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Dear Readers,

For many individuals, participating in the iGEM Competition has been a life-changing milestone. iGEMers have graduated from the competition and have gone on to undertake impactful journeys after iGEM.

In the second issue of the iGEM Digest, we feature the stories of such individuals who have not only shaped their career by what they learned from the iGEM Competition but also have provided a soundtrack for others to follow. The multidisciplinary nature of the competition coupled with an emphasis to understand the entrepreneurial and societal context of the project provides students an important gateway to the academic, research, entrepreneurial and business world.

Each one of our interviewees have taken a flavor from iGEM and spread it in their careers with passion. Cindy, who participated in iGEM during 2010 and 2011, and went to develop Experiment which Bill Gates defined as “a solution to close the gap for potentially promising but unfunded projects.” We then talk with Tina Lebar, from iGEM 2010, whose interest in research became contagious by participating in iGEM, as she later went to publish her work on TAL effectors in Nature Communications, Nature Chemical Biology and has a TAL effector tattooed on her arm. Peter Cimermancic participated in iGEM during 2007 in order to compete internationally and solve healthcare problems around the globe. He joined us through his office at Verily (formerly Google Life Sciences) where he is currently applying Machine Learning to identify unknown disease biomarkers. Finally we meet Shaun Moshasha, who through iGEM found his true calling in the open bio community and went to develop Open Bio Labs (now Charlottesville’s Education and Entrepreneurship laboratory). Today he is an instrumental part of the DIY Bio community.

That’s not all, in this issue we have included a spotlight section to celebrate initiatives from iGEMers which are contributing to Synthetic Biology community. For this issue we feature “Zero To Genetic Engineering Hero” which is beginners guide to programming bacteria authored by iGEMer Justin Pahara, and Julie Legault.

Finally, we hear from the After iGEM Ambassadors from Europe, Latin and North America who share with us the impact iGEM Competition had on them at an individual level and their goals as iGEM Ambassadors.

Through iGEM Digest, our aim is to share the stories of iGEMers from all around the world to everyone, everywhere. We thank you from the bottom of our heart for the work you have done through iGEM and after iGEM and it’s a pleasure for us to be a part of your trailblazing journey!

Sincerely,

Amy Chen
and
Hassnain Qasim Bokhari
Co-Editors-in-Chief
2006 was the year when iGEM went international, 37 teams were participating and among these teams, there was one lead by Professor Roman Jerala and Marko Dolinar. Like many other non-US teams, it was the first time a Slovenian team participated in the competition. They surprised many as they went on to win the Grand Prize. Their victory was not only momentous for the 2006 team members, but also it helped in setting an inspiring example for future teams from Slovenia, and those countries which were participating for the first time, that in the iGEM Competition they can equally compete with the prestigious universities of the world.

Peter Cimermančič, a 2nd year Biochemistry undergrad, was on such student who was inspired by the 2006 team’s victory, and it motivated him to be a part of the iGEM Competition in 2007.

We had a chance to reconnect with Peter who was now working at Verily Life Sciences (formerly Google Life Sciences), where his work involves using machine learning to interpret raw lab data as part of their search for new disease biomarkers. During his PhD, he mainly spent his time to model protein structures, but now has the opportunity to work on the data gained from actual patients.
Speaking on the effect of 2006 team’s achievement he reminisced with a smile on his face, “At the time, I didn’t expect science in our country to be comparable with that of world-renowned universities, and I kind of suffered from the Impostor Syndrome. You know a feeling that you aren’t as good as others or the students here aren’t as good as the ones at the top US universities, because they have a better research ecosystem. However, when Slovenia won in 2006 that gave us confidence. So I was like let’s give iGEM a shot.”

From applying for the team to presenting their work at the Giant Jamboree, it was all new and exciting for Peter.

“I remember writing a proposal and then going through interviews with Roman and Marko. After that, the three months of research was an amazing learning experience for me followed by going to US for the Giant Jamboree, where I listened and watched crazy projects, that opened a new world of Science to me.”

