

Anton Hud

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Posted on [July 23, 2014](#) by [Anton Hud](#)

I haven't posted in a really long time. I've had a lot on my mind, but not really put any of into words. I'm just going to ramble about some highlights to give a feel about what I have been doing the last couple weeks. This is in no way completely inclusive because so much has happened lately. I have topics not included in here, like my experiences with the Oculus Rift, our trip to Camp Dodge, the ethics courses and a wonderful trip to Holly's family's lakehouse that I can't even get to in this post, so I'll try to get to those in another post before I leave.



The presentation

I stopped blogging a bit before the presentations, so I never addressed it. Our groups presentation went very well. Sam and Kelsey had me practicing regularly before we actually had to present, so our presentation was thoroughly rehearsed. The slides went smoothly from the first run and were repeatedly refined afterward. The e-conference design was new to me and just made me feel a bit more removed from the whole thing. Sam doesn't like public speaking and remarked that she felt really nervous beforehand, but did exceptionally well, and probably better than I did. She didn't miss a beat. Kelsey showed enthusiasm that felt very real.

Honestly, I was a bit jealous of the first Lehigh presenters for having a project on exactly what I wanted to be working on. He had haptics research where tiny wearable machines gave the user the feeling of grasping items in virtual reality. He was really building stuff and it looked super cool. I got the feeling their facilities were not as nice as Iowa State's though, and that he didn't get to see anything like the environments I've gotten to see here. Also, the panel afterward talked on the subject of the difference in graduate research and REU research. They talked for some time about how REU students do not get to create their project designs or do literature reviews, which are both things we have done here. I guess that is a big tradeoff of being able to jump straight in on helping a graduate student work on their project. It became even more apparent how this program is so different from other REUs but it didn't keep me from feeling jealous of the students who were building hardware all summer. It's mainly because I love working with my hands and designing things rather than designing experiments, as important as it is. Luckily, I also got a lot of experience I wanted from the mini-classes in this program that I can use in whatever field I want to go into. I honestly do not see how a program could have a research experience with everything with only 10 weeks to work with. I feel like the entire process probably takes about a year to do.

The project

The project is coming along quite well. We are finally building the virtual environment and putting the architecture to run the procedure together. I am finally able to work on all the things I enjoy doing, but the writing is not done yet. I trade between working on the environment and writing/paperwork.

A couple weeks ago we finally made the decision to use Unity instead of VBS2. A big factor in that decision was the scripting language used. Unity is open to 3 different scripting languages, two of which are very common, whereas VBS2 uses an independent scripting language that looks difficult to use from the references online. The limiting end

of the Unity side was the lack of good, free models to use. VBS2 came with a pre-made building (a prison) that could be converted into stores and a lot of items that would have been used (like a creepy teddy bear and cutlery). Luckily, I eventually found a website with free models that looked decent. I had to make changes to some of them, but managed to scrap enough together to create a mall scene for our scenario.

Seeing the mall scene come together was really exciting and the stores have been created, but not marked or decorated. I switched over to scripting before stocking the shelves and making the signs because a lot of code had to be written to make the scene work run our experiment. I wrote up the scripts that set a computer as a server and lets guests join and spawn characters. I have an annoying error where the created server doesn't appear for others to join, but once that's fixed, it should work.

Sam wrote scripts for player and store inventories. The inventories look amazing. They are very similar to the ones in HL2 based games and are fully functional. I'm really excited to get them running with my code and would love to use those scripts in future work with game engines because they look so good. Just having working inventories pushes our virtual environment forward significantly in this experiment, judging that the majority of our experiment is shopping tasks.

Also, Chase gave a talk about EDA to the group that was very interesting. Kelsey especially took interest and talked with him afterward. They not only advanced upon the ideas about how we could use EDA, but talked about the possibility of using EDA sensors from another lab, which would allow us to use more than one. Their sensors are meant to measure more physical activity over a longer timespan, but can easily be repurposed for our experiment by changing some settings. I think that the EDA is an interesting measure and I am glad Kelsey has taken such initiative in putting together this part of the experiment.

Weekend stuff

Reiman Gardens

A couple weeks ago we went to the Reiman Gardens at Iowa State. The garden was a lot more interesting than I had expected. First thing I noticed was that they had a lot of Kalanchoe growing in front of the garden. My brother worked with the plant during his science fair project in highschool. Kalanchoe is one of the most commonly used plants for genetic experiments with plants. Crown Gall is commonly used to insert genes into the plant, which was what my brother did for his project.

The first exhibit in the actual garden was on butterflies and moths. I used to really be into entomology, so I was glad to see it. Unfortunately there wasn't too terribly much information in the exhibit, so I didn't learn anything new. I explained a lot of the differences between the two types of insects to my friends, but they all just seemed pretty grossed out by it all. I found it interesting to see them all, alive and dead.

Further in there was an exhibit on hydroponics and aquaponics. I have been interested in hydroponics for over a year now and have been converting four leaf clovers into mini hydroponic plants with mixed success. It's not very scientific, but it's an amusing hobby. I liked the exhibit because I was able to see how science quality hydroponic setups were constructed.

Outside there were a wide variety of familiar plants. I quickly realized that they were familiar because my mom has the majority of them in her garden at home. This made me realize two things. First, that my mom is a really intense gardener and two, that the flora that grows in Iowa was even closer to that of Georgia than I thought. I noticed that it was similar, but this blew me away.

There were also a couple other things. There was a children's garden with exhibits on simple machines and the five senses and a rose garden. The children's garden was really fun and I think would have been really educational for

children of the target age groups. The rose garden was incredible. I read about the professor who pioneered the rose research. It turns out he had bred more disease resistant rose cultivars than I even knew existed. His backstory was interesting too. He researched roses despite being allergic to rose pollen and had acquired his interest in roses from his Spanish pen pal who was the niece of a rose researcher. The roses all had unique scents and I spent a good portion of my time there.

Paintball

Paintball was a lot of fun. I hadn't been able to play for months before this activity, so I had been itching for a game ever since the activity was announced. The weather was perfect for the games. It was sunny but stayed cool throughout the day. Afterward I found myself more sore than usual and realized that this was because I didn't practice the skills for it during the last semester because my fraternity didn't have a initiation process this past semester. Also, the field had the markers set to a lower muzzle speed than I was used to, so it took me a few shots to actually get one to burst on someone. I only managed to get hit a couple times, at the very end of games when I had multiple opponents firing at me and I was out of teammates. I did reasonable well in the games, but had the most fun playing with Jesse after the games were over. Jesse was surprised at how well I played and said that he was better at lasertag and that I'd see when we would go to play that. He was telling the truth because he wrecked us all at laser tag. "The two are opposites", he said, "In paintball you stay behind cover, while in laser tag you walk around shooting people."

Luncheons and Courses

My two favorite recent lectures have been the ethics course and the lecture on audio. I want to talk about audio in this blog post. I can ramble about ethics later.

Everyone who knows me at my school knows I am a serious audiophile. I don't play any instruments, except I do voice, but sound is still fascinating to me. In my room in Redlands, I have one of the best sound systems on campus. There are drivers that play every range of sound, down to the frequencies only felt physically in the bass range. At school we would often have movie night in my room because of the increased immersion from the quality and fullness of the sound. The presenting professor went into the science of this when his presentation when he talked about sound environments. The extreme necessity of sound for immersion is barely noticed until the sound is not present. Just try watching a game or movie over someone's shoulders when their headphones are on or playing a game completely muted. It's not nearly as immersive or engaging. His explanation of how sounds build that environment inside one's head was incredible.

His talk also touched on another interest of mine. He presented two technical terms that define it: earcons and auditory icons. The two are very neat because you can be doing a task and a sound can notify you of what just happened in less than a second without words. It's like the crumpling paper sound when you delete something or the bu-bump sound when your peripheral device disconnects. They also serve to let you know that something was done. It's like the silent keyboard that confused users as to whether they were actually hitting keys or how one can tell their car door closed because of the click it makes.

Right before he ran out of time he brought up a slide on Spatial (3D) Sound, which is one of my biggest interests in sound. I have wondered about how 3D sound is done for years. I ended up staying afterward for a long time picking his brain for how sound is created and used. He explained 3D sound very well and then we started talking about all of the sound topics. Talking to him about immersion afterward was very rewarding. I told him that one thing that drives me nuts is when people hook up a game system or a dvd player to a TV without a soundsystem and they lose most of the effect of the sound environment. We exchanged a lot of "I know, right"s and talked about all kinds of

systems we had seen to immerse the user with sound. Eventually we both had to go, but I feel like I learned incredibly much regarding one of the most powerful but most overlooked aspects of technology.

ramble, rumble, ramble

Posted on [June 27, 2014](#) by [Anton Hud](#)

So, I haven't really blogged in a while. Part of it was that ideas were still up in the air about the research and I wanted to have them more together before I could really talk about any of them. It really kind of sucks to talk about what direction I'm going in when it will change by the next post. Another part of it is that I was really preoccupied with everything I needed to do. Additionally, I kind of use these blogs to get out my excess thoughts, which is crucial to my sanity. If I don't talk or write the thoughts pile up in my head and I get exhausted and flustered and will feel like I'm going to pass out. (I know, I'm really weird up there.) Lastly, since I do tend to ramble, I figured my readership probably had dropped off. I mean, it couldn't be that entertaining for people to read my long, rambling thoughts, especially when they experienced most of the things I am writing about with them. I usually find myself cutting out the details from my memories, because I am blogging, not writing books. The jokes also have been incrementally cut out for similar reasons. Any jokes left are usually subtle wordplay left in the text. They often may appear at first like grammatical mistakes, but I ask that you don't comb through the posts, in the fear that you will find all the grammatical errors I make while brainlessly blogging my bashfully blatant blather. ...bbbut don't worry about it, if you read this far you have made it past my expectation.

