Rediscover the Joy of Making Things
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As a transplant from the frigid northlands, the fact that I (finally) need to wear a sweater means that we’ve fully entered the holiday season. And with the holidays comes gift-giving.

That means makers can look forward to a month of bustling shops filled with people making gifts. Last year, we saw a huge variety of gifts made at Nova Labs: inlaid cutting boards, wooden menorahs, 3D-printed and laser-cut Christmas ornaments, and much more. Since we’ve grown membership by 38% in the past year, we can expect to see even more exciting projects to emerge from the shops this season.

In addition to the gifts we make here, we should remember the gifts of time, talent, materials, money, and inspiration that keep this community thriving. Next time you’re at Nova Labs, stop somewhere—anywhere—in the space and look around. You’ll see facilities built by volunteers, tools maintained by volunteers, IT systems designed by volunteers; and everything is paid for with membership dues and donations.

When a space is messy or a tool is broken, it is easy to get frustrated; however, I am perpetually amazed that a chaotic herd of amateurs have managed to organize, build, and maintain an amazing space with a huge suite of professional tools. Somehow, this crazy, beautiful place actually works.

While you are making your gifts for friends and family this year, please take a moment to thank our volunteers and donors—and consider joining them.

D Schneider
Daniel Schneider
Assistant Editor

Find me on Nova Labs Slack: @Daniel Schneider
BOARD OF DIRECTORS

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During the month of November, the Board has worked to increase both its visibility within the Nova Labs community and its understanding of the needs of each area within the makerspace.

The Board now holds weekly Benchwork meetings to keep things progressing between monthly Board meetings. Sam Aparicio, the new President, holds Open Office Hours (also known as Fireside Chats) every Friday evening. Shane Smith, Board Director, is reprising his role as interim Steward of Stewards while Nova Labs works to strengthen the Steward community until they can elect a new Steward of Stewards.

The co-Treasurers, Margaret Kositch and Mona Davis, have been working together with our accountant, Anamaria Lucas, to transition finance operations. Daryl Peace, Vice President of Outreach and Fundraising, has been actively crafting relationships with stakeholders within Nova Labs and amongst the DC metro area community. In addition, with the community’s assistance, he is launching a donation match campaign in December.

Lastly, Mr. Peace attended the Department of Energy’s Solar Challenge event to support members Fred Briggs and Adam Winsor as they received their prizes. The Board has also hosted several Listening Tours with the Stewards and interested members, asking questions about how Nova Labs operates, how Stewards spend their time, and what you feel works well – and, more importantly, what doesn’t – within our domain. The answers to those questions are now directing our motivations as we create the Board 2020 Strategic Aims: the targeted, focused projects which will be our main work as Board members for the coming year.

One more thing: the Board has approved the Nova Labs 3.0 Capital Fund! This fund is a separate account that will be used exclusively for Nova Labs 3.0. Rules are available here. If you include your community makerspace in your year-end giving plan, another generous donor will match, dollar for dollar, the first $50,000 in contributions to the Capital Fund received before December 31, 2019.

Click on image to donate
STEWARDSDoug Calvert
Woodshop Steward

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3D Printer Steward

Stewards to elect a new Steward Coordinator or Interim Steward Coordinator
Maker Market and Artisan Fair
Saturday, December 7, 2019
10 a.m. — 4 p.m.

Free. Bring your friends, family, and kids. Handmade gifts made by our artisans on our makerspace 3d printers, laser cutters, etc. Etched/painted glassware, personalized items, vases, bowls, cards, jewelry, ornaments, and more!

Activities/Entertainment: Blacksmithing demos, tours, Play in our magic sandbox and virtual reality rooms.

Nova Labs, Inc
1916 Isaac Newton Sq. West
Reston, VA

Nova Labs, Inc is a 501(C)3 Non-profit Charitable Organization
Team Lead Highlights by Jennyfer Peterson

This month the team leads are highlighting the Volunteers who make the makerspace work every day. We will have a maker awards ceremony at the Member Meeting on 16 December to express our appreciation for makers in our community who exemplify our values of Making, Community and Joy. We need your help! The deadline to submit maker awards candidates is December 8.

Click here to nominate your candidates for the maker awards.
The Empower2Make community thank you gift has finally arrived!