The participation set the tone for what Peter went on to do professionally with his research and career. It was both a realization and commitment, as he cheerfully said, “I realized that I wasn’t born to do wet-lab science. I really enjoyed doing Computational Biology. iGEM was my first chance to work independently in the lab, I got to do modeling and enjoyed doing the computational stuff more than the wet-lab and that ended up shaping what I chose to do next. So where I am now, it was basically ignited by iGEM.”
That’s the only way I do science now. The best thing about doing Science today, is that you can’t work all by yourself. Problems can only be solved when you have a diverse team working together on it. For example, wet-lab research gives a significant amount of information and data, which requires more expertise to analyze and process it, that’s where dry-lab comes in. Today, working alone is difficult, you can’t do that. Even at University of California, San Francisco, we were constantly trying to equip scientists from distinct disciplines with diverse skills. The setup of iGEM is great. It brings diverse skill sets together very early on, right at the time of the ideation process.

Human Practices wasn’t a part of the iGEM Competition at the time Peter participated, yet his team did a lot of work on Education. Peter gave the credit of their work to Roman and Marko’s vision of promoting iGEM to not just the scientific community but the public at large. “I remember that each one of us went to many interviews on National TV and Radio, we gave seminars to the public as well; so that we could use this opportunity to educate people about Synthetic Biology and its potential to solve major healthcare issues.”
Peter claimed that although Human Practices wasn’t a part of the iGEM Competition at that time but its inclusion over the years has ensured that the public receives responsible and credible knowledge about Synthetic Biology. "When you engage in a conversation about GMO, it makes the public fearful, but when you talk with them about all the new therapies being developed at the behest of Synthetic Biology, it generates a positive view and I believe that iGEM has a very powerful role to play in it."

After his participation in the iGEM Competition, Peter went on to do his PhD and post-doc from UCSF, but for him that’s not where he stops. He has higher goals, he wants to translate his research and build it up to help treat patients. Right now his research work at Verily brings him a step closer to his goal.

Although today his work mostly relates to bioinformatics and machine learning, he still follows the field of Synthetic Biology. He has high hopes for the future of Synthetic Biology, "I think it will be very interesting since now Synthetic Biology has entered into the therapeutic world (eg, CAR-T cells). Now that we have stepped out of the door, people will be paying more attention to Synthetic Biology and it will be great to see how iGEM grows in this scenario, since many of the teams, like I have said before, work on solving important problems. There are many challenges and all these teams are working on them, from food to energy, healthcare and agriculture."

The conversation finished with Peter hailing the power of iGEMers and mentioning his strong expectations from the community, "Through iGEM, many passionate individuals get an opportunity to work collectively on diverse set of problems. The work as a team and have this opportunity to make in impact in the world. Some of them have already done that and I believe many more will do it in the future."
Cindy Wu is a co-founder of Experiment, a crowdfunding platform for scientific research. During undergrad Cindy was funded by Howard Hughes Medical Institute to work on cell-based immunotherapies. In 2011 she was on the University of Washington iGEM team where they won the World Championship. Cindy dropped out of her PhD to build Experiment, a Y Combinator backed startup. Experiment’s mission is to democratize the research process so that anyone can do science. Their mission has been profiled by leading publications including Science Magazine, Discover Magazine, The Economist, and Science Friday. Cindy was named on the Forbes’ 30 under 30 list. Bill Gates recognized Experiment as “a solution to close the gap for potentially promising but unfunded projects.” Cindy serves on the Board of Directors of the National Speleological Society.

As an iGEM alumni, Cindy is excited to give back to the community and to help more iGEM teams generate innovative projects. Talking to Cindy about the various projects that Experiment has funded, I was happy to discover that iGEM teams have also successfully received funding for their project through Experiment. Over the past few years, 20 iGEM teams have been successfully funded on Experiment.com with an average project budget of $2663 raised for these projects. Experiment has not only helped fund teams in USA but has also had teams from Switzerland, Spain, Scotland, Netherlands, Nepal, India, and Italy. Experiment continues to support iGEM teams through the iGEM Research Challenge, an opportunity for teams to launch crowdfunding campaigns before the Giant Jamboree. The iGEM Research Challenge for 2019 is open and you can take a look at it on experiment.com/grants/iGEM2019.
Free pizza: Every university student’s weakness. An incentive that seems to instantaneously draw the attention of hungry college students everywhere. Pizza was how Cindy Wu first discovered the world of synthetic biology. Instead of walking away with free pizza, Cindy walked into a talk about reprogramming biology with an experience that changed the course of her career. It turned out that the professor giving the talk was encouraging the undergraduates to join a program called iGEM. At the time, Cindy had no idea what iGEM was, but she decided to attend the first meeting to find out more.

