



THE WEEKLY SYNC

At Heatsync: Board elections, Capture The Flag, the debut of a new mill instructor, LockSync Labs, Craftagious Meetup and Halloween costume making all happened! Welcome back to *The Weekly Sync*, Issue 2.

Thursday we elected a new board.

There are lots of reasons we do this, but the bottom line is that we are legally obligated to have one and update it's composition with the Arizona Corporation Commission. You can see our board as it is currently listed and all of our public records that we have submitted over the years [HERE](#). According to these records, HeatSync's incorporation as a 501(c)(3) was approved on October 27, 2009, which makes last Sunday HeatSync's fourth birthday as an official organization. Happy Birthday, HeatSync Labs!

This year, since none of the board positions were contested, the meeting went straight to a vote sans any inspirational speeches. So instead, *The Weekly Sync* asked each of the newly elected officials to fill out a questionnaire about themselves, their philosophy and their hopes for the coming year. The profiles will be featured in *The Weekly Sync* over the next couple of issues, so stay tuned. But first, meet your new Secretary.

Eric O., Secretary:



When Eric came to HeatSync for the first time in September of last year for 3D printing night, he was plagued by the type of questions that some members probably remember asking themselves: Will I fit in? Do I need to be more technically skilled? Eric said that, at the time, he had no related skills and didn't like meeting new people. Combined with chronic shyness, the decision to actually show up at HeatSync was a big one for him, he said. But when he did work up the courage to

stop by, he was greeted by Ryan Rix, who has since moved to the Bay area, and he said the overwhelmingly friendly introduction was exactly what he needed to feel comfortable.

The evidence of the power of this good introduction is overwhelming. In roughly 12 months, Eric grew from a shy newbie in electronics to heading HeatSync outreach to burgeoning hacker/maker-spaces in local libraries with the help of his fleet of Arduino-controlled, light-sensitive robots that he built. And, of course, he recently stepped up to act as Secretary on HeatSync's board of directors.

One of the things he remembered most from his early days at the lab is how much everyone

encouraged him to participate and share with the group. If there was something cool he wanted to add to the lab, as long as it wasn't disruptive to other people or the space, he said he felt completely empowered to do it. As a consequence of this, he said he felt investment and ownership in the lab almost immediately, like he was right at home.

Unsurprisingly, one of the values that Eric said is most important to him is that people strive to "be excellent to each other." He said he tries to replicate the warm welcome he received with those who are new to HeatSync and hopes that other members will strive for something similar. He also said he hopes that members can find ways of sharing opinions with each other without being discouraging or disrespectful. Welcoming new people can be hard, he acknowledged, because members do have to make a judgment call about the those who show up at the front door. Are they really interested in HeatSync or do they just want use the bathroom or something worse? But sometimes, he said, HeatSync might be missing opportunities for new members and in his case, he is thankful that he didn't just stand at the window and have members avoid eye-contact with him.

As far as the future of HeatSync goes, Eric said he thinks our greatest challenge moving forward is, well, moving. If HeatSync is seriously considering finding a new, larger space, beyond whether we have the money to do so, he said he is wary of burning out volunteers in the process, which was a problem after HeatSync moved to Mesa. But HeatSync also has a lot of things going for it, and for Eric, it's encompassed in the "sync" part of our name. There are a lot of programs and communities in the Valley that intersect with HeatSync, like FIRST Robotics, Tech Shop, and library hackerspaces to name a few. Members of HeatSync have a great opportunity to reach out to those communities and use their expertise to help them collaborate and grow, he said. In fact, the points where communities and disciplines intersect are also the areas where he hopes to see HeatSync grow internally. Specifically, he said, recurring events like 3D printing and Arduino really help to draw people into the space, much like they drew him into the space. But those nights are hopefully just the beginning.

"Some of them may feel like they can't use a laser or write code. Yes you can, it's not actually hard," he said. "Sure things can get complicated with certain projects on a laser or with code, but you can really accomplish a lot with very little learning compared to the tools in the past. People really should take advantage of that."

Hack.lu CTF 2013 by FluxFingers:

On Tuesday and Wednesday evening, team Pi Backwards, hosted by AltF4, competed in a Capture The Flag game put on by FluxFingers, a team from Germany. Capture The Flag is one of the closest things you'll find at HeatSync to Hollywood's version of computer hackers. Just take a look at the homepage for this last week's CTF. Very hackery.

