No School Yet, So Don't Fret!

Announcements

A special shoutout and thanks to all our interns who helped out on Sunday's **Open House**! We had a wonderful time, and a special Thank You to everyone who stopped in to see what PVNet has to offer! We showcased our **HTC VIVE** headset and our **3D Pens** to our curious guests, and boy did they have fun! We look forward to seeing you in our Summer and Fall classes!

Big thanks to the Grigoriev Family, who donated a second **HTC VIVE** to PVNet's virtual reality development department. Their donation is making it possible for use to expand our outreach at events to showcase what virtual reality is capable of.

Interns **Daniel**, **Lochlan**, and **Thore** prepare freshly printed 3D planetary gear sets. These gears will be given away at this weekend's *free* Tamiya Racing event held right here at the Promenade Mall! See our separate announcement for more details.

Classes

STEM UNIVERSITY

This week we had a huge class, and boy was it fun! With the help of instructor **Sam** and intern **Eric**, instructor **Aysel** led this week's class in a wide range of fun activities. Students this week particularly enjoyed working with Autodesk Maya to create 3D animations and models. A couple of the students had taken instructors **Christian's** and **Tommy's** game design classes previously and used their knowledge of design to make incredible animations, like a car race or a Star Wars X-Wing fighter!
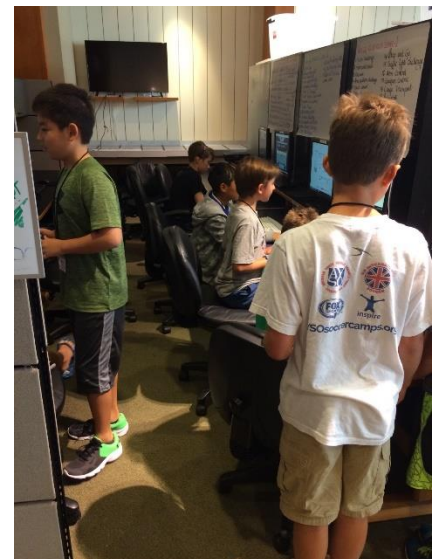
The 3D pens were, as usual, the biggest hit, and the students had such a great time making incredible figures to take home with them.

This week we decided to shake things up a bit, adding in a new element to STEM University. On Thursday and Friday, students practiced with online typing exercises to improve their skills on a computer keyboard – the exercises helped them memorize the locations of the keys and how to keep their hands steady while typing quickly. No more one-finger typing for these students!

Many of our students have been creating wonderful designs using TinkerCad, applying their knowledge of 3D modeling to create signs, race cars, penguins, and even hamburgers!

Here are some quotes from some of this week's students:

Cate: "I loved using Tinkercad to 3D print things, and the 3D pens were so much fun!"

Sawyer: "I've been working on a small dinosaur with the 3D pens."

Danica: "I loved Maya, and I used it to make a dog and then 3D printed it!"

Dillyet: "I loved everything! The 3D printing and pens, Tinkercad, LittleBits, and especially the Ozobots!"

Jace: "I had so much fun using Maya. I made a car and animated it so it moved around a racetrack!"

INTRO TO ANIMATION AND GAME DESIGN

Instructor **Christian** enjoyed a small and incredibly enthusiastic class this week. These students spent the first half of the week designing amazingly intricate game worlds in the Unity Engine program, each one unique to its creator. A couple of his students were also part of this week's STEM University class, and used their knowledge of Maya to help them create their game worlds.

Projects

PROSTHETIC HANDS

The Kiwanis Club of Rolling Hills Estates, a wonderful group that's always on the lookout for supporting our community, is considering sponsoring the building and completion of ten prosthetic hands in partnership with PVNet. Students from the Key Club and Kiwins would be involved in this great philanthropic project to provide cheap, 3D printed prosthetic hands to small children.

EMOTIV

Our "study of the brain" project commences in October. With the recent release of a 14-channel brainwave headset from Emotiv (as featured on TedTalks), students will be mentored by Dr. Carol Francis to learn about the use of the device for the study of

cognitive functions. In addition, students may reproduce a study of identifying individuals through brainwaves, as recently featured in *IEEE Magazine*, and another test to determine whether a person is lying. This should be a fascinating study for students ranging from high school levels through Masters Degree programs.

VIDEO PRODUCTION

Intern **Michael** finished editing some footage he shot for one of our PV Transit commercials, while **Eunice** polishes the animations she'd put together.

With all the principal production on our commercials completed, our team is moving into the final stage. We will be recording voice-overs in five different languages that will be overlaid on the animations to complete the commercials. Once the audio is recorded, we will edit and finalize the commercials before sending them off to the PV Transit Authority!

GAME DESIGN

Aysel has given her zombie model a walking and an attacking animation, which will be uploaded into the game by **Michael**. **Christian** and **Tommy** continue to play-test the game to make sure all the components continue to work smoothly.

BATTLE BOTS

Daniel and instructor **Don** are working on creating a prototype BattleBot for our new BattleBot Club, which we hope to officially launch this Fall. First, Daniel 3D printed a custom robot design. Then, he and Don used parts from a motorized robotics kit to build the customized BattleBot. At the moment, they are experimenting with different designs and robotic parts to see what combination works best.

What are BattleBots?

BattleBots are robots designed to battle others in tournaments, designed by engineers, hobbyists, or anyone with a competitive edge and a knowledge of robotics. There are several different kinds of BattleBots, mostly dependent on the weight and size of the final product. Originally started as a TV show aired on Comedy Central, in which competitors would build their bots and do battle tournament-style to see what design would reign supreme.