If you are new to the community, you might not be aware of the Empower2make (E2M) program led by Bo Wernick. E2M is a 72 hour make-a-thon event that brings in people with mobility challenges (“need knowers”) and works to improve some aspect of their life. The event focuses on bringing together volunteers from the maker community and partnering them with the need knower to work hand-in-hand to develop a custom solution specific to their needs.

The event is sponsored by Google and we are always amazed at how many Nova Labs members help contribute to the event. To help say thank you to the community for the continued support of the event, the E2M team has donated a Form Labs Form3 SLA 3D printer.

The Form 3 printer does require a sign off to use and we have begun running sign off classes which you should be able to find on Meetup. Fred Briggs is the steward for this tool and it is currently listed as a yellow tool (and as of the time of this newsletter, it is a Key member-only tool).

We hope to see you in the sign-off class and see what kinds of amazing things you can print! If you are interested in resin printing, please also join us on Slack channel #sla-3d-printing.

If you are interested in contributing to the next E2M event, which does not have a defined date yet, please talk to Bo to see how you can get involved.

Find me on Nova Labs Slack: @Fred Briggs
BENJAMIN FRANKLIN, ROBOTS, AND THE QUEST TO SHAPE A CITY

by Clara Aparicio, 13

Soldering Bench work for Solar Panel Prototype
How a group of kids discovered the power of teamwork through their robotics season at Nova Labs

We all know good ol’ Benjamin Franklin. You learn about his kite exploring electricity in kindergarten, and you wish you could see his face more often on green paper bills as an adult. If Benjamin Franklin were a 12-year-old in 2019, I presume he would have enjoyed being on First Lego League Robotics (FLL) Team 112, based at Nova Labs.

After meeting three of the team members, I discovered that these young kids are brilliant. It is astounding how they all have such distinct skills and personalities, yet they still work together to create an amazing team.

Team 112 made a very impressive robot here at Nova Labs. They used two large motors to move the wheels, two medium motors for their forklift, and three color sensors to stay on the right lines to prove they could win a competition. If you haven’t participated in FLL for three years as I have, you might be wondering what I’m talking about. FLL is a global robotics competition where kids learn discovery, teamwork, cooperation, and become more imaginative and innovative.

The competition is built up of three parts: the robot game, the innovation project, and the core values. This year’s innovation project theme was CITYSHAPER. The teams needed to find a problem in their community and devise a way to solve it. Team 112 decided to tackle the global energy crisis and find ways to reduce the use of non-renewable energy sources at schools. Their idea: Since schools have flat roofs, which is just available space, adding solar panels would be both cost-effective — reducing the amount of money spent on electricity — and much better for the...
environment. This brilliant idea did not come out of nowhere. FLL teams go through a lot of trial and error coming up with ideas. This teaches them they have to make mistakes before succeeding.

Team 112’s innovation project was very interesting, but their robot would be the one to leave your mouth agape. The robot’s brain is the LEGO EV3 brick, which needs to be programmed by the kids. Then they upload the program into the robot and Team 112 has successfully taught it all kinds of tricks. This specific robot has a forklift with x, y, and z axles attached by pegs. If science isn’t your first language, then it means the forklift could move up, down, right, left, backward, and forward. Something else robotics engineers like to add to their robots is called caster wheels. This allows the robot to move more easily. They are normally small, marble-type balls in a socket attached to the robot. However, Team 112 went above and beyond and built their own caster wheel. Another type of caster wheel is the type you see on grocery carts – except less rickety and with fewer high-pitched sounds.

So far it has seemed like smooth sailing, but really they faced troubles along the way. They struggled with maintaining balance since the forklift was so heavy, so they innovated and used small yellow rubber bands to distribute the weight. The rubber bands even helped to organize their cables on the back of the robot!

Interviewing this team was an amazing opportunity to get a glimpse into the minds of our future leaders. Everyone on the team agreed that they had grown close while collaborating over robots and thought of each other as friends.
Teamwork was hard, but, once they all recognized the way their different abilities complemented each other, they learned how to work together. The team members worked hard but still found the occasional break to play games, which was very helpful to stimulate their brains and get their good ideas flowing.

