

David McKnight

 projects.vrac.iastate.edu/REU2016/people/interns/david-mcknight/

McKnight Post 22 (28 July 2016)

Posted on [July 28, 2016](#) by [dem](#) July 28, 2016

Hlo

*Hello

Busy, busy! As good as I think I'm getting with the basics of Unity, it's still very much a learning process (I spend about a quarter of the time making progress in building our task, and about three fourths of it figuring what went wrong in the process of making that progress). In addition to being time-consuming, it's also for brief moments hilarious (in the right frame of mind), as oftentimes the bugs that I spend hours looking for and for solutions to are two-second fixes. On the bright side, once you're aware of the sort of errors that can occur, it becomes much easier to recognize and fix them the second time around :).

Speaking of fixes, Unity v5.4 came out today. I'm crossing my fingers that with it will come a fix for the multi-display problem I've been having (two of them, actually: the first is that only one player's UI elements ever display at a time, while the second is that I'm having issues getting the program to output to multiple monitors (from reading the patch notes, I'm hopeful for the second one)). I hadn't been expecting it to release so quickly after 5.3.6!

Anyway, it just finished installing, so I'm going to go check it out.

til nxt thyme

*'til next time

-David McKnight



McKnight Post 21 (22 July 2016)

Posted on [July 22, 2016](#) by [dem](#) July 22, 2016

Goeie middei!

I've made some more progress on developing the project- finally figured out some decent ways to display minimaps (although I need to divine how to interact with it- I think I should be able to use matrix transformations along with a global boolean array to regulate minimap visibility; I'll be exploring that in the next few days).

On the flipside, I feel as though my social interactions may need some work- I suspect increasing the amount of time I allocate to sleep should help with the matter (I've been running on empty this past week, but last night I bumped it back up to 6.5-ish hours of sleep, and plan on extending that to 7 tonight).

Anyway, I think I'm going to cut this blog post off earlier this time.

Oant letter,

-David McKnight

McKnight Post 20 (20 July 2016)

Posted on [July 21, 2016](#) by [dem](#) July 21, 2016

Kuut sunhehk!

So we got a bit of a tour of the Science Museum two days ago- lots of memories of things I enjoyed in the past came flooding back. Unfortunately, not all of the knowledge came with those memories XD. When we got to the portion of

-David McKnight

McKnight Post 16 (9 July 2016)

Posted on [July 12, 2016](#) by [dem](#)July 12, 2016

Buena tardi!

(for clarification, today I'm blogging posts from the last few days that I just never submitted)

So today we had our first HCI class- it was with Chase (the grad student around here who seems to enjoy gaming as a hobby the most) and Caitlyn (who also seems pretty fun (I hope I'm spelling that correctly)), so it was fairly enjoyable. We'll be going to Zombie Burger and Sky Zone later tonight- although not necessarily in that order. I don't remember ever going to a SkyZone-esque, place, so it should be interesting (and Zombie Burger is apparently an undead-themed restaurant, so... ☺)

-David McKnight



McKnight Post 15 (5 July 2016)

Posted on [July 5, 2016](#) by [dem](#)July 5, 2016

こんばんわ (apparently my keyboard preferences get transferred when I login with my MSFT account on another computer, so yay!)

So my hard drive stopped responding to startup commands a little while ago- either that, or an update corrupted my operating system somehow. I'm hopeful that 'tis the latter situation, as I'm still able to pull files from it (albeit directly), and my laptop itself will still boot via a Live USB device.

This weekends been bumpy for me- Friday night ended with a stomachache, Saturday introduced the hard drive issue, Sunday greeted me with my phone's left speaker inoperable, and Monday decided that a clogged toilet was a great idea on one of the few days of this summer that all of the places where I could procure a plunger would be closed. I still had a good weekend, though (Zero Escape: Zero Time Dilemma has been scratching a *serious* puzzle itch that I didn't even know I had.