Anyways, my project IS finally moving in some direction. It usually feels like the ideas seem basically boring at first until we explore them further. Once I am reading the papers and working with experimental design it all comes together in an exciting way. The use of people interacting takes the simplest models and assumptions rather complex. Though I thought that some of the models in the papers seemed simple at first, I read about their difficulty in actually measuring and finding positive correlations in their research. Also, a couple papers mention the vastness of the plethora of other article in their field, and how they only agree on the most basic constructs and vary wildly on anything beyond what feels innate.

To get into specifics, group work is tricky to say the least. Humans have become relatively individual over the eons, but almost every task larger than one's self (in business, academia, military, ect...) requires a group. The group is essential because everyone has strengths and weaknesses and even a theoretically "perfect" person lacks the time to do everything themselves. Humans don't have a "hive-mind" as simpler organisms have, but I like to think humans are pack animals, like other similarly complex organisms. The idea of independence is limiting and the idea of interdependence is essentially how survival works. This requires a "group think" though, because more than one human must function as a bigger one. That's one of the reasons I really like the executive functions. The executive functions are how individual minds get things done, but applied to a group it may be a measure of how they "meld" into a collective intelligence to solve problems. The issue is putting that together and webbing it to the group functions. It gets super convoluted, but it seems possible and I think it may just work.

Getting my brain together... and more.

Posted on [June 24, 2014](#) by [Anton Hud](#)

Everyone knows, I was late in submitting my final design for the 3D print. I had almost everything done, except I was missing the hole through the middle and the medulla oblongata. The task would've taken me less than an hour to complete, but I kept doing other things in my productive time and getting frustrated or distracted when I began the task. Yesterday I was told that it was the very last minute to get it done, so I churned it out. The first time I attempted I made a mistake that crashed the program and had forgotten to save, so I ended up doing everything twice. After grumbling about it for a bit I decided to stay a little after everyone was gone to finish the job right. In my haste, I did make mistakes, but I finished it.

Seeing the product coming together today made it all worth it though. The 3D printing lab group did me a huge favor in getting all the pieces I sent them yesterday into solid form today and I would like to thank them for their diligent work despite my seemingly shaky commitment to my project. Two of them complimented my brain-child in saying that they didn't expect a complex Maya model like that to work so well. They let me pick up the printed pieces that were done already and play with them. To see it all solidify made the toils of getting that stupidly complex model from rectangular prisms to presentable so worth it. It was just so much better than I imagined it when it was on the computer screen. It fit together much better than I even hoped those silly Maya models could. I think how well it turned out may be more intuition and luck playing out than calculated, deliberate action. That being said, I wish I had the brain to have made an exact model in solid works.

Now to talk about what kept my mind away from my brain again. Our OpenGL presentation went well. Kelsey shared an interesting and quite touching personal narrative about her misfortune with dirt bikes in the real world and then we showed our model with perfect reflexes that can land death defying jumps and does hard stops without even glitching. Overall, I was really happy with how it turned out. I told Bhaskar how I had fallen in and out of sleep and started dreaming about making jumps on sine waves, which he thoroughly appreciated. In the end, the voting did not end in our favor, with every group carefully contemplating who to vote for in order to get the outcome they wanted, but Bhaskar said he was very pleased and that we were all winners for creating such impressive projects in so little time. I am glad I picked up the OpenGL skillset (as much as one could in a week) because I can definitely see myself using it in the future.

Lastly, our luncheon lecture was phenomenal. We met Andrea's adviser for the first time over a video call. I have never seen a video call work so well on a side note. She began her slides, but since she allowed us to ask questions along the way, we eventually got sidetracked. Her topic was educational gaming, which the majority of us are extremely interested in. During the first slide, Mitchel had a question, that quickly multiplied into three more questions before he had to surrender to the queue of other people's questions. What was especially nice about this lecture is that it nicely overlapped with my team's (Team Dynamic's) project. She had users doing tasks in a game engine to learn, just like we will hopefully be doing with groups. My questions brought her back to her slides where she showed up how this worked over the next five slides. Then our discussion went back to questions and before we knew it, we had exhausted all our precious time with her. She was unbelievable excellent and should probably expect to receive questions from most of us with more questions about her research.

Looking back while looking down the long road ahead

Posted on [June 23, 2014](#) by [Anton Hud](#)

Last week ended on a fairly good note. It was time for the weekend. Everyone seemed fairly tired and we had a good night in. I went to bed at what felt like a reasonable hour to get up at a decent hour for skyzone on Saturday.

Skyzone was amazing. I put on those nifty skysocks and took in the ambiance of a room filled with trampolines. I was excited to be there. I went up to the first 'room' with trampoline floors with the group and decided to see what I could do. My first realization was that I didn't know how to do flips on trampolines. This is not to say that I don't know how to do a flip, which I do. In fact, I can do a few different types of flips on solid ground. The problem was that I would jump and then kick and go nowhere but back down again. Essentially I was just kicking into the air. I was momentarily perplexed by this. It was only later that I realized that I had broken the order and needed to kick first in order to make the flip, which felt quite weightless with the bouncy floors. Before I had time to make this realization, the group moved to a different room and we found ourselves standing in the skyzone Dodgeball court. It was really fun, but it took me a while to get



the hang of throwing a ball while jumping, much less hitting someone moving through the air. Needless to say there were a lot of inaccurate shots. It was fun though, and really intense. I was glad I had gotten the full hour because the smaller group made shots more deliberate and therefore made the game more competitive. I started to get the hang of it. With less people I was able to hold two balls and block with my left and throw with my right, kind of like martial arts. That's around when I figured out how to do flips and was so ready to try all of them just as our time ran out. Skyzone left me really sore on Sunday.

Afterwards, we went into town for Zombie Burger. Some of my peers went to go see the capital, which looked neat from the pictures, but I needed a pick me up and got a really good cran-mango smoothie with flax for Omega 3. It cleared my head up well. Zombie Burger was a lot like Vortex, for my friends in ATL, but had a slightly more expansive burger selection. I was able to get a burger with bacon, egg, avocado and fried jalapenos with a rootbeer float and loaded fries, so I was happy. I was taking it all in and everyone was freaking out about the world cup game behind me. I would highly recommend to a friend.

That night I was kind of tired and decided to take a nap. Right before, Sam hit me up and told me she was working on the OpenGL project. I wanted to work on it, but my eyes were feeling heavy and I needed the nap. She said it was fine and I planned to work on it that evening, but I fell asleep until morning. Honestly, that shouldn't have surprised me.

The next day I woke up hours earlier than I expected, so I went for a walk, which became a long walk, and I stopped in a pawnshop. I found a large pair of boxed speakers for \$5 that I could fit my 6.5"s in for a retrofit. At \$5 the price was right, so I found myself lugging the speakers back to the apartment all the way from the pawn shop. In the final stretch of the journey, it started pouring down rain again and I had to balance the speakers with my umbrella and quickly remembered how sore my back was. It was humid and I was sweating, but it was worth it. When I got back I dried off the speakers and tested them with my amp and the paper cones sounded like the 90s. The boxes were a good size, and were ported, so they were perfect for my use. I showered and made lunch before going back to the retrofit while waiting for Sam. She didn't take very long, but I work fast, so I got to test out the first speaker I completed before leaving. It sounded clean and crisp enough for my satisfaction and had excellent bass response. My day was made.

I went into the lab with Sam to work on OpenGL for the rest of the day. She showed me her progress on the project, which was phenomenal. She had a working landscape and had the camera moving already. I decided to get warmed up by building a tiny physics engine separately in OpenGL. She left to watch the game and I quickly realized how much of an OpenGL noob I am. It took me forever to realize that everything moves around the camera (eye[]), which felt like it should have been obvious. When she got back I told her what I had learned but was disappointed in having very little progress in the actual project. She showed me that she was having the issue the camera moving around the center-point of everything, rather than its translated point. I luckily remembered the order of operations that Bhaskar taught us and that fixed that part of the problem. Then movement started moving straight forward in Z rather than with the angle. That made me think vector math and I was able to fix it with good ol' sine and cosine, after realizing that they were in Rads. Towards the end of the night I struggled with fractal terrain and Sam worked on the handlebars until we were tired of it and she gave me a ride back. We sang the Katy Perry song Dark Horse, which I coincidentally plan to use in a my fraternity lip sync show in the fall. We talked about the possibilities with the program, which were vast, but all frustrating. She said she liked it how it was and I said I really wanted to get my physics engine working. I told her that I would do it if I got up early enough today.

