

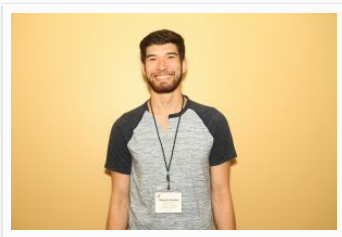
# REU|2017

Summer Program for Interdisciplinary Research and Education – Emerging Interface Technologies (SPIRE – EIT)



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## Sushi Schafer



### Beginning of the End



Posted on July 31, 2017 by masashi

Today is the first day of the last week here. Right now we are adding the final touches to the website. Unfortunately we are still waiting for IRB approval. Despite this we are still optimistic that we can get some last minute testing done. Hopefully the approval will arrive either today or tomorrow! The worst case scenario is that we end up doing internal testing even though we would not be able to use the data collected in a publication.

The website is practically put together and ready! One of the most challenging aspects of this website has been planning out and controlling the flow of data so that it stays consistent across every page. The state management has been one of the biggest hurdles in this project. Fortunately, it is working! The data communication is consistent and allows for a seamless transition across the different phases. Thanks to this data consistency, the matrix operations that go on behind the scenes work regardless of where you modify data on the website inputs.

All in all, it has been a great time working on this project. I would really like to run some people through it to get some feedback in the next few days. If there was more time, it would be nice to try and optimize some of the search algorithms a little more instead of doing linear searches. This wasn't necessary for the experimentation since we are dealing with very small data sets, however it is something that would most likely need improvement when integrated with a larger database.

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### Last Weeks Presentation and More Web Development



Posted on July 19, 2017 by masashi

Last week we had a video presentation with other REU students from University of Southern California. It was a great change to see what other people were doing with immersive technology and to see how people responded to our project. It was a great sign when people seemed to have genuine curiosity about what we were doing. There were a decent amount of questions asking about the augmented reality that we plan to use over the web. Overall it is a good sign for our project. We believe that AR can increase curiosity and through this presentation, we got a sense that those in college are interested.

On the other side of things deep in the cave of web development, we have made some great strides. With everyone working so hard things are finally coming together. When it comes to the foundation of the website we nearly have everything stood up. The biggest hurdles that I got over this past week was figuring out how to route everything within our website and getting the general format of the site ready. since we are creating a web application we cannot just use a bunch of hyperlinks. This is good because it follows modern design practices where you don't have to reload the entire page every time but can instead just switch out components for the new parts that you need. Right now I'm working on getting the matrix operations of the application working. It is nearly done and coming together pretty well. The other largest hurdle that we are working on right now is getting Redux to work with React so that we have a consistent state management system for the user when they switch to different parts of our web application. Back to coding.

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### Hey Look I'm Blogging!



Posted on July 11, 2017 by masashi

## I'm so Good at Blogging

I'm not going to try and sugar coat it or anything...I'm really bad at blogging. Despite that, let me catch you up on everything that you've missed the past week or so.

### Major Course Activity

Yesterday we got to present our major course activity. Everyone worked on a project within their deeper dives. My deeper dive was on graphics so my group made an application that worked in the C6. Our application used a custom shader to allow users to peel away the layers of a complex object. The shader itself hid portions of an object based on the relative position of the user. With this, the user could get close to an object and peel away the outer layers in order to see a specific part that they were looking for. The idea behind this was to make an interaction that allowed someone to view where an individual component of an object was by interacting and looking around it in a virtual reality environment. The scene in our app was themed around a corn farm (because why wouldn't it be while in Iowa), and on that farm there was a large combine harvester. The user was able to pull away the layers of the combine in order to see its other parts. The original application built in unity allowed the user to select which part they wanted to look for or peel away, unfortunately we waited a little too long and didn't realize that the user interface would not transfer to the C6. Despite this we were still able to demonstrate the workings of the shader. The code that implements it and the UI is very modular and I will probably make a version that runs with a smoother UI on the Oculus Rift.

### Research Project Update

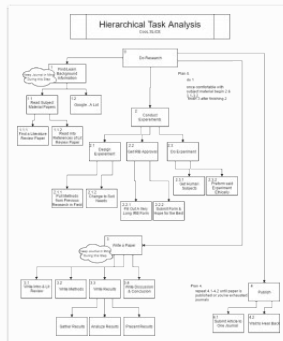
When it comes to my actual research project my team and I are making some good progress. We have fallen into our roles a lot better. This past week has been spent learning the web frameworks that we are going to be using to actually build the application. I have been learning how to connect multiple platforms and tools such as React, Redux, Webpack, Babel, Express, and a more into a functional foundation that we can build off of for our application. We also have an amazing mock up design of what the website should look like thanks to Natalie. Jameel and I continue to work at the back end but all in all things are starting to come together. Web development is a beast in itself since it is constantly changing and so many different frameworks are out there. At the same time it makes it fascinating since there is so much and it becomes a puzzle where you need to find what pieces will fit best with one another.