Edit: Just realized I never posted this. Almost done with work for today, and I don't feel like typing much more (it's kinda getting late, and I still need to prep for the Deep Dive project tomorrow and walk back home), so I'm just going to call it a night.

じゃまた、
ーダビドマクナイト

McKnight Post 14 (July 1 2016)

Posted on [July 1, 2016](#) by [dem](#)July 1, 2016

Guid mornin!

I was unable to post yesterday, so I figure I'll do yesterday's post right now, and today's later today (my research group had a presentation to give during blog time yesterday).

Yesterday was a packed day. We had to put the finishing touches on a preparation, we had a Luncheon Lecture, we had Craft of Research, we had the presentation to give, we had a meeting for feedback on it, and we had meetings to discuss things moving forward from it.

I had an interesting time last night troubleshooting one of my room-mates computer problems- for whatever reason, his computer lost access to his hard drive, so I spent a few hours trying to set up a Live USB (a USB with a full OS on it) for him. Unfortunately, the first two hours of that time were spent trying to troubleshoot why Puppy Linux and Damn Small Linux wouldn't run on his machine (in the former's case, it was having trouble finding a file that I knew was on the flash drive, so I was quite confused). I ended up conceding temporary defeat on that one though (I had gone through 3 different installation methods for Puppy Linux, 2 of which were bootable from my machine but not his), and I was confused by the DSLinux message, so I just installed Fedora (a more common flavor of Linux (albeit larger), one of my personal favorites). Everything was working at the end though, so that's good!

I had considerably less luck with adding bones to the model of myself (my roommate requested it for whatever project his Deeper Dive group is working on). I couldn't figure out how to keep the texture file associated with an object+texture file group that had a subtraction (set difference) operation applied to it in Maya. I'm hoping to ask Karen if she has any feedback on that. In the meantime, Stanley just said that he'd have my character float around, so I suppose that'll work with what they're doing.

Oh, and I discovered a new artist (Ken Ashcorp) whose songs have really interesting lyrics (like, well-constructed).

Well, it's 10. I've got things to do, but I'll post more later today.

Until next time!

-David McKnight

McKnight Post 13 (29 June 2016)

Posted on [June 29, 2016](#) by [dem](#) June 29, 2016

Maidin mhaith!

So I finally got sleep last night (went to bed at 6pm, woke up at 8am XD). I spent a bunch of time on Sunday night and Monday night (read: most of those nights/mornings) preparing the task for our meeting with the professors/grad students yesterday that, thankfully went well, so... yay! We have a task to build on!

Deep Dive-wise (in my case, the class on GPGPU and CUDA) we learned a bunch of interesting things on Monday and today that I look forward to implementing in a project- I'm hoping to build a graphing program (because calculating points is something well-suited to parallelization), but because only a part of that is relevant to the specifics of the deep dive, I may need to combine that with something else (maybe make it so I can turn a resulting graph into a texture model, then import such models to Unity and apply shaders? That could be interesting. Or... if I worked with multidimensional graphing, I could use shading to represent extra dimensional values. Yeah, I think I'll try to do that).

In terms of my personal life, the game I pre-ordered last week on Amazon (Zero Escape: Zero Time Dilemma) finally released, and got really good reviews (which is cool, considering how niche the Visual Novel/Puzzle marketplace is, and the fact that I had assumed they'd expended most of their ideas on 999 and Zero Escape: Virtue's Last Reward). I look forward to playing it, although Amazon seems to have not only messed up my shipping address (I didn't realize it had auto-formatted it to an address that hopefully will get it here, but that I'm not sure of) and the fact that Amazon seems to have postponed the delivery of it indefinitely (it looks like they did NOT order enough for everyone). That's a good thing in the short term, though, as I definitely don't have time to play through it right now anyway (I suppose I could just get a digital copy, but I like having a hard copy of my games ☺).

Anyway, I've a group meeting in 5 minutes that I should probably get to. Until next time!

