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STEMmersion Internship May 2022
CAMP Dosser Lab Assistant
Every day accounted for 8 hours totaling a 10-day 80-hour internship

5/18

My first day began on Wednesday, the schoolwide day off, where I came in to get a head start into the hours I would need for my internship. Mrs. Vijaya Patel, who runs CAMP Dosser, was very informative and excited to get me started on training and really gave me an in-depth understanding of what my role as an intern, or lab assistant, would look like. Since I had a loaner, I had to first get some software downloaded that I had on my personal school laptop, some of them with TAC's assistance. I downloaded the slicing software for the Dremel 3D FDM Printers, called Prusa Slicer, and watched a few tutorials to gain a basic understanding of the software. I also downloaded the Adobe Suite and Illustrator as Mrs. Patel told us that we'd be working with a middle school STEMmersion who's main focus was with 3D printing and laser cutting. I began watching a few tutorials as I had forgotten a lot since it had been a few years since I had last used the software. Mrs. Patel also gave us a tour and explained a little of what the various printers did. She was however, secretive, as she verbally expressed she wanted us to learn through experience; something I was excited to do. This was an opportunity few probably have had; to be given full access to various 3D printers and run my own experiments to understand and learn how the machines operated. This was something Yash, my interning partner, and I would do starting the next day.

5/19

I began the day with Joseph, a fellow junior who had worked at CAMP Dosser this year, give a short but very information heavy training and helped me upload the Prusa configs to my laptop to sync with the printers properly. This way, the printers' settings would all be on my own so I could see exactly how projects would run on them, even if I was offsite. I began the day continuing to watch tutorials on Adobe Illustrator as we would have batches of students from the Laser Lab STEMmersion come in to see our laser cutters and create their own designs in Illustrator to later print. Many of these kids were 6th graders and had not used Illustrator before, so this required us (Yash, Amy and I) to have at least a basic understanding, to assist the kids with physically expressing their creative designs. Before the kids came, Yash and I began our experiments running different CAD models to better understand how the print axis, support material, size of file, and printer type affected the print quality/build. I documented our ideas, hypothesis, results, and conclusions in a separate document I have attached. Mrs. Patel was a driving force in our learning experience as she really wanted us to figure things out for ourselves even though she was happy to help. Later the students arrived, in three separate batches and we gave a tour of the laser cutter, helped them design their ideas on Illustrator, and showed them examples of past student-created laser cutting files to illustrate what kind of designs worked to highlight to them various design constraints they should keep in mind while crating their models.

5/20

We began the day helping the middle school Laser Lab STEMmersion design their own nametags to cut using the laser cutter. We also explained to them how our 3D printers worked and presented a short PPT slideshow explaining the design constraints of 3D printers similarly to how the laser cutter did as we

showed the previous day. Later we continued our experimentation while Yash was designing I continued to document our findings. Mrs. Patil showed us how to change the filament. We also made significant progress on our glossary of terms and that became the focus of the workday. It was a relatively quiet day that consisted of me learning more about how to operate the printers and explaining to younger students how CAMP Dosser operated.

5/23

Today I began compiling STEMmersion students key chain designs into Illustrator templates to laser cut. Yash and I also analyzed the car models that finished printing over the weekend and the results of those can be found in the other word document I have attached. I also attended a presentation by Dr. Kay Ball, a registered nurse whose specialty is laser applications in medicine. She was the first female to conduct laser surgery on a dolphin as well! Her presentation as comprehensive yet easy to follow and was also very interesting. After the presentation, Dr. Dosser, Dr. Ball and her husband came for a tour of CAMP Dosser! They were really impressed with the printers, what they could do, and the student designs. I finished compiling the student designs and will set up the rasters, cuts, and engravings tomorrow.

5/24

In the morning, I completed the first drafts of student created keychains with the Epilog cuts/commands. I am still having issues with my OneDrive, but luckily my best friend Emanuel saved the day by swooping in finding all the mistakes I made. We were still unable to solve the problem but Emanuel was really helpful in the process. I then presumed following Amy and Yash. Emanuel wrote this lol. I then had to edit the designs as I had rastered the wrong things. However, before we could test it, Mrs. Harris came in with an urgent job; a plaque. Amy and I had our first job! It required the STEM logo and ACE into a 10x10 square. We test printed it on white acrylic and it came out great. However, when we printed on clear acrylic, it burned the edges and did not print well. We assumed that it was due to the thickness of the acrylic and the power of the laser. After a few drafts, we were able to present our final product in dark red to Ms. Harris. I then went back to the student key chains and had to change most of the “no cuts” to rasters. We then tested a few on cardstock and realized certain strokes did not appear. Amy theorized this was due to the fact we needed vector engraving instead of rasters. I then went back and added all the vector engravings, ran it on Epilog; and ran into more issues. Several of the strokes still did not appear. We could not figure out why until Amy saw that a lot of the strokes changed, for whatever reason, from 0.001 to 0 inches! Must have been when I flashed them onto the PC. Anyways, some STILL did not show up, this was mind boggling. Amy, our savior, by chance noticed that some of the strokes were in 0.3 and 0.5 instead of basic! After fixing these, they finally worked. Seeing the vector engravings were really cool and Amy and I made lots of progress today and were very productive. I know now how to use the laser cutter as well. Yash was unfortunately absent due to his broken arm☹.