All of this could not have been possible without Nova Labs. The team talked about how it was so helpful to have a space full of engineers, innovators, and world-changers with whom you could also have a long, geeky conversation about Star Wars. Not many of the kids had been to Nova Labs before, and FLL was their first reason to go. While interviewing them, I asked what their first impression of this fantasy- and science-filled workshop was. They all spoke about how amazing it is. One of the team members even said: “It was like a family and they did everything together.” This showed me how this close-knit group of geeks and nerds can really change people’s perspectives.

And if Benjamin Franklin were still around, I bet he’d be at Nova Labs every Friday night perfecting his self-flying electric kite. As he used to say, “Hide not your Talents, they for Use were made. What’s a Sun-Dial in the shade!”

So next time you are looking for a fun place to make your own creations in a crowd of helpful, creative folks, why don’t you do what Team 112 did and experience the family that is Nova Labs.
First LEGO League Jr. Boom Town Challenge Video
Click here
2019 Participant Interest - Nova Labs Robotics
Click here
Rachel Carson MS Field Trip

Competition - Presenting Project

Library Research
FEATURED ENTREPRENEUR: **BOB COGGEHALL**

by Loretta T. Dipanda
“There are nerds in Northern Virginia!” exclaimed a very happy Bob Coggeshall, about ten years ago.

Newly relocated to Reston, VA, Bob had been “lurking” on Google groups and following the burgeoning maker’s movement across the United States. It wasn’t long before Bob discovered Nova Labs, and Nova Labs discovered it needed more space, and the two of them found a synergy and...voila! The first incubator tenant/small business running out of Nova Labs was born.

Bob continues to run his successful small-batch microelectronics assembly business (aptly named Small Batch Assembly) out of one of the incubator offices at Nova Labs. His company also offers hardware and software design services, and Bob is also a Nova Labs instructor.

But we are getting a bit ahead of ourselves, so let’s start at the beginning... like a lot of makers, Bob found he had “the knack” at an early age.

He started taking things apart in grade school. At some point, he started putting more things back together than he was taking apart and thus became employable.

A graduate of the State University of New York at Buffalo, with a master’s degree in computer systems. Professionally, Bob advanced from systems administrator to hardware/software engineer. “I started during the last days of punch cards,” Bob said.

Look up “sudo” in Wikipedia, and you’ll learn that Bob was the originator of the Unix/Linux command for superusers – “which makes me Internet famous, not exactly really famous, but still, they named a beer after me, and it was referenced in a Simpsons episode,” he said with a grin. The sudo command gets used millions of times a day around the world!

“Back in those days, I was a systems administrator, which meant computer technician,
system, network, and desktop admin, cable stringer, and everything else,” Bob explained, “now all those jobs have their own titles with different folks filling the roles.”

Early in his career, Bob had the opportunity to travel and work overseas, where he co-founded an Internet service provider (ISP) company and worked for Sprint selling Internet-in-a-box in mainland China. He originally traveled abroad thanks to his wife, who holds a Ph.D. in computer science and obtained a teaching position at the Hong Kong University of Science and Technology.

Later, back in the United States, Bob and his family moved to Seattle, where he evolved into more of a software developer – coding in C, Perl, and scripting languages for Unix – but always with one foot in the hardware arena.

After yet another move to Reston (and now we are back to the beginning of our story), and shortly after the Nova Labs’ founders started Nova Labs 1.0 across the street from the current location, Bob, a lifelong maker, was thinking about what he might want to do next.

“How hard can it be?” is the question that makers often ask themselves, Bob said. “Makers aren’t always realistic, they are sometimes really bad at figuring out how long something will take to build, but they will build it anyways...if they are makers.”

As it turns out, Bob himself was thinking the same thing in 2012: “how hard can it be...to start your own electronics assembly service?” It’s expensive to send your board out to be assembled, Bob explained, and “all one would need is a pick and place machine” (that’s a super cool industrial robot whose job it is to take tiny electronic components and place them on circuit boards).

Of course, a lifetime of experience in hardware, software, design, and building electronics is key, and that’s what Bob has in abundance. So, he
went out and bought that industrial machine, rented space from the growing Nova Labs 1.0, and built his thriving small business.