-David McKnight

McKnight Post 12 (24 June 2016)

Posted on [June 24, 2016](#) by [dem](#) June 24, 2016

Buon Giorno!

So I'm running out of memorized greetings in different languages (or languages in which I've memorized greetings, to be more accurate). Imma have to resort to fictional languages soon, after which I'll probably just look up some more (my goal is to see how far I can get without resorting to looking stuff up). Anyway, REU stuff is the major point of these posts, so posthaste shall I discuss it :).

We started our "Deep Dive" topics today- I'm in the "Shaders and Graphics Processing" group along with June, Sam, and Steve. Today we learned a general overview of the graphics pipeline, as well as what shaders, textures, bump maps, displacement maps, etc. were. They seem really nifty! I'm looking forward to messing around with them when I get home.

Oh, and Brexit happened :(. Now we'll have to see what response Scotland and Northern Ireland have to the whole situation (and whether EU entities other than the UK decide to split). I'd talk more about it, but I gtg.

Until next time-

-David

McKnight Post 11

Posted on [June 23, 2016](#) by [dem](#) June 23, 2016

Aloha! So the Brexit vote's going to be finished soon (although the results probably won't be out until tomorrow noon-ish). Been dreading this day for a while now; here's hoping that Bremaing prevails... On the lighter side of things, we just got back from a very interesting presentation concerning using the GPU to compute things (I even got a chance to ask very specific questions about some of the specifics, and the speaker, Dr. Adarsh Krishnamurthy, proved to be a veritable fountain of knowledge on the subject (and had some awesome additional PowerPoint slides to help illustrate)). He said I could e-mail him for copies of the presentations, which I will definitely do. From a project perspective, the problem statement's pretty much written- all that's left is to finish formatting sources and getting feedback on it (which may mean it's not even close to being finished, but for now I'm going to be optimistic in order to keep myself in a positive state of mind when discussing it with my group members- no-one likes a mopey group member XD). Oh, and on a personal level, I'm pumped for the Bloodstained demo that I'll be receiving in a few days (lol. Aria of Sorrow's "Ruined Castle Corridor" just came on my playlist as I was writing this XD). For those who're unaware of what it is, basically there's a game series out there called Castlevania, that, among its many games, has a set that have a gameplay style known as [Metroidvania^{\[1\]}](#); most, if not all of the games in said set, were directed by a person named Koji Igarashi. Konami's kinda switched away from game development and over to Pachinko machines now (they've even tried to shoehorn the Castlevania franchise into pachinko machines, to my horror- the trailer for it had mindless stereotyping and oversexualization, which I suppose make sense in a gambling machine, but are NOT major elements of the series I fell in love with). So Iga (Igarashi's nickname) left the company and started a Kickstarter for Bloodstained (so-called because the main character has a curse slowly turning her into stained glass) to basically reboot the series under a different moniker; long story short, it raised over 5 million dollars to become the most-funded game in Kickstarter history. That was about a year ago; the actual game comes out in 2017, so I doubt the demo'll be very fleshed out, but I'm still excited, regardless (the last Metroidvania game directed by Iga, Castlevania: Order of Ecclesia, came out in 2008, so it's been a while). Anyway, I gtg. Until next time! 1. [Metroidvania is a genre that combines RPG elements with those of the Platforming genre, so-called because of certain Metroid games and certain Castlevania games that made it popular. Incidentally, the first of the Metroidvania Castlevanias, Castlevania: Symphony of the Night, was actually not going to be a "major" Castlevania](#)

game. At the time, Konami (the development company) had a main office where the main, classic-style Castlevania games were developed, and the only reason that Iga and his dev team were able to so drastically alter the normal Castlevania formula at the time was because they were working on a "minor" Castlevania game. Castlevania: Symphony of the Night was an enormous success, both sales-wise and game-wise, so it became the formula for most of the 2D Castlevania games after that.