5/25

I began the day troubleshooting an Epilog issue where one of the AI (Adobe Illustrator) files did not send to the laser cutter; it would just close the application. This was frustrating because all the other AI files we ran worked; so it must have been one of the student keychains on that compiled document as the other documents with student examples sent without an issue. I had to go one by one through the

keychains, deleting then printing to see if it would crash, then do it for the next. Eventually I found the one that gave it issues; it had a bunch of invisible points confusing Epilog of what to do with them. After removing these, I tested them on cardstock and after some minor fixes, occasional new student key chains coming in, I finally finished cutting them all on wood and finishing this multiple day project. We immediately moved on to the tasks Mrs. Patil had given us the previous day since she told us she wouldn't be at school today. These included printing files for past projects during the school year that had yet to be delivered. We also, at the same time, got some new projects Mr. Sears wanted for the Laser lab STEMmersion that was on a serious time crunch. He wanted student created board games, boats, and some art pieces all printed by Friday midday at the latest. Today is Wednesday and there are over 30 student created files that need to be printed and each take roughly a couple hours to print. To save time, we printed multiple student projects on one print bed and used several flash drives to do so.

5/26

Today, the fellow interns and I continued documenting and printing the Laser Lab STEMmersion students boats on our Dremel 3D printers. While Yash sliced the files and sent them to the printers, I documented all of the submitted, sliced, and printed files in an Excel status log sheet, and Amy was removing support material from the finished prints. We then reviewed some of Ms. Harris pending prints that were yet to be delivered and scheduled to those whenever Mr. Sears project prints finished. As you can probably tell, Mr. Sears prints were on short notice and it gets pretty backlogged here at CAMP Dosser pretty quickly due to how slow 3d printing is. This is an issue Mrs. Patil warned us about that we should always keep in mind when "promising" projects to clients by a deadline. I then reviewed some vinyl printing files from Jiang laoshi's STEMmersion and watched some Versa Slicer tutorials as this is the equivalent to Prusa Slicer for vinyl printers. We ended the days following up with Jiang laoshi with some of the minor issues with some of the students' files and what exactly they wanted the medium to be.

5/27

Today was a very hectic day as the boats had just finished and we began printing Ms. Harris backlogged prints. The issue was however, some of the files needed to be duplicated and printed multiple times-in different colors. This meant we had multiple printers running the same print which wasted a lot of time to start other prints. We did begin using the MakerBots since we were basically running at max capacity. However, these had issues with warping, lack of a heated bed, and inaccurate printing maneuvers, all resulting in us having to restart some prints wasting even more time. We still had to look over the vinyl printer and laser cutter files as well to ensure they were good to print. We also needed the Laser Lab STEMmersion students to submit their final designs soon since we know it'd be a time crunch since the sudden boats project took 3 days and we only have 3 days next week to finish the final products.

5/31

Today I finished the last batch of 3D printed boats and my lab partners removed the support material and delivered the products to the client. I also went the STEMmersion to ask about their final projects and Mrs. Williams said most of them, aside from laser cutting jobs, were all running on her MakerBots, which was stress relieving for us as we could continue working on Mrs. Harris backlogged projects. While one of those were running, we ran into a filament jam resulting in the extruder not printing but

just moving around. This happened to 3 of our 5 printers and we troubleshooted the other 2 using Dremel's own solutions pdf where we removed the jam with a paperclip and if that didn't work, Yash found a purging option that would superheat the extruder to remove any jammed filament still remaining inside. Unfortunately, neither of those worked for the most recent jamming error and we spent over an hour removing the extruder and trying to take int apart without any luck. At least we still had four out five printers running smoothly so we decided to work on it later. I then started resuming the Chinese STEMmersion vinyl printing files I had opened last week and nested, compiled, and configured all the posters on to one sheet with all relatively the same size. We had to troubleshoot the printer, Mrs. Patil and I, because Versa Works gave one width for the medium while the printer had another. After comparing the Versa Works interface to the vinyl printer, Roland SVG-540, we recognized that the media clamps were not in the right position, and according to the maintenance log, written by former students running CAMP Dosser, these calculated the width of the medium that would send over to Versa Works. After setting these parallel to the markers provided, the printer ran the job smoothly and I ended the day reviewing Mrs. Miller's memoir project sheet to print the next day.

6/1

Today I focused more on housekeeping and organization. One thing about CAMP Dosser that's amazing is Mrs. Patil's documentation and many folders that make everything easy to find, record, and see if the product's been printed, sent, delivered back, or anything else about it. So, I went through Mrs. Harris' "not yet delivered" folder and organized all that we'd printed from this folder these past two weeks into folders and everything we still had left into others based off if they were 3d printing, vinyl printing, or laser cutting files. I then started working on more vinyl printing projects and setting them up to print in Versa Works. I also changed the media roll in the SVG-540 and ran multiple jobs including the new 8th grade class' 6-Word memoir project and the Chinese STEMmersion posters.

6/2

Mrs. Patil wasn't here this morning so she gave us some final tasks to complete before exhibition night. We finished most of them yesterday so we only had a few to do today. We had a few vinyl printing jobs and one final 3d file left to print. I cut out all the vinyl printing jobs and delivered the last 3d printed pieces and vinyl prints to Ms. Harris and my partners delivered the rest to Jiang laoshi and Mrs. Montgomery.