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## HCI Project Analysis and Cognitive Psychology

Posted on June 27, 2017 by masashi

A while back we had an intro human computer interaction course where we learned affinity diagrams. As an assignment we had to create one ourselves. Essentially it is a way to logically group and organize the steps of something. In particular we had to make one for our project. Below is a diagram which shows that.



We had a speaker today. Her name was Dr. Dark and she was a cognitive psychologist. It was an interesting talk on different types of reasoning that we go through in order to process the information that we receive. In particular she talked about distal and proximal stimulus. Basically, distal stimulus comes from the world around us where as proximal comes from ourselves. This relates to the idea of bottom up and top down reasoning. In top down reasoning we are more likely to interpret information in the world based on our own perception as opposed to bottom up reasoning which is based on what's actually in the world. To me this posed the question of, "Is there a way to determine if someone is more likely to use top down or bottom up reasoning?" If so, is there a difference in how fast they come to their perceived conclusion and is there a difference in how accurate that conclusion really is. This could then be applied to stressful situations and how someone may respond to said situation. Will they use top down or bottom up reasoning and then depending on which one was used, how will that effect the outcome of the situation that they are in? All in all this would be an interesting study to conduct that could potentially be applied to enforcement training and their hiring process along with other highly stressful careers.

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## I loooooovvvvvveeee IRB's...said no one ever

Posted on June 21, 2017 by masashi

This week we had to revise our IRB. This isn't the worst of things but it has made me realize just how intensive they are. We had all of one weekend to enjoy the brief feeling of success after the initial submission. Even though it was a minor setback it was an even greater learning experience. There are a lot of parallels between an IRB and safety factors in engineering. Just as in designing something you need to have some redundancy to ensure that it does not fail when one aspect of the design fails. In the same way, if one part of the IRB is not clear enough it isn't the worst of ideas to reiterate what you are trying to say in multiple parts. In this way the safety factor is increased and the chance of failing the submission process decreases. All in all it has been a great learning experience and after our re-submission we are ready to start prototyping our project.

At the moment it is a lot of planning. We have an idea of what we want to do, now we just need to find a way to implement it. This

means that we need to research which platform makes the most sense for our web application. Once we have this figured out then it is just a matter of getting over the learning curve. I am excited to start building but we need to make sure not to rush into something just to have us change directions later because we did not plan. However, on the flip side we only have seven weeks left. Hopefully we can find the middle ground where we don't make poor decisions due to rushing things while at the same time keeping up with our deadlines.

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## Shocking revelations and an IRB



Posted on June 16, 2017 by masashi

We did it! We learned how to write and IRB and submitted on all in under a week! Thanks to a couple late nights, a great team, and responsive faculty mentor we were able to get through it. I never knew how extensive getting approval for any sort of simple testing could be. Thankfully we did it and now comes the grueling process of waiting for a response. Hopefully all goes well with the review so that we can go right into testing when we get the approval.

On another note there was an intense lightning storm last night! I had never seen anything like it. Instead of being in the middle of it, it was like movie in the sky over the horizon. We could be outside and just sit in the field and watch the streaks of light dance through the sky illuminating the backdrop of the clouds. I had never seen lightning so consistent in all of my life and in a way where I didn't have to worry about it striking anywhere near me. We tried our hardest to get the best shots, unfortunately I was competing with two high end cameras. However, I think I did pretty decent if I say so myself while using my phone. I mean you can see a tiny bit of lightning below...kind of...



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## Chicken and IRBs



Posted on June 12, 2017 by masashi

Yesterday I spent the majority of the day cooking for the upcoming week. I decided that some fried chicken sounded good so early in the day I started marinating the chicken in the buttermilk concoction. Somehow it ended up that myself and my other two roommates were all cooking at once! It was a great time and before we knew it most of everyone was in our room. It became a sort of mini family dinner. The downside to having everyone in the room while frying chicken and having the windows open is that it gets HOT. On top of that the oil used for the chicken decided it would be a good idea to start smoking a little. Funny enough, this just turned into another bonding moment where everyone in the room grabbed something to fan the air in an attempt to not set the fire alarm off. All in all I would call it a success. It was a nice moment that we got to share.

