.

JB: What do you see as the most important real-world application for ERPs as far as research? You’ve already talked about the fact that infants can’t be put in an fMRI, and that they can’t always give an appropriate behavioral response. Is this the next stage of infant research?

SL: I would say that infant ERP research is extremely difficult, so I wouldn’t say that it’s the best application. I think that ERPs have not been used to their full potential in studies of various psychiatric and neurological patient groups. The vast majority of the published studies of those groups use very old fashioned approaches to ERPs. There is a lot more that could be done to use ERPs in a smart way to answer really good and interesting questions. Most of the research has just shown that there are differences, and then gone on to characterize the reliability of the differences. But we don’t know what those differences mean. With more contemporary approaches to ERPs, I think we can begin to understand what those differences mean.
The Google G1 phone with service through T-Mobile has its pros and cons. Priced at $179.99, it is a competitive introductory price for a smart phone that has to compete with the recent price drop of the IPhone 3G. The G1 comes with a full QWERTY keyboard which is a must for quick email, text messaging, and web browsing. When the keyboard is flipped open, the screen format switches from portrait to landscape, which further adds to the ease of navigation. I found the operating system to be efficient, user-friendly, and very customizable, no surprises here from Google. The phone can be navigated through very easily with the use of its touch screen interface and/or in combination with the track ball, combining the benefits of the iPhone touch screen and Blackberry traditional track ball abilities. Aesthetics are minimal at best, but it’s what’s on the inside that counts.

-Andre Garcia

I recently had the opportunity to use the Sony Reader Digital Book PRS505 and was very impressed with what I saw. Not only is the Sony more inexpensive than the Amazon Kindle, it also comes with 100 classic ebooks, and you can download your own content to the device so that you can also read research papers and other PDFs. The screen pleasantly surprised me as it is backlit in a way that does not cause the eyestrain of a normal computer screen. It is also constructed from an ultra low glare material which makes the user’s experience even more similar to that of its paper cousin. Add to its list of accomplishments an easy to use GUI and a two week battery life, this device makes a great frequent traveler’s companion.

-Erik Nelson

Many computer based tasks that I work on involve the coordination of multiple windows from multiple programs. When I have too many windows open Microsoft XP does me a "favor" and collapses by program (e.g., Word, Firefox, Excel). If I am working on multiple tasks it is very difficult to quickly switch between them - I have to spend time scrolling through and finding the correct windows to open - and then it is often frustrating to try and organize, maximize, and minimize the correct windows. Microsoft Research has developed a tool to help with this. GroupBar is a Windows add-on that acts as a separate task bar. The main difference is that you can group windows by task and clicking on a given task will open up all the relevant windows. This makes it a lot easier to work on multiple tasks and single tasks with multiple windows. GroupBar is a triumph of productivity.

-David Cades
Apple Time Capsule is a feature of the most recent Mac OS X that allows for seamless data backup to another hard drive. All I had to do was plug in a USB drive into my iMac, and OS X asked me if I wanted to use it as a Time Machine backup drive. When I said yes, Time Machine did the rest and automatically backed up all my data. It is easy to restore your entire system if you lose everything in a crash (hopefully I'll never need that!), but the coolest user interface of Time Machine is when I need to recover just a few files.

Let's say I navigate to a folder and find that I'm missing a file (such as Dissertation.doc). I begin by freaking out, then I simply click on a single button to bring me to the Time Machine interface. The OS X desktop disappears and is replaced with a stack of overlapping windows and a timeline (see screenshot). The interface is set up so anyone can intuitively understand that the windows are stretching back in time. This way, I can navigate the timeline, find my file, and bring it back from some distant past. Once I've found the file, I can click on the "Restore" button, and the file is copied into my current Finder window. My dissertation is back where it belongs, and I can stop freaking out!