McKnight Post 10 (22 June 2016)

Posted on [June 22, 2016](#) by [dem](#) June 22, 2016

Bonjour!

So yesterday we talked over our "Team Tutor" idea again. We'd thought a lot more about it, so a lot of holes in it were patched, but there were still enough gaps in logic that made the task problematic.

A lot of our issues are still stemming from the fact that we need the tutor to be for a program that is sufficiently tied (by journal article results) to real-world skills or training (previously, we'd thought that since the focus was on building a team tutor, improving a somewhat made-up task would be fine, as the goal would then have been to show that a team tutor could improve a virtual multi-person task, and... well, the complete line of reasoning was on another post, IIRC, so I'll skip that). Anyway, turns out we need to strongly tie the virtual task to real-world skills/activities, so we're considering scrapping the "building" idea we'd had previously and instead building our task from real world activities/skills in research rather than trying to shoehorn research into a task. To that end, we've come up with two alternatives that seem promising.

In terms of non-research items, I'm rather worried about the Brexit vote tomorrow- really hoping that the UK voters elect to remain in the EU. If the EU gets fragmented, I don't foresee another multinational entity like it appearing again anytime soon (or perhaps even in my lifetime), so it'd be a big loss to globalization if they did leave. Additional concerns I have about the UK leaving include a lessening of the relevance of English as a *Lingua Franca*, increased tensions in Europe (for example, the UK leaving the EU likely won't have a good impact on England's relationship with Ireland or Scotland), and damage to the UK's economy.

Anyway, until next time-

-David

McKnight Post 9 (20 June 2016)

Posted on [June 20, 2016](#) by [dem](#) June 20, 2016

Guten Tag!

Today we started working with Unity. It's pretty enjoyable- a lot of concepts are similar to weaker game engines I used (and indeed, to Unity 2D (which is basically and essentially just Unity 3D constrained to two dimensions)). I got partway through building a snowman and a snowy terrain when the program decided that my progress had to be destroyed- I suppose this serves as a warning to myself that I need to be sure to save my progress when working on things :p.

I'm still trying to determine if I'm getting the Oculus Rift, the HTC Vive, or Playstation VR- or some mix of the two. The Rift and the Vive have already been released, which makes it easier to compare them (or it would, if I had more access to them- I should ask about that). The Rift's major advantage is that it's more comfortable to wear and it boasts better specs (IIRC), while the Vive's claim to fame is that it's designed around the concept of "room VR" (for lack of a better thing to put in quotation marks)- basically, apps for it are designed around the idea that the users will be in a confined area (say, between a desk and three walls or something) and the device warns you (via holodeck-like cues) whether you're approaching a wall; it also sports motion-tracking controllers, but Oculus will be doing the same at some point in the future. The PSVR, on the other hand, is designed to hook up to the PS4- which means

that, presumably, if I got it I would not have to get a new computer/laptop (although as far as GPUs go, now's a pretty good time to get a new PC, AFAI can tell, particularly in seeing that I don't have a home PC at the moment).

Oh, and I showed "Too Many Cooks" to some of the friends I've met here (if they still let me call them that, considering I got such a song stuck in their heads). Balanced it out with "Wintergatan", though, so I don't think the feelings can be too hard :). (although I did show them "Don't Hug Me I'm Scared"... yeah, I'm probably disowned XD (incidentally, a 6th one came out a few days ago)).

Until next time...

McKnight Post 8 (17 June 2016)

Posted on [June 17, 2016](#) by [dem](#) June 17, 2016

Jambo!

So yesterday we had an interesting experience with Frisbee golf- I used to play with my dad when I was a kid periodically, so I thought I'd do alright, but I was consistently getting double/triple bogies, so... yeah. I'm glad we ended up doing it than volleyball, though, as although whatever nerve in my neck that I pinched is feeling better, it still hurts (and I have a feeling that volleyball would have made things worse).