I was really restless and couldn't sleep. I wanted slow waves and REMs but my head could only do Sine waves. I briefly dreamed about riding sine waves in fleeting dreamscapes, but did not get the rest I wanted. By morning I was exhausted from my lack of rest but had an idea how to do the rest of the program. It was a slow morning due to how tired I was, but I got in about 20 min before everyone else and made some headway. Pretty soon I had a working physics engine and changed the landscape to sines and cosines to round it out and prevent the dropping and falling through. With the forward set to gear up to higher speeds and the reverse serving as a hard break, I was able to

make jumps and get decent airtime. The game didn't have a large environment, nor was it physically accurate to earth, but I was just glad to be able to build it in OpenGL, which is so much harder but more rewarding than Python. After stressing about it so much, it was fun to play around with the game for a while. Still, I can't ignore the gigantic pile of work for this week that keeps staring me down. Today just seems to be the calm before the storm that will be this week.

I see a long road ahead, into the unknown, with a lot of bumps.

Hopefully this means we will get some serious airtime going down this path. 🏠

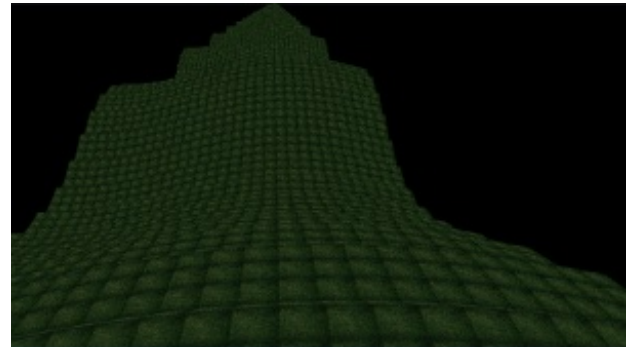
Team Dynamics

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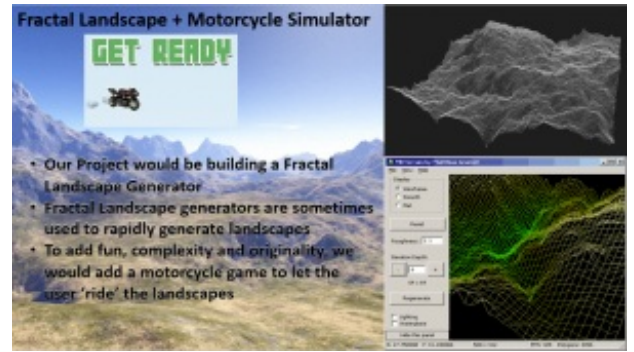
Desmond told us to create a group name, and after pushing to think of names and much deliberation, we decided that we would be team dynamics. Yes, we named our team "dynamics" as a joke. Desmond was amused.

The lecture by Dr. Gilbert today was riveting. That's a good thing. He hit some of my favorite parts of the history of computers and then got to my favorite stuff, the things I don't know. He showed me an entire part of computing that I hadn't heard about before, which nicely tied in the HCI end. The next part was also fun, as we got to do interactive experiments to see HCI from the user end. It was the kind of talk that had me on the edge of my seat. He gave us the titles of a few books in the field and told us he would buy us the books if we read them and presented them to the group. It is tempting, but I am also busy and –should– be doing GRE stuff. We also played with memory, perception and optical illusion, which are more of my interests. I had a couple friends who were artists who liked to play with optical illusions and we were always trading pictures and art that played games with our perception. There's very few things I enjoy as much. I feel like optical illusions could be very useful in virtual reality and augmented reality.

Open GL has been going a lot better lately and Bhaskar has been very helpful. As he said, the course did get easier. I have been taking lots of notes and taking his advice on how to do things very seriously. Our project has the potential to go well, but I am afraid that an error could potentially hold us back for a long time. Luckily Sam is on my team and Bhaskar said he would be around to help on Sunday. I spent a lot of class trying to get Open GL to work on Eclipse on my computer and talking to Sam about how to write "simple" physics engines. I couldn't get Open GL to work yet, but I am getting closer. The physics engines took me back to freshman physics lab where I modeled everything in Python. The class switched professors, unfortunately, and the source code links for the models were dead. I remembered all the times I created those fun python models as some of my classmates complained about the programming in class. I remember a friend saying "I came here for astronomy, not to debug code. There was a definite difference between those working towards astronomy and those more *geared* toward engineering. Over the next two years, these lines would become more clear. I imagine between Sam's skills and mine, we can scrap together this project and I'm really excited to drive through fractal terrain. I can't wait to do jumps of random peaks holding on for dear life to two virtual handlebars. If things go poorly, we might stay grounded. If things go well, you might bounce a bit when you impact. 😊



The main project is coming along too. I like the idea we are working with because it is simple but has lots of possibilities and implications. I am glad I'm not the only one who is getting more interested in it. When we talk with the group, ideas get thrown around, and I get excited about what we may be able to do with it. I really want to use audio to give feedback and Kelsey seemed to like this option too. I feel like talking into someone's ear is one of the most direct ways to put ideas into their brains. It also allows us to give confederates more believably, even if they are read off a script. I could see one of us working a mixer or switchboard to give different messages to the participant(s). We are supposed to write out possible research designs this weekend. I have some partially formulated, but they need work. With any luck I will have at least a handful of them by Monday. I am stoked to see what my group members come up with as well. They are interesting, creative minds and perhaps some of their ideas will merge with mine when we present them, or maybe one of them will come up with something better than what I have. Either way, I think we will come up with more interesting stuff by leaving everything open and then coming together when we have ideas. Go Team Dynamics!



More About Daily Activities

Posted on [June 17, 2014](#) by [Anton Hud](#)

The brain model went over well, but it needs to be tweaked a little bit. Small stuff, like adding the hole, which I realize will have to be done before merging the parts. I was told that I would have no problem submitting the design a bit later, as long as I do before the end of the week. Also, I started playing with the MakerBot program, which won't have a problem printing it, but there are a couple disappointing limitations. First, the printing will have to be done using the "fast" setting, which eliminates a lot of the detail I hoped to have. Second, only a single brain can be produced in the given time, in a size far smaller than I had hoped. Each piece will have to be printed separately, at the size I expected to use for printing them all together. Printing all the pieces at that size will take all of the time we are allotted. Good news is that it will work, bad news is that a single brain, the size of a prune, can be produced. I'll just have to live with that. The knowledge of the difference in the limitation and the way the printer looked when I saw the promotions years ago is very valuable in itself. I can't complain, I get a free 3D brain.

Open GL didn't go very smoothly today. I can understand though; programming and teaching programming are two far different things. Bhaskar looked flustered as he tried to explain what was going on in Open GL. Everyone's frustration with their lack of understanding of the math and language only seemed to make everything worse for him. I had brought my Linear Algebra book just in case, which I was glad I had done. I did an independent study over last semester related to Linear Algebra last semester because I needed programming and I wasn't fully understanding Linear in class. This, however, was the opposite problem. My college course just switched professors from the professor who loves application of math to another professor who didn't fully understand application and was far more concerned with mathematical definition and proof. In my independent study I tried to do more application, but struggled with my additional course over the semester. Today I found myself sitting, watching a presentation that showed application after application, with the instructor struggling to bridge the gap between the application and the math that the computer uses to do it. The time was productive, despite our frustration, and I managed to get 2 very full pages of notes about Open GL and how it works. Bhaskar had all the information I wanted and needed in the presentation, he just struggled to convey it to a layman audience.

The Luncheon lecture was neat as well. I kind of had a strange experience with graduate students in my life, so this gave me a more holistic view. I essentially grew up around grad students. I was in the lab regularly, waiting for my dad to finish something or other he was working on and I always saw them all at the holiday parties at my house. My brother would always run and hide when they were around, but I preferred to interact with them. They were always

really smart and really stressed, to say the least. Also, post-secondary education was always expected in my family. Almost all of my aunts and uncles on both sides have their advanced degrees. Some of my cousins, who are of age, didn't pursue further education. Despite how they are occasionally looked at in my family, I have noticed a stark difference in how their lives have gone. Even though they didn't pursue higher knowledge, they all are very good at things they are passionate about. Unfortunately, those things are not their jobs, nor will they ever be. That makes me feel like my family is right in telling me I should go to graduate school. The opinions about graduate school I have heard from family and other graduate students are mostly consistent with what we were told today, but today managed to fill in a lot of the little blanks that I haven't been asking thus far. I can definitely say I learned from it.