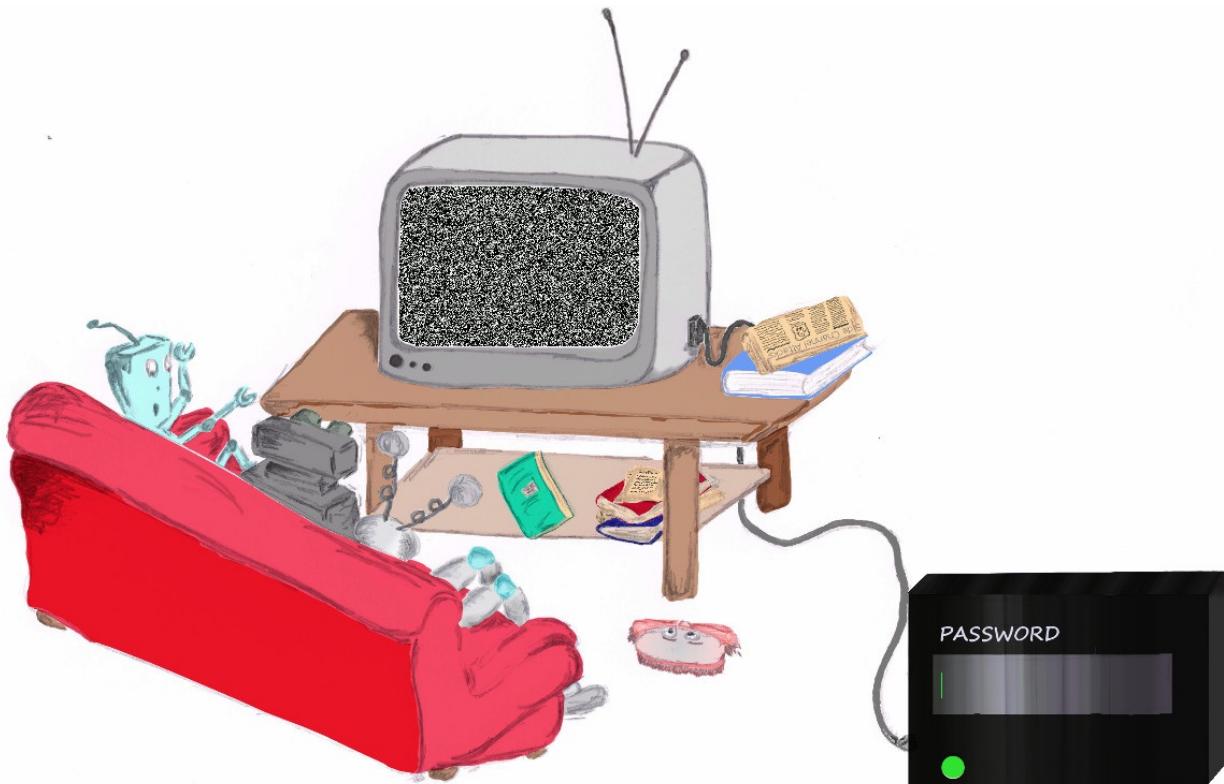


AltF4 explained to *The Weekly Sync* that the most common type of CTF game is jeopardy, which entails solving different kinds challenges for varying amounts of points. There are categories like cryptography, web, encryption, exploitation and miscellaneous and competitions typically last for about 48 hours. That's the type of game that Pi Backwards was participating in last week.

AltF4, who has a Master's in computer science, said that when he graduated from college, it became clear to him that there were a lot of questions that his education hadn't answered. He said he had learned a lot of "You shouldn't do thing X" but when it came to the "why", the answer was often "because bad things will happen. For him, CTF is a good way to learn and stay on top of the in-depth why's and why-nots of security practices. It's also a fun way to learn about important computing concepts for people at all skill levels. Though some of the challenges require very advanced knowledge, there really are challenges that are accessible to beginners, like web problems, where all you need to get started is a browser.

For example, one of the challenges that Pi Backwards solved during the competition, sends players to this website with the instructions to help the "robo-friends" watch a paywall protected broadcast of "Oktoberfest."

(Hack.lu CTF 2013 by FluxFingers: (cont'd))



For this kind of challenge, one of the participants explained, the best thing to do is to just start look for clues on the page and in the source code. In this case, there is a clue hidden in the newspaper on the of the TV table. The headline says "Side Channel Attacks," which is a type of attack that exploits information gained from analysing a secondary effects of whatever system you want to know more about. An example of this that AltF4 gave, is measuring the amount of power a system draws while it is encrypting data to get information about the way the data is being encrypted. Other examples include, the amount of heat something is giving off, the sound it makes and the amount of time it takes to do a task.

A second clue was hidden in the javascript for the website. In the line of javascript that sends the password attempt to the FluxFingers server for evaluation, was the one-word instruction "&debug," but it was commented out so that it wouldn't be executed. Normally, an incorrect password on this site just returned the password attempt and message saying that it was incorrect. But when the debug instruction is active, the amount of time that it took for the server to process whether the password was correct or not is also returned.

At that point it was just a matter of evaluating the processing time for each possible character. Nate P. started out by sending the FluxFingers server 36 different single-character password attempts by hand, trying A-Z and 0-9, with the debug option uncommented. He noticed that the server took one millisecond longer to evaluate the letter "A" then it did to evaluate the other characters. And with that, he had the first character of the correct password. Nate actually got pretty far sending password guesses one character at a time, by hand before someone wrote a script to automate the process.