At first, Bob’s customers came through Google searches for “electronics assembly,” but now, six years later, a lot of the work comes through word-of-mouth referrals. His customers range from research and development labs at big companies, research departments in universities or the government, and individuals who want to create a new widget for a side hustle or even a hobby.

“Hackaday is an example of a middle-range customer,” Bob explained, “they needed a conference badge with a mini-board in it—it’s become part of the ecosystem of technical conferences – check out #badgelife to learn more about it.”

Bob also uses the Nova Labs laser cutter to make assembly jigs for his business (circuit boards sometimes require jigs to hold parts in place so they can be assembled or hold components), and he has recently been signed off to use the Nova Labs Matsuura CNC mill. “It’s the big red machine that is 8,000 tons of maker joy,” Bob exclaimed! You can still hear a bit of that boy that was taking things apart long ago when he talks about the Nova Lab equipment.

“All these tools, the democratization of the ability to create stuff through use of CAD tools for wood, metal, printing, and electronics design, is what the makers’ movement is all about,” Bob said. “It’s really a great community, one heck of a cross-section of humanity comes through the door: mad scientists, frustrated workaholics, engineers, artists...they all share this one creative thread.”

Besides helping expand Nova Labs with his incubator and entrepreneurial space, Bob helps with Nova Labs Information Technology (IT) needs and teaches electronics assembly and electronics design. He brings in new IT and software developers (both newbies and experienced folks) through the software developers Meetup, and he is the co-creator and manager of NovaPass – the embedded system that tracks usage and provides access control for some of Nova Labs’ machines. Bob even keeps the pilot light on the ham radio cohort burning!

A big part of his role at Nova Labs is to help talk other people into doing other stuff, because there’s so much to do! “I am voluntold what to do, and I voluntell other folks what they should do!” he jokes.

You can meet Bob at Nova Labs Monday through Friday during business hours, and often on weekend afternoons running meetings and helping with all our IT needs. He can help you learn how to build your first board or share more fun stories about the early years of Unix and the coolest, newest microelectronic stuff going on today!

“It’s really a great community, one heck of a cross-section of humanity comes through the door: mad scientists, frustrated workaholics, engineers, artists...they all share this one creative thread.”

Find me on Nova Labs Slack: @bobcoggeshall
HAPPENINGS IN DECEMBER

Some of the Main Attractions in December are below. Class names are clickable.

Dec 4  EL: Introduction to Basic Electronic Circuits
Dec 5  NoVA Maker Faire 2020 Organizing Team - Come help make the Maker Faire
Dec 5  LC: Laser Cutter 101 Red Tool Sign Off
Dec 5  GO: Green Orientation Sign Off
Dec 7  Nova Labs Maker Market and Artisan Fair
Dec 7  BL: Blacksmithing 101 Safety Sign off
Dec 7  BL: 2x72” Belt Grinder Sign Off
Dec 8  WW: Woodshop Bandsaw Red Sign off
Dec 8  MW: Enco Vertical Mill Red Sign Off
Dec 8  CS: Bubble Free Casting
Dec 10  Tech Toast: Technical speaking and presentation skills
Dec 10  AC: History of Tea, or Knowing the Difference Between Teas
Dec 12  WW: Woodworking 101
Dec 12  Guest Speaker: John Tolly, CTO of Edge Tech Labs
Dec 13  AC: Acrylic Paint Pouring
Dec 14  BL: Blacksmithing 101 Safety Sign off
Dec 16  Nova Labs Associates & Member Meeting - featuring free Pizza
Dec 21  WW: Woodshop Router Red Sign Off
Dec 21  BL: Blacksmithing 101 Safety Sign off
Dec 22  Nova Labs Holiday/Christmas Makers Potluck

Calendar of Events
Provided by Instructors and Karen Shumway
Guest Speaker:  
John Tolly, CTO of Edge Tech Labs

As part of our initiative to highlight some of the innovation in our community and at Nova Labs, we have invited John Tolly, the CTO of Edge Tech Labs, to Nova Labs as a guest lecturer. John will be speaking on December 12th at 7:00 pm in Classroom A. It is free to attend and we will be providing pizza and refreshments.

To give some background, Edge Tech Labs has run five successful hardware-based Kickstarters with products like Drink Mate and Fret Zealot. They have also developed and deployed Internet of Things (IoT) networks for vineyards with a product called VineTracks. John has helped Edge Tech work through the R&D process, design for manufacture, quality control, and supply chain management.