The cycle begins anew

Posted on [June 16, 2014](#) by [Anton Hud](#)

I was relieved last Friday when the week was over. I was tired but still felt the drive to keep moving. When I got home I considered lying on the couch but remembered I had promised my brother I would run by the card shop and check on the prices of a couple cards. Everyone was going to play soccer anyways, so I figured I should keep busy as well. I am not much use on the soccer field, so I figured Friday Night Magic would be a good preoccupation. They gave me free pizza and every game I got the whole "I tried to get that type of deck to work, but it never did, good luck". It appears the designers just didn't do a good job with my colors this time. It was fine because I got free food with really funny and geeky guys, who all told me I should come back next week. We'll see if that happens.

The next day we went hiking. I woke up super late and decided that I wanted to shower and eat before leaving. I ended up making crepes and took the last one to go with me, folded on a plate. In doing this I forgot about the things I needed to bring, like my flip-flops. After following Kelsey down the initial trails on Jesse's request that we not lose her, we went down the river. I was kind of burnt out socially, so I played music so I wouldn't have the compulsive urge to talk. Our group traveled down the winding river without any sense of direction. I was oddly okay with this. However, I didn't want to take off my shoes, because I lacked flip-flops, but also refused to let them get wet. After at least 20 min of carefully jumping from rock to rock, I accidentally dipped the toe of my shoe in the water on a particularly hard jump and it was all over. I stripped off my shoes and socks to avoid the discomfort of wet socks and went barefoot like most of the others. It wasn't all that bad anyways, it just meant I would have to deal with my feet being wet and muddy without any way of doing anything about it. I had fun though, and probably needed that break from society.

Afterward we went to a giant bridge that overlooked a river. We were on a bike trail and bikes constantly were zipping by. While trying to take a picture I accidentally got chili powder in my eye (due to wind and mexican candy) and blindly wandered to the other side as I heard bikes skidding to a halt. My face burned with embarrassment as I clung to the rail to gather myself and yelled "sorry!" The view was definitely photo-worthy though and I was over my embarrassment in a couple minutes. The sides of the bridge were loaded with facts about Iowa. I learned that Iowa became a state 30 years after it was obtained in the Louisiana purchase and was fully populated 13 years later. I also learned that the prairies had a life cycle that involved natural wildfires (like parts of SoCal) and had natural floodplains, which made for lots of problems when trying to build on the land. The idea that just because a place is flat, doesn't make it easy to build on is an interesting thought. Apart from the educational content, the bridge also had cool blue lights in squares at different rotational displacements along the bridge. The geometries created an interesting visual effect for those passing through them.

That night I went out with Alexis. I met a bunch of his bros, who were really nice and accommodating. We joked around and traded stories and showed off dance moves. They were really laid back and I can see how Alexis fits in well with them. They really liked me and invited the group to come back when they felt like it. We had fun, but left with Alexis a bit early and all went to bed.

I woke up even later on Sunday. I ended up going on a trip with the guys to Walmart and picked up some needed supplies and some more food. I also got a fan for my projector setup. Later that night I was able to try out the fan

while watching Silicon Valley with the guys. The episode was really funny and the fan worked perfectly. From a tiny fan, lightly blowing on the LCD, the entire setup stayed near room temp. Go figure. The rest of the day was spent trying to finish the Maya/Cad Project. With only the breaks for Walmart and Silicon Valley, I still found myself staying up all night to get it done. I really lost track of time and saw that I was deep in the AMs when everything started to fall into place. Part of it was the fact that the first two attempts didn't really work out, so I started over a couple times before getting everything to work. That's how learning works though and the finished project looks great. And now the cycle begins anew.

<< endweek;

Posted on [June 13, 2014](#) by [Anton Hud](#)

Our third week is finally coming to a close. Overall the week was a success, but that's not to say that it went smoothly.

Yesterday we went to a luncheon lecture on Version Control by Joe and Bhaskar. On a personal level, I like them, but on an intellectual level, I would like to learn from them. The lecture reminded me that I never put a version of mercurial on my laptop and haven't used it since my last machine. However, I have used google docs and use open source software, which I learned are both examples of version control from the lecture. Bhaskar also mentioned he would be leading the OpenGL class, which I am excited to start. I don't currently know any OpenGL. However, all the tutorials I was finding for a project I was trying to do in my May-term were written in it. Also, I managed to get all the OpenGL questions right from things I had learned in other courses. From these alone, I am extremely interested in learning OpenGL. Also, Sam has told me it is good at modeling shapes with equations, which I have enjoyed doing minimally in Vpython and POVray. Bhaskar told me to brush up on linear algebra, so the book that is currently sitting in my room may get some use. 📖

Later in the day, my group had a meeting with our faculty advisers to see how everything was coming along. We had an impromptu meeting the previous day where we talked about what we could be doing, then all went off in separate directions to work on what we were going to bring to the table. I decided to take two of the ideas, one mine and one originally Sam's, and run with them. I added detail, question context and potential design. During the meeting we all saw how our ideas had diverged since the meeting the previous day. We all also went about purposing the question in different ways. Sam and I were working with the same idea and had gone about it in completely different ways. The faculty seemed to like all of our ideas and asked us to write one of them up to turn in today. After talking about it, we decided to refine what I had written on Sam's idea as a preliminary research question idea. Hopefully this is a winner, but we have backups if it is not.

Also, while I was writing up the original ideas the night before the meeting, I was also sculpting the pieces for the brain model out of clay. This helped me wrap my head around how everything would have to be shaped and fit together. Unfortunately, the sculpty dough shifted slightly in the oven and would no longer fit together, but it helped me wrap my head around it. During our class, we learned about Maya, which seems easier to use than SolidWorks, but powerful in many different ways. Sam showed me some of the ideas I had for the model in Maya and proved in many other ways that she is a total Maya wiz. I slowly started to catch on and had a lot of fun. Anthony, the Grad student, also came by to help and worked with me on possibilities in putting the complex structure together. Anthony really liked my clay models and I drew up sketches as he told me better ways to accomplish my goals. He was great.

After we finished we had Bowling as an activity. The bowling alley was a bit bowed and had some software errors, but I had a good time without trying to hard. It was fun working with those who had not bowled before, and they started to get the hang of it while having a lot of fun. We weren't really playing competitively, but rather more for fun. Afterward we played the robot game (Virtual-On) for a few rounds afterward and I found another robot I can play well, named Dorkas. We are all getting better with the controls and it is starting to get competitive. Speaking of competition, I lost my first games of airhockey here to Jesse. I was really happy to find someone else who plays at

my level and he narrowly won against me twice. Losing to someone gives me the ability to improve. We agreed that we should play again some time.

That evening I received a message from Ben informing me that they had picked up the overhead and monitor from the surplus sale. That meant that I hadn't missed out while I was at the etiquette lunch on Wednesday. They were even nice enough to drop both of them off at my apartment. Ben's roommate had gotten the monitor for \$15 and the overhead for \$5, so the entire setup was a thrifty \$20 together. Ben's roommate told me about how he was using surplus monitors to build mirrors with widgets. I wanted to talk about hobbies but they had to leave right after they dropped off the parts with me. It was fine though because the group was in one of the other rooms and my food had just arrived. After I finished up the problem question and finished eating I decided to work on the setup for a little while. To my surprise, the parts were easier to work with than parts I had in the past and I was able to get everything set up with a beyond decent image quality in well under an hour. Now my entire living room wall is used as a projector screen with my side table holding up the projector setup. It works perfectly. With everything in order, days before I expected, I decided to go to bed.

This morning started a bit late for me. I woke up and got ready and was making my way to the office when I heard Jesse's voice. It turned out I had dreamed all of it. I need to stop falling asleep repeatedly in the morning, but mornings have been something that has always been a struggle with me. I think I need a new system. I got out the door to try to catch the bus, but missed it by a hair. By the time the next bus got me to VRAC, I was 15 min late. I was embarrassed about being late for the first time, but I read the powerpoint to catch up and managed to get back on track.

Anthony had some ideas on my project that he shared with me. They felt complex but I tried to follow along. I was glad he was thinking about what I showed him for my project, but I got a sinking feeling like I was in a bit over my head. I will be putting in some time this weekend to see if I can get his ideas, or possibly my initial ideas, to work. If I can get it to come together, this project will look great, but if I can't I may have to simplify the project significantly.

Afterward we had journal club. It hit me that the journal article was the thing I forgot about that I couldn't think of last night. It was dumb because I had been planning to read it for a while. I should have had it on my list. In the beginning I raised my hand when we were asked who hadn't read the article. Unlike the first two journal clubs, where I had done the reading, I was totally lost. I decided that the best way to approach the problem was to read the whole thing instead of sitting quietly or talking without knowing what I was talking about. The article was light so it took only about 15 min to read. Toward the end of the paper, Joe asked if he could comment on the content of the paper. As opposed to those who praised the interesting research applications from the introduction, he dug into the content of the study, which did not manage to accurately test or prove anything. From what I was reading, he was completely right. We talked about the problems with the paper as a group and it felt like the authors had written the study merely as a way to test out their new VR Cave, rather than to actually prove anything. It became very apparent why we were told to figure out what question we were to answer, then figure out what we were measuring before deciding what tool to use. This paper was an example of what happens when one does the opposite. I have nothing against the people who wrote it, or their purposed research area, but they didn't go about it in a very academic way. Some people seemed to take this as an attack on the researchers or their field, but I saw nothing personal about it. Then we were told to research the people who wrote the paper. It turns out they are working in a center in Wisconsin that works on similar projects to VRAC, but smaller. From further reading, I found out their center has not been around for very long and they are essentially just trying to get started. They probably rushed out this paper so that they would be able to show their VR environment in a conference or something. The center (coincidentally called the C4) itself didn't seem too bad, except for the fact that the website emphasizes how the PI was featured in magazines instead of making reference to any academic journals. Hopefully they are able to use their new environment to run useful studies that can contribute to this field in the future.