Notable among the early participants were Adam Savage, Jamie Hyneman, and Grant Imahara from the popular *Mythbusters* show.

Robots were outfitted with a myriad of different weapons and devices to try and beat out the competition. Sawblades, spike strips, ram-rods, and pneumatic sledgehammers were among the popular offensive weapons. The goal of the competition was for one robot to either disable its opponent or knock it out of the boundaries of the stage. There were four types of classes:

- Lightweight – 60 pounds (27 kilograms)
- Middleweight – 120 pounds (54 kilograms)
- Heavyweight – 220 pounds (100 kilograms)
- Superheavyweight – 340 pounds (154 kilograms)

Unfortunately, our BattleBots will not be nearly as large. Since the show gained popularity, people all over have begun creating their own versions of the tournament. Most notable, and what PVNet hopes to one day take part in, are the "minibot" challenges – in which the BattleBots range from six inches to a foot in length and rarely weigh more than a couple pounds. These competitions are table-top, and the bot wins when their opponent is disabled or knocked from the table.

3D PORTABLE SENSOR SYSTEM

Our new programming project is about to kick off! This project, which would save California millions of dollars annually, has the potential to replace manually locating, identifying, and digitally mapping potholes around the state. By attaching the sensor to the backs of all fleet vehicles owned by a city, all someone would need to do is drive around and the device would be constantly scanning the road. Once a pothole is discovered, the sensor would provide a detailed 3D image and map the pothole's location. There would be very little human intervention, potentially eliminating the need for a manual, time consuming process.

Engineering and Robotics

Engineering mentors **Don** and **Kirithika** are working closely with students on teaching MatLabs levels one and two, how to solder so they can build their own robots, and electronics measurement for programming.

PJ is assisting his student **Zach** in Java programming and coding. Originally drawn to PVNet to learn more about technology in general, Zach plans to use his new skills and knowledge to improve his future dreams of being a pro-Golfer. A highly talented golfer, Zach consulted with PVNet director Ted Vegvari to create a 3D visualization and scanning program that would improve athletic performances. The software would use advanced sensors and design software to analyze the movement of athletes to provide tips for improving performance and technique, analysis of certain movements, and much more. Great work, **Zach!**

VexIQ

Our VexIQ team is preparing for a scrimmage scheduled for September 17, right here at the Promenade Mall! Using the Carnegie Mellon robotics training system, students are blazing through the training modules and showing tremendous progress and promise. Best of luck to you guys!
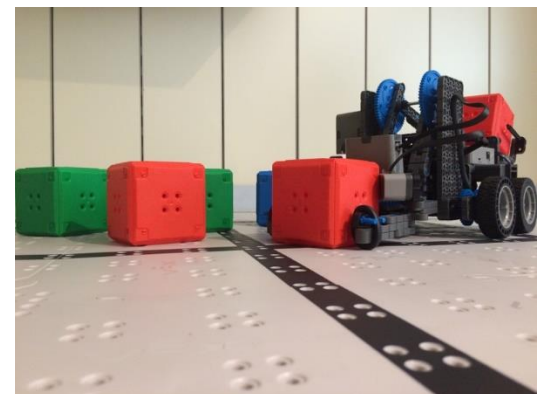
Interns

A super special Thank-You to **Eric, Christian,** and **Daniel** for assisting with STEM University this week. We couldn't have done it without you all.

Aysel has completed work on her T. Rex model, made entirely using a 3D printing pen. She's begun work on another project, utilizing different techniques to improve upon her modeling skills.

Daniel is hard at work with his BattleBot, hoping to have a functional prototype by the end of summer. Using *Inventor*, a 3D modeling software, he's also printed a cable management attachment to organize the VIVE's long headset cable when not in use. Thanks, Daniel! Without it, we'd be tripping over stray cables all day.

Sam has been experimenting with our new laser cutter, making hooks and hangers for our many cables, headphones, and signs. He's also been using the laser cutter to make detailed etchings in both plastic and wood, able to etch portraits and names.

Herb Stark, PVNet volunteer for 20 years, has put together another awesome sign to showcase our new BattleBots program and inspire the next generation of engineers.

Mentored by instructor **Christian, Leo** is completing the video game he created using the Unity Engine, and will enter it in the National STEM Video Game Challenge. Originally inspired by President Obama's *Educate to Innovate* campaign, the National STEM Video Game Challenge is open to middle and high school students to work as individuals or in teams to create original games or write game design documents. The students' efforts will be showcased, and winners selected based on quality and hard work. Best of luck, Leo!
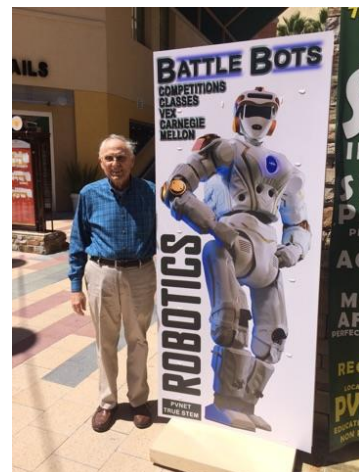
Raoul Castrellon has been using both the 3D printers and our new laser cutter to create pieces for use at PVNet. For example, a large-capacity filament roll is suspended by a laser-cut filament feeder, that smoothly delivers the filament into the 3D printer thanks to ball bearings situated in the feeder.

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