He has also been an important part of taking the successful Kickstarters and turning the products into sustainable businesses. The current product, Fret Zealot, is now available in Guitar World stores across the country and they recently released a version of the system for Ukelele!

Please join us on December 12th at 7:00 pm to have some pizza and hear John talk about how to develop a hardware-based product, launch a Kickstarter, and convert that into a sustainable business.

Latest Kickstarter project: Click here

Link to meetup event: Click here
When working in the common workspaces – Orange Bay and Green Way – please limit yourself to one table when the area is being used by many people. If you are not using the work table, please remove your items to your car or home. This will maximize the number of people who can share these spaces. This is courteous and considerate so we may all share the space.

Safety Reminder of the Month:
Please remember that red tools cannot ever be used by anyone under 16 years old, and 16-17 year old users must both hold proper safety sign-off and have a tool-certified adult actively supervising them in order to use any tool with a red designation.
CALL FOR VOLUNTEERS

Our most critical need is for Team Leaders. Volunteering as a Team Leader at Nova Labs is an engaging, hands-on way to deepen your current leadership skills. Put your prior leadership experience to work while working toward a worthy goal at an increasingly high-profile nonprofit. Re-envision Nova Labs Team Leadership roles as an opportunity.

How can volunteering as a Nova Labs Team Leader benefit you? Here are the key benefits that can boost your skills and value as a leader.

- **Exposure** to senior leaders both inside and outside of the organization.
- Use of planning tools, such as Asana, in support of business strategic goals, major project management, task structuring, goal setting, and task management.
- Hands-on learning and mentoring from senior leaders and professional sessions (in planning) to practice solving complex, real-world business issues with a diverse, cross-functional group.
- Learning to act as mentor for emerging, high-potential leaders to develop.
- Leading new organizational initiatives to develop project management skills.

**Education Team Leader:**
Make Nova Labs a better place to teach and learn

**Entrepreneurship Team Leader:**
Make Nova Labs a better place to start and run a business.

**Finance Team Leader:**
Manage Nova Labs’ finances to keep Nova Labs growing and thriving

**Steward Team Leader:**
Lead and represent the shop stewards and keep the shops running

**Tech Services Team Leader:**
Keep Nova Labs’ technical infrastructure in working order and make improvements to facilitate Nova Labs’ mission, operations, and programs.

**Volunteer Team Lead:**
Connect volunteers to volunteer opportunities

Contact volunteering@nova-labs.org if you’re interested!
Team Leader Vacancies list, click here
The second installment of the Kids Open Make Meetup took place on Saturday, November 16. Although there will not be one in December, all those spellbound little makers convinced us to turn this into a monthly happening. As we head into the cold winter months, please consider attending on the third Saturday of the month with your kids, grandkids, or a borrowed neighborhood mini-maker. This is not a drop-off event, adults must remain with their charges and get involved in the making, if at all possible. The Meetup is free and includes a light dinner. Our “hat” is always available for monetary contributions, should you be so inclined.

Activities are arranged in several stations the children can visit at will. The offerings change from month to month. In November we had embroidery, assembling and painting of mini furniture, an air cannon, marshmallow and toothpick structures, and, of course, a variety of gadgets to take apart. I have it on good authority that one of the trademarks of a good engineer is a childhood spent dismantling other people’s belongings.

For January 18th, we invited Dia Michels, from Science Naturally, who will treat us to activities inspired by the STEM oriented books her company publishes. We’ll also have ‘sew a monster pillow’ (monster as in scary and imaginary, not as in gigantic), and other TBA stations.

We welcome anyone in the Nova Labs community willing to share their expertise with the next generation of makers, to propose and/or run an activity during an upcoming Kids Open Make Meetup. I am looking forward to hearing your childish ideas.

Email: fabiana.cesa@nova-labs.org
please join us for our

3rd Annual Nova Labs Holiday Party

SUNDAY, DECEMBER 22 AT 1PM - 6 PM

Join the optional
White Elephant Gift exchange at 4pm.
Gift must be a kit for making, book about making, or hand made item.
Max value $25 (or close to it)
(Please double bag any scented items.)