Although there were some bumps along the way, this has been a successful week. With the brain project in the works, this will be a busy weekend, so most of my time not spent camping will probably be spent in my pod

modelling a brain. I'm just glad everyone has been so helpful in giving me the guidance to do it.

A varying set of activities keep us awake in our various wakeful states (6/11)

Posted on [June 11, 2014](#) by [Anton Hud](#)

I left off yesterday before the end of the day, so I will go in chronological order for this post.

Advisory meeting

We had a short meeting to see how our research project was going. The first part went really well, with confirmation that our lit review and work towards a research question were going well. That was the relief I needed, but, as always, we ended the meeting knowing about more stuff we should do. My notes from the meeting trailed all the way down the page. Also, the EDA is looking like a better and better option and Kelsey may be onto something with that. If she can collect enough data from that, we could have an easier study, where the participants wouldn't be paranoid of us reading their thoughts, or in an uncomfortable cap. The EDA would give us less data, but more may be known about the data. Desmond sent us a couple papers on it from one of the other grad students, so Kelsey should have enough information now. On my end, we brought in the Rift in addition to the EEG cap but realized we didn't have a computer that could run it to test it out. I want to test it out because of the major problems with it I have been reading about in the papers. I need to see it in action to see if the problems will make it unusable, or if I can somehow work around the problems with it. Because of this, I registered with Oculus as a developer and got Oculus SDK running on my computer. Most of this had to wait until I was at home with my computer, however. I should be able to test it out with that so I can start narrowing down the usable materials for our experiment, because my end is limiting as well.

Rock climbing

When I left the lab, I had feelings of frustration and couldn't peg where they were coming from. Kelsey took my frustration personally and said she wanted to talk about it. I didn't, which seemed to upset her more. Rock climbing would be my outlet that would reset everything on my mind. Once I was ready to climb I was asked which route I would like to try. I asked my belayer about an unmarked path in blue because it was in an interesting place on the wall and has grips that looked fairly easy. His estimate of the difficulty of the route was far greater than mine. I naively agreed to do it out of sheer confidence in my ability. Within the first few grips I was falling off the wall. I was confused because the route looked clear and the grips just didn't work with me. I apologized and tried again repeatedly. He tried to help, but was guessing at the pattern of grips himself, which was curious judging by his superior skill in rock climbing. I found myself wedging myself sideways and clinging to the increasingly concave wall to stay on the grips, which became increasingly far apart. After trying the same set of grips many times while only managing to hold on with my throbbing arms and only touching the higher grip before sliding off the wall each time, I figured I had stopped making progress. I was tired, but upon coming down I realized I was close... but not nearly close enough as the grips got progressively harder. After my former belayer climbed a route, I struck up conversation about the route. He explained to me that another guy who works there had created the route specially to be only possible if one were to try a very specific set of movements up the wall. That explained the "easy" grips were sideways, which caused me to repeatedly slide off the wall. I kept trying different ways to climb up, some of which worked. It also explained why there was no difficulty rating on the wall either. He shook my hand, introducing himself, and telling me, "I work in IT here." He invited me to come back any time to try the wall again, but advised me to warm up beforehand next time. I am intrigued by the route, so I may spend more time on the wall before the end of the program.

Cooking and stuff

I had to lay down after walking back. I tried a different route and had to go on a longer trip back. After I was up and running again, Mitch asked me if I was down to cook. I was and figured food would set me straight. We made an excellent meal with orange chicken, penne pasta and veggies. The meal was greatly enjoyable, but didn't give me back my energy. I was caffeinated as well, but it did nothing for me. I couldn't shake the feeling. Oculus SDK download fine and I got it running but I was crashing even on simple things like that. The rest just didn't get done because I somehow still needed rest. The rest of the students kept mentioning how late it was all of a sudden. The time had just slipped by but I usually went to sleep far later than it was. I kept dozing off randomly. I decided to go to sleep "early" and get up early. The morning did not go very well though, I felt more tired then when I went to sleep and fell asleep continuously throughout the morning. I figured Jesse had already left by the time I was on my way but soon found out he wasn't up by then. Alexis saved us both by giving us a ride to work. I got to work and Sam told me how tired she was. It wasn't just me. At least it wasn't just me.

3D printing lecture

I had been reading about 3D printing since high school. Seeing the MakerBot and the printed models was exciting, despite my lack of energy. The lecture was captivating. It went through much of the history I had read, and more that I hadn't managed to find. Kelsey, who previously didn't understand our enthusiasm about 3D printing got so excited she was jumping out of her chair. I was thinking about what our group model could be. My initial idea was a brain, but discarded it due to the complexity. I found people's models for tiny rockets when I was browsing thingiverse. This was captivating because I built a few model rockets as a kid after my 4th grade teacher taught me how to build one out of a plastic wrap roll, cardboard, a plastic bag, string and construction paper. These models were incredible. Our group started talking and the first thing Kelsey said was "Let's build a model of a brain!" Go figure. She asked if we could just use a model from the internet but we need to at least modify a model. My idea of modification was making a square hole between the regions on the inside, making a hollow brain, with separate regions. The inside would have extended pieces with holes that would line up so a tiny metal rod could hold the regions together on a stand, but the pieces would fall into the separate regions when removed from the stand. Kelsey said she liked the idea because she wanted a brain because models of brains, especially with separated regions, are extremely expensive. Our instructor said he had a complex model but it would not be possible to downsize it. Kelsey asked if we could just delete all the complex grooves to make a simple model. I explained that it was not feasible, but she was not convinced.

I started thinking about how I would build it with the tools I learned in solidworks. I had some ideas, but they were complex. I thought hard and came up with a new idea, which felt too difficult as well. I remembered back to when I had built two model brains from clay in my 3D art class. I created the wrinkles in the cortex by rolling the clay into cylindrical pieces and folding them onto themselves to mimic the complex geometry. From that thought I imagined creating a rotation around a very carefully generated guiding path, essentially doing the same thing. The inside could just be boxes with tabs with holes in them to hold the brain together, which could be made effectively with solidworks. Those are just ideas though. I may need to get some sculpty dough to make a 3D model that I could use to estimate the complex math needed to make these parts for our 3D computer model, which would be used to create a perfect printed 3D model...

Etiquette lunch

I originally planned to spend lunch today going to the surplus sale to build the makeshift projector I told Ben about, which he already managed to build in less than a day. Instead we were scheduled to go to an etiquette lunch, which is my personal hell. I had an idea of what the lunch was before I stepped in and had the misfortune of finding exactly what I was dreading exactly as I imaged it. Don't get me wrong, I think it is important to carry oneself in a respectful manner and eat in a tidy way during an interview. I knew almost all of the etiquette procedures before the lunch began. I hate it though. I don't feel like I should need painfully rigid rules to prove to business people that I'm a civilized animal during a dinner. The meal was phenomenal, but I felt like it had the joy associated with nice food sucked out of it. I, more importantly, feel that I should be hired based on my skills and actual personality, rather than

than some 'face' I put on for a night while going through a careful procedure for a potential employer. I enjoy hearing that the formal dinner interview is getting less common and would rather work myself to death trying to get a startup off the ground than work in corporate conformity. The instructor kept looking for mistakes to pick on students for messing up. The only mistake I made was ripping the entire top off of the coffee sugar instead of letting it hang from a strand. I found myself wishing they had left me an additional knife, but that might have been the easy way out. I wasn't sure how to use the coffee spoon I had instead to end my suffering as I ate one of the finest meals of my life.

My deep hatred of etiquette procedures isn't random. It is not just hating the structure and anal retentive nature of it. I also loath the classist implications left over from the previous centuries. I just imagine those who try to move up in older civilizations and ran into invisible walls set by the upper classes, like etiquette. Regardless of one's skills or intellect, you could be called an animal because of your lack of knowledge of an extremely intricate and inefficient system of eating. On the other side of things, rigid etiquette has played to the disadvantage of the upper classes in previous centuries when working with the lower classes. I'm not just talking about French cake eating and head chopping. The first case that comes to mind is an exploration group that ventured into the arctic. It was a British crew that was not doing well adapting to the environment. With too few tools and heavy supplies, the crew petitioned the commanding officer to drop the heavy dinnerware that they were carrying with them. The commanding officer responded that they were not animals and would continue to "eat like Englishmen" until the expedition was over. Their meals were served on multiple plates with myriad pieces of silverware even as they were freezing and starving to death. The entire crew died before they made it back, but they did eat like Englishmen until the expedition ended, with their deaths. I figured that by now we would have evolved past such pointless and frustrating methods of eating, but I may still need to practice this at some point in the future to close a deal, so I will probably pretend to be some sort of OCD raving elitist if I need to. Until then, "Down with the Bourgeoisie, give me a good, bloody chop", and I don't mind if you reach across the table to hand me that tasty piece of pork.