Things continue to progress quite swimmingly with SolidWorks- It's really intuitive to me. It's slightly inconvenient how there's no set difference operation on shapes, but I understand that such a thing would probably create a lot of logistics problems coding-wise for a program that produces models for engineering purposes.

For Maya, I'm going to try to see if I can insert a model of myself from a few years ago

-tb continued

McKnight Post 7 (16 June 2016)

Posted on [June 17, 2016](#) by [dem](#) June 17, 2016

¡Hola!

Research-wise, we've made some progress, in that we now have a much better grasp of what our end-goal is. We'll be designing a tutor – virtual-task environment that will be designed to simulate a real-life situation/skill, then determine whether we can create the tutor half to positively influence performance on the virtual task, after which (/or along with) we'll develop a further experiment to test whether, on average, improving an individual's scores on the aforementioned virtual task improves said individual's performance on the IRL skill/task being simulated (previously, we'd been confused as to the scope of the research in the next two months).

We had a really interesting Luncheon Lecture today, given by Dr. Dark, a professor of Psychology at Iowa State (we have biweekly (twice weekly, not to be confused with once every two weeks ("biweekly"'s kind of a useless word because of that dual meaning, come to think of it)) provided lunches where they bring in a professor to talk about interesting topics). Dr. Dark's presentation was on the difference between sensation (feedback our minds get from the outside world) and perception (what information we actually understand after our brain has processed the sensations).

-edit: will finish later. adding this so dating order is more consistent consistent

McKnight Post 6 (15 June 2016)

Posted on [June 15, 2016](#) by [dem](#) June 15, 2016

Howdy!

So it's been a bit since my last post... I keep meaning to do blog posts at home and forgetting that I don't remember my login credentials. Oh well- I guess I'll just do them during the allotted time slot.

So this week we've been covering Maya, a modelling program (or should I say, we've been modelling :3). I thankfully had no experience going in, so this has been a totally fresh experience with me. So far I've created two models, a snowman and a cactus, that I'm quite happy with (although the cactus is missing some data info- I've been looking into that).

As for research, our initial proposal got shot down- we need more backing research before it can be considered viable. It's surprisingly difficult to find journal articles that say things like "spatial understanding in a virtual environment is related to spatial understanding in a real environment" or "understanding a spatial task in a virtual setting improves similar tasks in a non-virtual setting"- I would assume that one of my assumptions is wrong but for the fact that there's a good chunk of research out there that seems to assume that. Maybe I'm just not looking in the right places.

Recreationally, we got to spend an hour light-painting yesterday, which was quite fun. Basically you take a camera, slow the shutter speed waaaaaay down, and take a colored flashlight (or in our case, use apps that display a color on our phones' screens) and draw in the time between the initial flash and the snapping in the photo. I believe the photos have been posted to this website, so I'll refrain from describing it too much here.

As for personal life- most of the past few days I've spent practicing skills acquired in class/reviewing research notes, but in my free time I have been keeping up with E3 via Kotaku articles. I'm becoming increasingly hyped for FFXV- they've introduced a really cool "pause" feature that lets you survey the area around you before taking actions. It's a really nice throwback to the old turn-based FFs (and is more in line with my preferred style of playing in many cases). My fear that the game's plot is rather androcentric in its politics has not been alleviated, on the other hand; hopefully one of the nations in it'll be a matriarchy to help balance it out.

I also messed up my neck a bit this morning when I was washing my face- I think it's a pinched nerve, but I'm not sure. Regardless, I've some trouble moving my neck left (rather, there are painful consequences if I do so). Hopefully some rest tonight will make it feel better.

Anyway, until next time-
-David McKnight

McKnight Post 5 (9 June 2016)

Posted on [June 9, 2016](#) by [dem](#) June 9, 2016

Selamat sore!