In regards to the project that I am working on, we need to make the deadline to submit an IRB by the 15th of June. That's only three days. Fortunately it's been interesting learning about the IRB process and has brought up a lot of questions that I've never had before. For one, I am curious about how IRB work as a private company. If a company decides to test a MVP or conduct a survey do they also need an IRB? It has been a great learning experience that will help me plan how to prepare for future situations when dealing with customers/clients.

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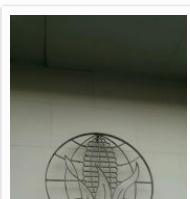
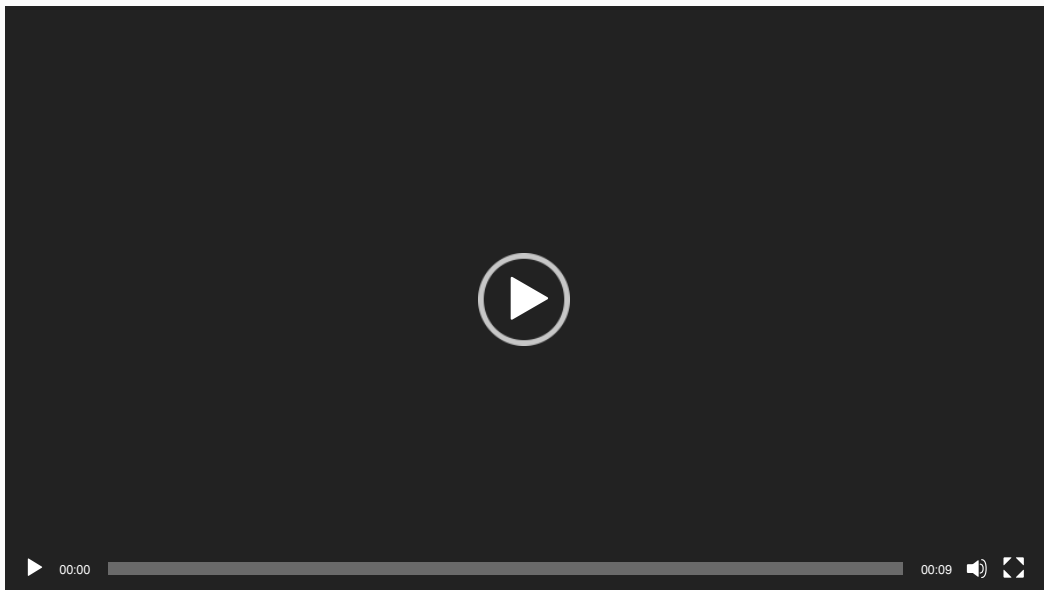
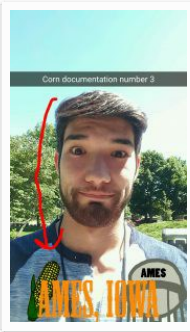
## The Hunt for Corn

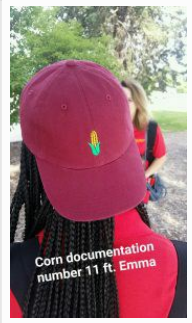
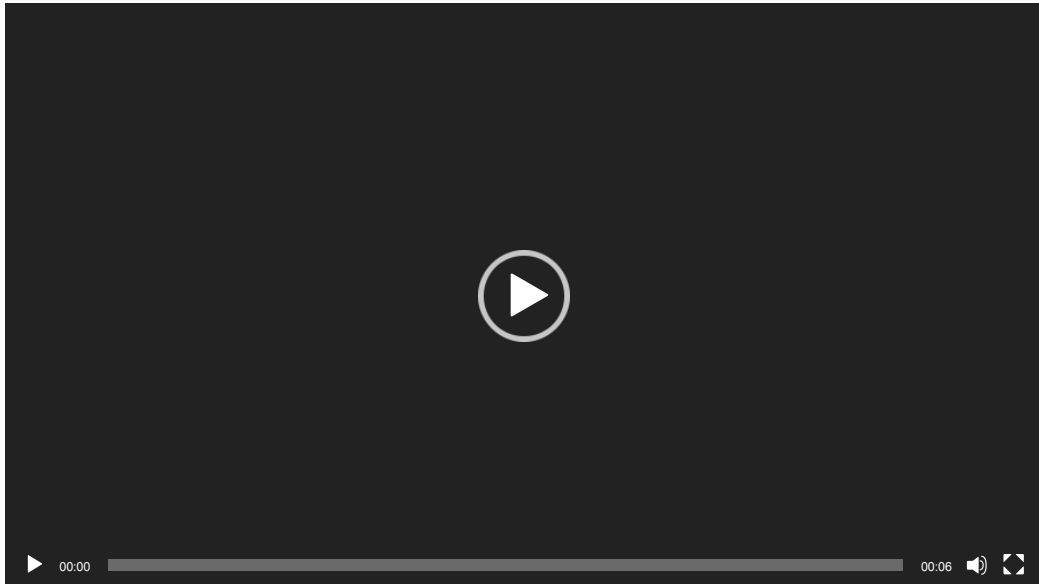