Conclusion

My enthusiasm and wakefulness has fluctuated wildly during the recent events. I have both loved and hated what I have needed to do over the last few days. I couldn't have expected to like everything and I am happy to be here. The next few days should be more organized and I will have to make lists of all the things I have to do so that I can insure it all gets done. The constant extracurriculars dominate the free time I have, but I like the activities and the group enough to enjoy the activities, even when I could be working or doing other things that are on my mind. Even if my projects don't go as well as I hope, I will walk out of here with skills I need and want for what I want to do with my life. Even failure could result in personal gain over the summer. If I weren't in the program I would be working retail and tutoring while doing an electrical engineering course at Georgia Tech. I can't imagine enjoying that summer in any comparable measure to even the worst of times here. I think too much, but I enjoy being overstimulated far more than being under-stimulated. My free time and sleepless hours in Atlanta would be spend dreaming about the applications I see here every day.

Geek@insertdomainnamehere.edu (6/10)

Posted on [June 11, 2014](#) by [Anton Hud](#)

I had to finish up the post from yesterday (6/10)

Instead of the normal chronological convention I've been following, I'm going to go in reverse chronological order. Why? Because the thoughts are flowing and I feel like stopping and working backward to remember the first thing and retracing my steps will make me lose my momentum. If I stop I will remember that I struggled to get out of bed this morning and feel tired. Wait, no, don't remind yourself, stay engaged and interested and you wont remember. It's like saying don't think about elephants. Now you are thinking about elephants. Good, that's a better thought!

Lunch-in Lecture

Our lunch in lecturer was extremely engaging and wanted to begin by talking about the elephant in the room for our generation. Our parents talk to us about it, most people our age are doing it and some are even addicted. Oh no, epidemic! I'm, of course, talking about our interactions with technology. (Jeez, what were you thinking?!) Technology is the norm for our generation, while older generations are often weary, or even scared, of it. I feel like many of those who are quickly find themselves in retirement homes are leading the witchhunt of the wizards of our generation who communicated through digital means. Our speaker acknowledged the problems with students going harddrive on the technology, but outlined some of the advantages as well. He immediately addressed the very black and white views of technology interaction in the media, and showed us numerous ways they are inaccurate. The effects of daily use of technology is definitely a grey area, with many mixed outcomes. His specialty is stats, which he uses to put order to the chaos of big data.

Our speaker was named Reynol Junco, or as his email alias says, "Geek". Yup, we met the guy who was bold enough to challenge the system and write his username as "geek". He laughs, "But I have tenure!" He then openly admits that he hasn't prepared any structured talk for us to outline what he does. He'd rather just chat about it as if we were his peers and show us data analysis and papers he finds interesting to give us the academic connection to our thoughts on our own experiences. We were all engaged and at ease while he joked with us at our level, not once pulling rank and authority. It was almost like we were the interest of his study while we were interested in his studies. The more we could contribute, the more we could all learn and the information started flowing. Kind of like facebook, which brings me to the next point.

After chatting and joking with him for an unprofessionally long time, I managed to coax him into showing us his slides. He admitted he was working on them for a conference he is going to soon. His slides were regarding the effects of the internet on our generation. What I found interesting about these slides was that students who were twittering their way through their academic programs had a 18% higher retention rate (70% opposed to 88%), which is greatly significant. He also talked about how students were more open to discuss books they read with each other through social media, and were more likely to participate in discussions in class afterward. There were graphs about how the career services and recruitment offices used information from facebook and twitter. There were studies about how online social environments set up by social networks allowed youth to rapidly develop socially. He even had data on how people from different socioeconomic status used facebook and other social networking differently. We were expecting a long structured talk and ended up with a giant discussion and Q & A session. It was nontraditional, but engaging and interactive. Through his slightly uncouth methods he got our minds working. Go figure. I'll have to look into reading the studies in his book.

Solidworks

Before our lunch in lecture we worked in solidworks again. It went much better than yesterday. I suppose I am starting to get the hang of the options menus. I was able to complete the tutorials today without much trouble because I had a feel for how to get the menus I wanted and could mostly find what I needed. I first made the basic candle stick with the rotate tool and then created a pawn from chess to see if I could do it myself. The rotate tool was one of the tools I wanted to work with from the initial lecture. I had used similar tools before and feel like that is a tool that will come in handy in the future. We were also told that we were going to be able to create models and 3D print them, which got me excited. I started reading about 3D printing when it went mainstream when I was in high school and was waiting for a chance to actually use one. This will be a firsthand use opportunity I am lucky to have during my undergrad. I also heard we would start learning Maya as well, which is what one of my friends who went to art school learned. Maya seems like a powerful program that could be used for other things I want to do. Although I kind of suffered through the first day, things are moving more smoothly now and I am excited, but apprehensive, about what is to come. Even if my research doesn't go as well as I hope, I feel like I can leave here with a skillset that will prepare me to begin the journey to my dream career.

C++

Continuing in reverse order to the end of my last post, the day before our groups presented our programs for our

C++ class. Our project came together smoothly in the time leading up to the presentations. Sam and I had the working parts and Kelsey gave the user instructions that tied everything together. We were confident in our working project but were afraid that other groups would show us up. The night before I was going to bed, only stressing about other things, when I saw Jesse staring at his computer, looking very frustrated. I asked him what was wrong and he told me that his game wasn't fully functioning. When one piece moved into the space of another, the claimed piece didn't reset back to home in his trouble game. His game looked phenomenal, with a functioning gameboard. His game would surely blow ours out of the water. I asked him numerous questions on the inner workings of his program and the classes that work within it. His class structure was elegant but was written in a way that made finding and resetting a piece difficult. He then moved to different lines of code. These were really long and had a giant logic structure that checked every piece. He said "this *should* work, but I know there was a more elegant way to do it." I agreed and sat on his floor as the gears turned in my head. "Part of the problem is that all the players and pieces are written as colors and names, so you can't just run through them." He nodded and said, "Yes, that is *part* of the problem." I asked if there were 'getter' function and he showed them to me. I thought more and told him that I would put the colors into arrays and run through the indexes in a couple nested loops to check every single piece against the one moving, then inside the loops I would put the function that would return the piece the loop to home if it was in the same place on the board. He understood and told me he could do that. I knocked out while he was still working but asked him how it went the morning before we presented. He said he got it, but it was not as simple as what I said. I told him, "It's never is *that* simple" and he nodded saying, "it never is". That morning we presented and his amazing project won the competition. Our presentation went well as well, but Jesse's project deserved the win, especially with all the work I've seen him put into it.

I am very good at very random things.

Posted on [June 9, 2014](#) by [Anton Hud](#)

Those who know me well, or have gotten to know me well recently, know that I have very random strengths and weaknesses. One of these was my innate test taking ability. This has gotten me far, but not as far as one would expect. I have often been singled out as being "smart" for showing such strengths, yet preformed about average the majority of the time. While other kids always hated me for killing the curve on their tests in school, I was very rarely the top of the class when all the grades came out. I have wondered before if I am some sort of idiot-savant. It feels as if it takes me far more effort to work on any of my weaknesses than anyone else, but that may just be the egocentric perspective messing with me.

I've been noticing this a lot lately though. I figured an interdisciplinary would be easier for me because I could mostly just apply my strengths and preform at my optimum level. That was a very naive thought. There are aspects of research that everyone must do, like the literature review. I struggle with finding the right resources, organizing notes and citations, reading large amounts of text and constantly get caught up in details. Nevertheless, I managed to read a lot of papers, many of which were written in ways that I luckily could understand well. Last week I buckled down and wrote up the notes and copied the citations of about 10 papers I had previously read. Writing up the papers, and meeting with my group, made me realize what I needed to read, which was kind of intimidating. Part of that was expanding on one of the topics I had found in the papers and the other was research into whether the Oculus rift would be a good option. I assume I searched the wrong databases when I initially tried, because nothing I found seemed to work with what we were doing. Kind of frustrated, I went to the picnic on Sunday to eat, socialize and blow off some steam. While there I was lucky enough to strike up conversation with Phil, who started talking about papers on the rift and was nice enough to agree to send them to me to read. Phil is amazing at the literature review stuff and sent me exactly what I needed. When I thought about it my thoughts trailed back to my strengths and weaknesses. Finding good resources: Weakness. Networking and Socializing: Strength.

This morning also brought interesting insight into the same subject and gave me other things to think about as well.