AltF4 said it would be pretty unlikely to find a vulnerability exactly like this in real life. FluxFingers probably built in a one millisecond delay to make the difference between the evaluation time of

correct and incorrect characters very obvious. It's also unlikely that there would be a neat, built-in tool for measure the delay. But the point of the exercise was to get into the mindset that computing has secondary consequences that leak information, and those leaks can be a big problem.

AltF4 said that anyone is welcome to come down to the lab or join in online for competitions and play on team Pi Backwards. Even though last week's competition was at an awkward time for people to get together (competitions don't usually happen in the middle of the week), AltF4 said that they had eight to 12 people in-person and online play for about four hours on Tuesday, which tapered off to three or four people on Wednesday. Even so, they finished the competition in 140th place out of the 349 teams that had points on the board.

Alex C., Mill instructor:



On Monday, Alex C. made his debut as an instructor for the big blue mill. He's only been with us since August, but has clearly launched himself into some stellar volunteerism.

Alex recently graduated from Chabot College in Hayward, California with two AS degrees, one in machine tool technology and the other in NC programming. He said he spent several years tutoring in math and has enjoyed teaching people how to do craft projects, so he naturally gravitated to teach around at the lab as a way to jump into the community. He's also been helping to put together the content for the CNC mill class on Friday this week.

He said he first became interested in machining after his fiance, Anna, who was working on her now completed PhD in Physics at UC Berkeley, took an intro class to machining at the physics department machine shop. Alex said he was especially intrigued by the machinist who ran the shop, whose whole job consisted of teaching physics students about machine tools and helping them fabricate parts for experiments. Alex said that kind of job really appeals to him, so helping HeatSync as a mill instructor is actually very symbiotic. He said he is hoping to gain more

experience in machining and teaching machining, and while it will take time before he's ready for a job at a university shop, he said this is definitely a step in the right direction.

LockSync Labs - Impressioning:

On Saturday, Austin A. hosted his recurring workshop on lockpicking. While the photo below - Austin pouring a duplicate key of soft, indium alloy into a plasticine mold he made from the original - is what a lot of people think of when they hear impressioning, it is apparently just one of a whole range of methods that fall in the impressioning category.



The type of impressioning that Austin spent most of LockSync demonstrating doesn't even require access to a key. As Aaron K. demonstrates below, you just need a lock, a key blank, a rounded file and a good magnifying glass with a light.



First, Aaron inserted the blank into the lock, twisted it to bind one of the pins against the barrel where it is trying to shear and wiggled the key up and down a bit to score the metal with the pin. (Key blanks have been known to break in this process.) Next, he looked for score marks in the blank with a magnifying glass.



Then he filed down the blank with the round file at the place where it was scratched by the pin and repeats the whole process. The idea is that once you've filed down far enough to put a pin in the correct position, it won't bind against the barrel anymore and will stop scoring the blank. The, of course, when all the pins are in the correct position, the lock will open and you will have made a duplicate key.



Austin said that for people who are just starting to learn impressioning, it typically takes about an hour to duplicate a key with this process. But in 2009, a man in an impressioning competition named Jos Weyer duplicated a key in 87 seconds. Austin said that unnamed agents with unnamed agencies have also been known to duplicate keys via impressioning over several weeks, wiggling a key blank in the lock once a day as they walk by, filing blank based in the marks and then trying the lock again the next day.

Craftagious returns!

After working out some scheduling issues, Craftagious members were back at their fibrous arts on Monday. You may have seen Amber's picture on HeatSync's front page showing off the hat she was working on for her Lumpy Space Princess costume.



Amber said she is currently one of two people who is helping to organize Craftagious meetups at HeatSync. While the group used to be at the lab every Monday at 6pm, they will now be around every other Monday at 6pm, the next being Nov. 4.

Speaking of costumes, several people have been spotted in the lab working on projects for Halloween. This is Ray C. with his brand new Wolverine claws made with assisted from Erik W. on the laser. This file for the claws was actually a fortuitous find in the laser projects archive. Ray said his wife is going as Jean Grey and his daughter is going as Rogue.



And Oliver F., our 3D printer Champion, printed a replica of Tony Stark's arc reactor.



He said it took him about a month to make, though without trial and error, it was five to seven hours of printing time, two hours build time and about 30 minutes of wiring time for the LEDs and the Arduino. He made the files with 123d design, basing it off of version he found on Thingiverse. He said that he is now working on a design for a smaller, brighter version.

Coming up this week:

Wednesday - [Coffee and Code](#), - Hosted by Luis M. - 10am - 4am

Friday - [Young Makers Night](#) - Hosted by Jose D -, 7pm - 10pm

[CNC Mill class](#), hosted by Oliver F., 7pm - 9:30pm

The *Weekly Sync*, issue 3, comes out Nov. 1. Did I miss your project or event? Make sure it doesn't happen again! Let me know what you're up to at weeklysSync@gmail.com.

Aly Z. has been a member of HeatSync Labs since August 2012 and appreciates constructive criticism/suggestions.