Posted on June 8, 2017 by masashi

So...when I first decided to take this REU position my only hesitation was that it was in Iowa. I knew, and in a way still know nothing about Iowa. Whenever I tried to ask anyone about it the one response I would get was, "Well there's corn." That was when the hunt began. I embarked on my journey to the land of corn and was ready to discover all the wonder of it's green stalks and yellow kernels. So ever since I stepped off the plane in Des Moines my eyes searched expecting to be surrounded by the towering crops. I searched...but they weren't there. The corn crops weren't next to the airport or in the city. Then we got into the car and during the hour long drive...still no corn. Once I got to Aimes I searched...but still...no corn. The one thing that I was told about Iowa wasn't coming true. So in an attempt to fulfill and document my corn sightings I have decided to take pictures every time I see corn. To my dismay... all of my sightings haven't been of actual corn but instead unfulfilling impostors (I'm kidding every time there's any corn reference I probably get way too excited). As of now I have 9 "corn" documentations. When I numbered them, 9 and 10 are missing since Emma likes the number 11 and the corn was sighted on her hat.







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## Learning Despite Level



Posted on June 5, 2017 by masashi

Today was our intro to C++, a language that I'm very familiar with thanks to my school's computer science department's strong view that it is the language students should learn in. Despite going over intro level concepts I was still able to learn a lot that I hadn't before. I was able to dive deeper into the concepts of the built in `std::cin` functionality. I analyzed these concepts from a different point of view. Instead of just wondering why something was working, thanks to what I've learned, I was able to explore the deeper workings of how the buffer behind the `std::cin` object works.

This experience gave me some new insight into how to approach situations that may at first seem redundant. Even though it was all concepts that I have seen before I was able to look at it with a fresh perspective that brought out even more questions. It just shows how knowledge builds off of itself and that even old concepts can bring about new questions that were unseen before. I'm starting to realize how circular knowledge is and that by re-looking at something I may be able to discover a whole lot more instead of passing it off as something that I've already done.

Being able to bond, explore, help, and discover with my cohort makes me realize just how great everyone here is. They are a passionate and kind group of people and I already know that I will be missing them all when this is over and we aren't even a week in.

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## Entering The Eye of the Storm



Posted on June 2, 2017 by masashi

Today I ventured into the eye of the storm...

The reason I say this is because we got to try out the C6 which is housed in a piece of art that looks like a cyclone. A little dramatic I know, but I liked the title. The C6 itself is a giant projection based virtual environment. I was astounded at what it took to power the entire thing. A massive cluster of Quadro graphics cards helps to power 24 SRX-S105 projectors. The engineering behind all of the parts was fascinating. I want to learn more about the graphics workforce that is the cluster of processing power that takes up an entire room. As I entered I also started to wonder how this group experience within a virtual environment would be if the room was spherical instead of a cube. Unfortunately projection mapping onto a sphere with that many projectors that can only sit horizontal would be very difficult, but still my mind wonders.





*C6 located at Iowa State's Virtual Reality application center.*

Throughout the this trip I am starting to realize just how important grants and funding can be from both corporations and governmental institutions. I say this with a large emphasis on the governmental side of things. Before I have always been dismissive of government funding and interactions due to the mounds of bureaucracy that seemed to be necessary. However my views are shifting after hearing the faculty here talk about how a good portion of their funding comes from the government and, to my revelation, that even many corporations function off of this funding too. I still am not in favor of having to deal with the bureaucracy and red tape that is involved with governmental affiliations, however I am starting to realize how necessary it is to play the game if you want funding for your project.

It is exhilarating to be surrounded by other like minded innovators who want to push how we as humans interact with the digital world. It's an environment that's contagious and I'm looking forward to these next 9 weeks.

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