The lecture about 3D modeling was riveting, to say the least. It got my thoughts flowing and I wrote extensive notes on all the information in the slides. The first thing that sparked my interest was in the introduction of the talk. The idea of modeling parts that are easy/possible to make was fascinating to me. My dad worked with a lot of machinists in the shop while getting his physics degree in college. I also have an acquaintance who is a machinist, who extensively explained to me the toolset that workers in his trade work with. I remember boxing electronics projects with my dad and wanting slide switches, only to find myself arguing with my dad when he switched them out for toggles and potentiometers. I was young and tried to argue, but he quickly shut me down by simply asking how I would box my project and pulling out the drill. He told me a story about a friend in college who wanted some electronics built with all slide potentiometers, who couldn't find anyone who would agree to build it for him for any amount of money he offered. I later worked on a project later with my dad where he wanted to include numerous square ports and I spent many hours trying to make it work. After he saw me struggling with a drill and the dremel, he gave me his nibbler, which had too small a gap for the thick plastic boxes we were using for the circuits. Working with the tools at hand: Strength. Building things that the tools aren't designed for: Weakness.

The topic also sent my mind spiraling in another direction. I love to play with electronics, and since the course taught me to build my own, my hobbies have really taken off. Although building circuits can be very solitary, I am a very social person. I would often have people over at my room at school, where I had a work bench set up with lots of tools and parts. Often someone would come in and tell me that they thought electronics were cool and ask me to help build stuff for them. The requests were usually quite absurd, with people asking me to build them robots, touch screen tables, iPhone docks with built in mixers and so on. These requests often showed the lack of understanding of those people. I had these requests before I started playing with electronics though. I was playing with scripting for game engines in high school friends would ask me to make things like "boots that allow players to walk on walls". I sometimes would explain what scripting was only to get the response of blank stares and questions like "so, how long do you think it would take?" I can only imagine how the machinists feel when people come in and ask them to do tasks that don't make sense in their world. In the future I would love to work/network with machinists and I would hate to be that idiot who tells them to do impractical or impossible tasks. Luckily, I could probably communicate with them well enough to avoid such a thing. Communicating to find what is possible: Strength. Communicating with enthusiastic but naive users: Weakness.

The next part of the lecture was even more fascinating, if that is possible. I first encountered drawing with equations when my calculus teacher in high school, who had a master's degree in mechanical as well as electrical engineering showed the class how products could be designed using equations. Many of the students couldn't believe that products could be designed in such a way. Later, I saw drawing with equations in programming fields for electricity and magnetism in college. My dad also showed me how to do similar drawings with equations when he tried to teach me POV-Ray (A ray tracing program), with mixed success. I attempted to learn POV-Ray again in a class last semester for a project, but mainly stuck with tutorials. Drawing with equations seems like a whole new world and I am excited to start playing with it. Hopefully this REU will solidify those skills because I feel like the skills would be extremely important in any of the fields want to work in post-college. Modeling shapes with equations: Strength. Lack of knowledge of programs to do it: Weakness (so far).

Finally, it was time to start working with the program. I was excited at first because I could finally start working with something tangible. The layout, however, was nothing like any other program I had used before. I suppose the menus could be intuitive to an experienced user, but honestly, I struggled at first. I had the same struggle the first time I opened photoshop, many years ago. I am now very proficient at photoshop, so I am sure I will get the hang of this program. However, the learning curve seems a lot steeper in this case and I am back to something I struggle with, following directions. I am not saying the tutorials are bad, quite to the contrary, they are written extremely well, I just fail at following directions. In flash and photoshop, I spent forever stumbling through the tutorials at the speed of rock before I was able to take the reins myself and practice enough to become proficient. The Adobe programs are an obsession now and I do many tasks without even having to think about where everything is. I hope SolidWorks becomes the same way, but every time I mess up and hit undo or click on the wrong thing, the menus seem to change and I get hopelessly lost in the program. I have been stuck multiple times today when I lost a menu and had

to spend lots of time and brainpower trying to find it again. I restarted the first program because I messed up and got completely lost after hitting undo. Step by step tutorial following: Weakness. Finding good ways to perform tasks in programs: (usually) Strength.

How unhealthy work habits work... or don't.

Posted on [June 6, 2014](#) by [Anton Hud](#)

Around the middle of this week everything seemed to hit me at once. I went over what I had to do and realized I had a long list of things to do, all of which were high priority. The previous day I had gone to the gym with everyone so that I could exercise the stress away. The bike said that I had peddled 8.5 miles and burned over 250 calories, averaging about 100 rpm. I then did arms with Mariama, who was a great work out partner, and worked on abs with the roman chair. After walking back with Philip I decided to lay down before my shower and ended up waking up the next day. This meant that the numerous tasks I had hoped to at least touch that night were all crammed into the next day. Essentially, using the gym to knock out stress completely backfired.

The stress came back that morning when I felt the need to do all of these tasks at the same time. I tried to make a to-do list a few times but got sidetracked by all the tasks at hand. I ended up channeling all the stress into hyper-productivity and knocked out the biggest ones super fast. I had realized that I started all the tasks previously but not completed them. I mean to say that all the papers had been read but not posted and summarized AND the code was all written but it needed to be debugged. All the other tasks were the same way. It made me realize that I had been putting off the tasks that I struggle with or dislike. Luckily, these tasks went relatively smoothly and I was able to get through more than expected. At the end of the day I was still stuck on the code, however. Frustrated I finally broke down and asked Sam for help. Realizing I had only commented half of my code, I decided to tell her what was going on line-by-line. While talking it out, my error of setting one variable to another was switched became obvious. I felt the frustration of having been stuck on one error for at least a couple days and then realizing how simple it was. If I wasn't so stubborn and would've just asked for help before I wouldn't have had the problem at all. Additionally, I was trying not to talk out all my code because, honestly, I talk too much anyways. I guess that goes to show that I can't change that certain parts of my problem solving process are primarily verbal. What I can take home from these issues is that I need to work on working with my strengths and weaknesses, even while trying to work around them.

These endeavors left me feeling extremely drained. I had to leave to lab just to spend a moment away but had to go back to do light painting. Light painting felt like it would be one of my favorite activities because I have enjoyed doing it before, but I was too drained to really enjoy it. I was asked for creative contributions a few times, which makes me feel good about people recognizing my creative ability, but I couldn't get the creative juices flowing. Perhaps I had burned up all the glucose in my brain. At least it felt like that, as one feels after a long exam. I eventually stopped trying to be involved and outgoing as my head began to hurt more and just hung out on the sideline for the majority of the activity. Luckily, most of the pictures look great without much input from me. I suppose it shows that the group is strong enough to function and support me during my worst of days. Hopefully I won't have days like that in the future, but if I do, I am confident that the group will help pull me through them.

Afterward, I went out with some of the members of the group to go eat. It was nice to hang out with a different subgroup from my regular friends in the program but I was kind of hungry and crabby while we struggled with indecision about where to eat. One I had food in my system I started to perk up, but still felt as though I was constantly striking out whenever asserting my thoughts and opinions in conversation. It may have been the low I was hitting or the uncomfortable feeling of being away from my usual group, or both. At the end I halfway apologized for being the oddball in the group, but they said I was fine, so I don't think I offended anyone. Afterward I decided to see if I could find my usual group. I found Mitch, who was really accommodating and told me the rest of my peeps were coming back from the store. I began to feel much better from both metabolizing the food and hanging around the more familiar group. Despite this I was still feeling drained and wished I had been more charismatic and agreeable with everyone else. I suppose I shouldn't expect to instantly hit it off with everyone perfectly. We'll grow on

each other through the program and next time I see them I will be hopefully feeling a lot better than I was yesterday. With the guys, I started watching the show “Silicon Valley” that Dr. Elliot Winer had recommended earlier. There were a lot of hilarious, socially awkward jokes in it. It was a hit with all of us and I enjoyed seeing how the programmers and the business people interacted. We enjoyed it so much we had to watch another episode before we were content. Afterward I went back to my dorm and read the paper for journal club and then slept better than I had in weeks.

Out of the nest... but not ready to fly yet. (Yes, another analogy)

Posted on [June 5, 2014](#) by [Anton Hud](#)

Week two has been a major contrast to last week. Last week was full of lighthearted happiness about being in the program and feeling good about what we had learned before we came here. This week has shown us what we haven't learned yet and given us a glimpse of what is to come. I imagine this with an analogy of a bird reaching the age where it is necessary to leave the nest. Like a small bird, at this point in our lives, we are used to just internalizing the regurgitated needed contents straight from our experienced and full-fledged adults in our learning environments. At some point we are ready to graduate from the nest and forage for our own food for thought. A bird does not learn to fly instantly through some kind of magic, just as one does not instantly learn to do their own research. The fledgling is pushed from the nest, lightly at first, until they are out in the open air. They beat their wings and push themselves directly... into the ground. A painful realization is reached, which is that we don't know. That's fine though, because nature, and our prerequisite teaching, has hopefully made us strong enough that we won't become damaged and fall apart from our first fall.