So we just got out of a really informative meeting hosted by Dr. Oliver, the director of VRAC here at Iowa State, wherein he briefed us on the process for applying for grad school and what to expect. I was relieved to hear about several of the options for getting Grad School paid for- given that there's not a marked difference between lifetime net income from Masters earners and lifetime net income from Ph. D earners, it had been something I was concerned about (not that that would or should be my primary priority, but out-of-state Grad School is quite expensive). Essentially, though, I've further realized the need to buff up my GitHub account.

Gtg- we've got a "Craft of Research" lecture in a few minutes.

Until next time!

-David McKnight

Post 4 (7 June 2016)

Posted on [June 7, 2016](#) by [dem](#) June 7, 2016

'allo!

So yesterday, after my last blog post, we received an optional programming assignment for getting a program to

compute a derivative of a preset function; to make things interesting, I decided to see if I could get it to work with `_any_` function.

Functions are just mathematical objects; in math, functions can take other functions as input parameters (that's essentially what one interpretation of the derivative is). Thankfully, said interpretation can be carried over into C++ via `<functional>`, and by applying forward approximation (less accurate, in general) or a [five-point stencil](#) (generally more accurate), you can get a really nice (accurate at least to the 5th decimal point, in general) approximation of the derivative at a point.

I'm going to try to implement integration tonight in a related manner; then, if I have time, I'm hoping to implement a parser for user input to a function created at run-time via a [lambda expression](#).

Post 3 (6 June 2016)

Posted on [June 6, 2016](#) by [dem](#) June 6, 2016

So today we started C++ lessons and saw an overview of what we'd be learning this summer. We're starting out with C++ programming, moving on to modelling in Maya and SolidWorks, then on to some other topics that I don't feel like finding the names of at the moment. We'll also be learning more about applying for Grad School.

For the C++ side of things, I think a decent number of the lessons are going to be review, but they've said there will be advanced practice projects for those who are interested, so hopefully that'll be more exciting (I did learn about the escape sequence `\r` today in one of the additional assignments, which was fun).

As for the rest of the classes, they involve things I have much less experience in, the majority of which intrigue me greatly. I'm particularly looking forward to learning about the subjects of 3D modelling (modeling, if you prefer) and programming for VR devices.

McKnight Post 2 (3 June 2016)

Posted on [June 3, 2016](#) by [dem](#) June 3, 2016

So, today we got to see three things- the C6, some 3D printers, and an HTC Vive.

The C6, for those who don't know (and I'd assume that's most people), is a structure for Virtual Reality. It consists of a 10x10x10 cube that images are projected onto from the outside, and viewed from the inside. Using 24 projectors and 96 linked GPUs, it simulates virtual settings seamlessly and allows users on the inside to traverse a virtual world. In order to accomplish this, glasses are worn that filter a set of 2 images to the left and right eyes through stereoscopy. To further improve the user's experience, the projectors provide shuttered stereoscopy; that is, at any given time, only the left image xor the right image is being displayed to the projectors. This is done at a fast enough rate that the human brain picks it up as one image, and is done to avoid a blurring effect that occurs when information intended for the right eye escapes to the left eye's view (and vice-versa). It's really, really cool (but too expensive to be used for consumer applications).

The HTC Vive, on the other hand, is comfortably within consumer price range; it's not cheap, as it retails at \$800, but certainly affordable to most people who are interested enough to make the investment. It's an HMD (head-mounted display) that uses stereoscopy as well, projecting a separate image to each eye (similar to the Oculus Rift, if you've heard of it). Unlike the Oculus Rift, however, it ships with two (will talk about the other technology later; running out of time)

McKnight Post 1 (3 June 2016)

Posted on [June 3, 2016](#) by [dem](#) June 3, 2016

So let's see...

Hi! I'm David McKnight, and I'm one of the interns at the SPIRE-EIT REU group this summer. I hail from St. Louis, MO and from the University of Oklahoma, where I'm majoring in Computer Science, Mathematics, and Computer Engineering.

Anyway, I look forward to working with everyone this summer!

(I don't really know if I need an intro post, but I'm going to post this one anyway, so that if I need one later, I've got this.)