-Jason Wong

Although the TI-30XIIS scientific calculator is a relatively inexpensive model, Texas Instruments has included several design elements that make the device easier to use. Most notably, the screen of the device is able to display two rows of content at once. The top row is consistently used to display the input entered by the user, with the bottom row reserved for displaying output. This allows the user to easily view both the input and output of their computations simultaneously, helping them remember what data they entered, and aiding the recognition of input errors. The calculator also contains memory for the storage of 5 pieces of data as variables, which can be used to either preserve a piece of data that could be easily forgotten, or save the operator from having to re-enter an oft used piece of data multiple times. Arrow keys that allow the editing of individual characters of the input before requesting the output also addresses the frustrating experience of having to re-enter an entire operation because of a single typo. The TI-30XIIS retails for a little more than its single-line cousin, but costs much less than more complex graphing calculators.

-Daniel Roberts
A Young Adult's Perspective on Self-Determination: A Personal Reflection and Review of Research on Self-Determination.

Children's Stigmatization of Childhood Depression and ADHD: Magnitude and Demographic Variation in a National Sample.

Driver distracted: Do voice recognition systems help drivers focus on the road?

Driver visual occlusion and lane drift recovery.

Generalizability theory in laboratory interruptions research: Estimating variance to improve future research.

Knowing when to switch tasks: Effectiveness of internal versus external cues.


Selective attention during change detection leads to implicit learning for probable changes.

Visual working memory capacity for objects from different categories: A face-specific maintenance effect.

When and where perceptual load interacts with voluntary visuospatial attention: An event-related potential and dipole modeling study.

Where is the real-world variance? A generalizability theory approach to understanding interruptions in naturalistic environments.
Conference Presentations & Proceedings

A design methodology for controlling, monitoring, and allocating unmanned vehicles.

A generalizability theory approach to understanding interruptions in naturalistic environments.

A Repetition Suppression Study of the Visual Processing of Gait and Configuration from Biological Motion.

A test of intra- versus inter-modality interference as a function of time pressure in a warfighting simulation.

Are shifting, splitting, and scaling of attention similar processes?

Dealing with interruptions can be complex, but does interruption complexity matter: A mental resources approach to quantifying disruptions.

Designing an adaptive automation system for human supervision of unmanned vehicles: A bridge from theory to practice.

Designing systems for human use: Adaptive and adaptable automation.

Enhancing human performance in complex systems: Neuroergonomics research and applications.

Generalizability theory in laboratory interruptions research: Estimating variance to improve future research.

Recovering from unexpected lane drifts.

Reliance and compliance: How automation failures affect user trust in automation.

The effects of brief interruptions on task resumption.

The effects of task-switching on interrupted tasks: What type of task-switching matters?
The Scoop

By Allie Jacobs:

The fall semester had some great social events. We started off the term with a few happy hours and dinner nights. A group of us met up at Front Page in Ballston for their happy hour special. For the next event, we stayed closer to school and went to Hard Times in Fairfax for their amazing chili. These low-key events were a good way to get to know the incoming Master’s and Ph.D. students.

Our big event this semester was a wine tasting at The Winery at La Grange in Haymarket, VA. Eight of us met up at the winery and toured the grounds. We then tasted a variety of 10 red, rose, and white wines. Some wines were better than others but we all found a few varieties that we liked. After the tasting, we enjoyed some wine and appetizers. We then went into the barrel room and learned a little about how wine is made. Everyone enjoyed the event so I’m sure there will be more wine tours in the future!

Towards the end of the term we all got a little busier and didn’t have as much time for social events. Our last event, after classes ended, was a laser tag night. Many new events are planned for the upcoming semester, including a poker night graciously hosted by Ewart. Our annual ski trip will be February 20th to 22nd at Snowshoe Mountain in West Virginia. I’m always open to suggestions for new events!

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A Sneak Peak of Next Issue...

The Next Wave
See what Our Soon-To-Be Graduates Have Planned

Designs We Love to Hate

3rd Annual Ski Trip
Putting Research Aside for the Sake of Coworker Bonding

Where Are They Now?
A glimpse of some of the Arch Lab’s Finest Alumni