“I couldn’t tell you the difference between proteins and DNA”, Cindy expressed as she recounted her first UW iGEM meeting. “What were minipreps? What were oligos? How do I use a pipet?” were mind-boggling questions that she had at the beginning of the summer. However, as the project progressed over the next few months, her understanding of Synthetic Biology and her confident in lab skills grew.

Despite her fear of public speaking, Cindy and her team won the Best Health or Medicine Award at the iGEM 2010 competition.

I met Cindy and saw her present at a recent event, so I was genuinely surprised when she told me that she is naturally very shy and introverted. “I give talks quite often now but giving that iGEM presentation at MIT was mentally very challenging for me. I credit preparing for the iGEM talk as one of the moments where I got over my fear of public speaking.” said Cindy.

Despite her fear of public speaking, Cindy and her team won the Best Health or Medicine Award at the iGEM 2010 competition for their project that focused on redesigning a therapeutic for anthrax bacteria. With this initial exposure to iGEM, Cindy and her team won the iGEM World Championship Jamboree in 2011.

“This iGEM thing really made a difference for me and my friends”.

Featured Story: Cindy Wu’s iGEM Journey
I was curious to know what lead Cindy to found Experiment, a crowdfunding site for scientific research. Upon asking it, her answer took me by surprise, “Jelly!” she replied in a jolly manner.

Jelly? I didn’t know how to interpret this answer. What was jelly? This answer was so unconventional that I was excited to hear more.

Cindy elaborated on this one-word answer. “Jelly is that the kind of wondrous feeling one has upon making a personal scientific discovery. And, I experienced jelly every day during iGEM.” There were many moments of jelly for Cindy during her iGEM experience. From successfully connecting a bunch of oligos to designing a working DNA part and engineering an enzyme treatment for anthrax, these moments all generated the feeling of “jelly” for Cindy. Cindy hopes that iGEMers can hold on to the “tiny moments in the lab where [they] feel that wondrous feeling, a moment of discovery.” To Cindy, passing on this feeling of “jelly” with others is extremely valuable. “Share stories of why this experience and your project is meaningful to you. When you tell stories about your own passion, your passion and enthusiasm become contagious.”

When asked about what advice she wants to pass on to iGEMers, Cindy responded, “Do not try to explain your project in the way you ‘think’ is the ‘right’ or ‘formal’ way to explain it. The communication often falls flat when humans try to follow some archaic ways of explaining their science for the sake of following a prescribed method. Write how you speak. Keep your communication concise. Ask your audience questions. Make your communication a discussion. Allow your backers the opportunity to feel like they belong. Give your backers a window to your world in the lab.”
Experiment's mission is to democratize the research process, so anyone can do science. Cindy recognizes that achieving this as a community is going to take a long time and expects that this mission will extend beyond her time on the planet. Cindy believes that the biggest hurdle to making the system more efficient and accessible by keeping our scientific integrity high is behavior change. She sees an inequity in the fact that the current incentives in the system reward career scientists who publish in high impact journals and earn large government grants. This barrier to research was something that Cindy had personally experienced.

After publishing their iGEM project in the Journal of Biological Chemistry, Cindy wanted to continue looking into the enzyme that she and her team engineered. Informed by new research studies, she wanted to test out the applicability of the enzyme designed for anthrax on Staphylococcus epidermidis. However, she needed funding to test this hypothesis. Sadly, when she asked her professor where she could find a small grant, he told her the system doesn’t fund people like her. Cindy explained that the system is so conservative today that it only supports established ideas from professors with track records asking for more than $50,000. "That's when we decided to create an online marketplace where researchers could post research ideas and anyone anywhere with a credit card could be a patron of science," says Cindy.