This week has had repeated setbacks where I learned that I didn't know what I was doing, when I thought I did. It has also shown me that sometimes what I was doing was also not to par. At first, it stung a little, but that's how learning works. If you fall and you deny it, you never develop fully. You become a walking bird. You don't want to be a walking bird. A bird is meant to fly (except for emus, ostriches, kiwis, puffins and penguins) because that is what gives the birds their advantage over the other species in the animal kingdom. A human has the advantage of sentience, which can be developed into great stretches of thought and creation. That stretch into wrapping one's head around the unknown and figuring it out is called RESEARCH. That's what we are here to learn how to do. The time before we were here and the first week were all in the nest, with only glimpses of the outside world. This week was the first experience with being pushed from the nest and the rest of the program will be us first learning how to fly.

Image taken from: <http://blogs.bu.edu/bioaerial2012/2012/10/09/nature-vs-nurture-how-do-baby-birds-learn-how-to-fly/>

Finally Moving (sort of)

Posted on [June 3, 2014](#) by [Anton Hud](#)

Today has been the second day of the C++ course. For the first part of the course, my computer was under repair by the IT guys but it was restored, with new a new version of Microsoft Visual studio and everything. Luckily, today, unlike yesterday, used code that was identical to the Java code I am familiar with. Once my computer was restored I had no problem writing the assignments and even learned a few things along the way. The course is going smoothly and I feel like the transition from Java to C++ will not give me trouble in this program, pun not intended. Also, we had to decide on a programming project to work on as a group. I was originally hoping to build a text-based RPG (Role Playing Game) that could run inside of the C++ console, as I heard Philip originally hoped to build as well. Sam had her mind set on the 'Mastermind' game, which I eventually agreed to because it seems like a good exercise in coding that probably wont run us into the ground, or take us down the rabbit hole. It should be simple enough to build with an array, the data types we learned yesterday and the logic structures we went over today. However, Ben, the graduate student sitting in on our C++ course said that he would be willing to additionally write the RPG game code with me and whoever else would like to. Hint, hint **Philip**. There is a lot of interesting coding that would go into building the RPG that could be useful to our group project program dialog. Also, it may come in handy if all of the guys actually get the tabletop game running.



Moving past programming, the last couple days have been critical in meeting the faculty which we will be working on for our group project itself. I now have a much more solid grasp of what we can do as a group, as opposed to feeling anxious and lost regarding our project topic last week. Although we haven't quite nailed it down quite yet, our project will involve guiding our test subjects through a 'maze' in a game world where they make simple binary decisions that ultimately determine the outcome of each game. With any luck Kelsey will be analyzing the cryptic brainwaves from our subjects as they go through the tests Sam and I design for them. Sam and I may even act as fake group members, also known as confederates. The subjects would, of course, have to be oblivious to all these things going on under the hood. As long as we keep it **simple**, we should be able to collect data from ~10 subjects and analyze it within the 10 weeks. It is major crunch time though, and that is where the anxiety comes from. I feel like I need to be speeding through this experiment in the time given, but we've been killing a lot of time trying to figure out how to start, and painfully hashing out the details. I have some ideas about how to implement it, but I am going to need approval, group cooperation and a lot of luck to get my ideas off the ground. I want to make this as interesting/involved as possible without adding so much complexity that we get too much data to collect or analyze. It is a tricky balance.

Blah Blaa Blog

Posted on [June 2, 2014](#) by [Anton Hud](#)

I have to make an extensive blog post to make up for all the things I missed writing about because my computer wasn't working on Friday. The IT guys felt really bad for me too. After trying numerous things they finally were like "We're sorry, we ran out of things to try, so we'll get you a new computer, but we'll run the virus scan just in case. Lo and behold, it found something and now my computer works perfectly. Thanks guys!

Then there was the tour. It was phenomenal! So much incredibly cool research goes on in this building. The C6 was a lot of fun and the graduate students were very helpful in informing me on the intricacies of its "inner" workings. I

love how it is no longer just a big “black box” in the middle of the building. Playing the games was fun and my mind almost instantly stopped seeing the projected walls and merged them into the expanse that is STAR WARS! 3D movie theaters do not even begin to compare. The closest I had ever seen was a projected dome, which lacked the interactivity. I made short work of all the bogies, but felt the need for more virtual objects penetrating the space inside the walls and force feedback. I had the pleasure of talking to one of the graduate students who tagged along with us, who said he was open to feedback and was working on just the things I felt the need for already. Afterward I saw some neat augmented reality, flight simulation labs, space simulation labs, windtunnel and tornado simulators and an entire collection of airplane parts from different eras! Each is enough to write an entire blog post about, but I’m already rambling. I look forward to seeing where I’m going to be working soon. Honestly, it has been hyped up (at least for me) even more than the things I have already seen. If it is even half as good as I am hoping this summer will fly by.

The next part of our Friday was the Myers-Briggs personality test. This is my favorite of all the personality tests because of its ability to describe people so well from such basic information. I was really excited because I had never seen the kit designed for Human Metrics for the test. Their’s seemed to focus on individual pairings of the different traits instead of just the profile as a whole. Seeing the personality types of my peers brought some interesting insights into our interactions, but seeing how people differed from their types was just as interesting. Honestly, I wasn’t as impressed with the personality profiles as with other tests, but the test itself seemed to work well enough. I registered as an ENTP, which is what I always come out as, but interestingly all of my percentages shifted since the last time I took the test. I could attribute these shifts to work I had done on myself to achieve better grades over the last academic year. As I forced myself to become more structured, I guess my personality became more structured. Also my personality shifted towards more emotionally based decisions, which I attribute to bending my own rules to make accommodations to people in my life who are more emotionally based and need my empathy. Nevertheless, I still come out as an ENTP, which Human Metrics calls the “Inventor”. I rather like this title because it sums up my interests and was also the title of my “What I want to do when I grow up” essay from first grade. I’ve changed a lot, but managed to keep my wildly imaginative but analytically able personality intact.

The last thing I will talk about in this post is the ropes course. The course taught us a lot about ourselves as well. Especially how we function together as a group. My group did well at pendulum and pinball and we all managed to work together almost seamlessly on the spider web. By then we had established our group mind and were ready to try the swing. It was higher than expected. It took me a while to figure out what we learned from the swing but I think I figured it out. The swing definitely taught us who would be the first to go in a zombie/werewolf/horror movie. We can measure this as an arbitrary constant we can call λ . Lamb, duh because of the development of our herding instincts, the random reference to sheep getting eaten by monsters in movies before humans and just for the sake of really Baaaaaa’d jokes. Yup, these are *horrible* horror movie sheep jokes. Since we are not the dumb, stereotypical college students who walk right into death while saying “I wonder where Stacy went... we should split up” while following Stacy’s screams of horror, we would probably have to be lured out one by one. From the swing we can measure λ from blatantly bleating bloody murder to no giving a flying flock. (Because sheep have flocks but don’t often fly.) I imagine Sam would be the first to go because she is independent, didn’t scream and hates horror movies. We would all look for her to try and get her to go to the arcade with us. Suddenly I would get distracted and wander away from the group and be the second to go missing. It’s okay, I’m not a big horror fan either. As the group member would slowly get eaten or turned into zombies, the movie would gear toward climax with louder and louder screams. The climax of our movie would have Phillip climbing the water tower with lots of zombies (or whatever) chasing (or possibly just encouraging) him to the top. Since he isn’t the most surefooted mountain goat, we would have an intense 20 min long action scene full of screaming and literal suspense. I had a lot of fun and I woke up the next day feeling like all my muscles had been tenderized and was ready to fall right off the bone.

First post!

Posted on [May 29, 2014](#) by [Anton Hud](#)

I have to start somewhere, so this is my first post.

I'm **not** a morning person, *but* I am ready for today to get moving. The morning walk was a nice way to stretch my legs and get my blood pumping while walking through this gorgeous campus. Iowa seems to have such fertile land with everything growing so well. It is kind of ironic that everyone has told me about how horrible the allergies are here but I have almost no allergies at all despite having some of the worst allergies in both of my home states. I have definitely not entered the state of allergies. It may just be the fact that Redlands and Atlanta are notorious for lush trees and grass that spray the air with pollen. I suppose there is less pollen here, or perhaps I am just not allergic to it.

To segue back to the subject of this REU from my tangent, I am looking forward to my time indoors even more than my glorious time outside. I always was a giant science and computing nerd, so I feel like I am completely in my element in this phenomenal lab space. I am so glad that I ended up in this group of likeminded, yet diversely skilled, individuals rather than working with distant people in a giant chemistry lab (again). I prefer programming to pipette work any day, even if my coding leads to hours of infuriating debugging. I feel like my previous semester with electronics, computer science and some math has prepared me to get started very well. Not to say that I know much about this subject yet, but I feel like I am far better prepared to start learning about it than when I applied last year. That being said, I couldn't be more glad to be here today. It will be fun exploring what may ultimately become my career. Hard work is not as draining when one is passionate about what they are doing because sometimes "play is work and work is play". However, I feel like play may be play as well while I am here.