Set on this mission to build a scientific community that utilizes the internet to communicate discoveries efficiently, allow anyone online to access existing knowledge for free, and build a way to verify the accuracy of scientific outcomes in real-time, Cindy believes that we will end up producing more high-quality scientific content. "We will enable better science for more people," says Cindy.

When asked about the role that she sees the iGEM community playing in this mission, Cindy stated, “The iGEM community is unique because the majority of our members are just starting out and the system does not currently judge us by our publications or grants. I encourage the iGEM community to question why the scientific community does things the way we do them. It is not a good enough reason to continue with processes because ‘this is the way things have always been done’."
The world’s first beginner’s guide to genetic engineering is here! Zero to Genetic Engineering Hero guides new aspiring scientists on a journey of real-world, hands-on genetic engineering experiments that teach real experimental techniques and the first principles of biology. Upon completion of the book, learners have a strong understanding of genetic engineering and can begin their own synthetic biology projects.

Written for secondary school education, iGEM teams, and at-home learning, Zero to Genetic Engineering Hero is seven chapters of DNA and bacteria-based activities, virtual simulations, pro-tips, and more than 130 color illustrations. This book replaces the need for an expert teacher with university training and enables a new generation of education in genetic engineering.

“This book is the perfect journey for students to learn the basics of programming bacteria. Covering the first principles, extracting proteins you’ve engineered bacteria to create, and controlling genetic circuits are the topics you need to know before you start innovating on your iGEM or Science Fair project.” - K. Turton, High School iGEM advisor
A Synthetic Biology Career: Tina Lebar’s iGEM Road

Thousands of iGEM alumni continue to pursue a career in academic research. How has iGEM shaped the experiences of alumni like Tina Lebar? The iGEM Digest interviewed Tina to find out what set her on her path to pursuing a career in Synthetic Biology research.

Tina first participated in the iGEM competition in 2010 as a student member of the Slovenian team, which won the Grand Prize at the Giant Jamboree. Since her participation in iGEM she has gone on to pursue a PhD with expertise in Molecular Biology, Genetics, and Biotechnology at National Institute of Chemistry, Slovenia. Before taking part in iGEM Tina wasn’t sure what career path that she wanted to take.

“I always just knew I wanted to learn more things, but not necessarily by pursuing a PhD. iGEM was definitely an experience which pushed me in this direction.” says Tina.

Tina’s participation in iGEM was a life-changing experience that helped guide her in the direction of a career in academic research. “I didn’t have much experience working in the lab before iGEM, and when we worked on our project I just loved it. I could barely wait to see the results and then discuss future experiments and (most of the time) options to solve the problems that we encountered,” says Tina. Her involvement with iGEM also fostered her interest in the field of Synthetic Biology. “Before I participated in iGEM, I actually didn’t know much about synthetic biology. I heard about the successes of the previous Slovenian teams, so I read up on their projects. They sounded really interesting, almost like science fiction (compared to the things we learned in college), so I decided to apply to be part of the 2010 team. The experience has changed my entire understanding of science. Indeed, there is a lot of things in biology left to discover, but we can also apply the knowledge we already have to create something new. Synthetic biology and iGEM have taught me to think out of the box, like the famous quote says: ‘See things not as they are, but as they might be’.”

Tina Lebar is a Postdoctoral Researcher at the Department of Synthetic Biology and Immunology at the Kemijski Institut - National Institute of Chemistry in Slovenia. She is an alumni from the 2010 Slovenian iGEM Team and has served as an advisor for the 2012 and 2016 Slovenian iGEM teams, who won second place and Best Foundational Advance Awards, respectively. Her research has been published in academic journals such as Nature Communications and Nature Chemical Biology. Her current research focuses on transcriptional regulation of mammalian cells with TAL effectors and the CRISPR/dCas9 system.

Written and Interviewed by: Amy Chen and Hassnain Qasim Bokhari

Photo credits: Tina Lebar
Tina was selected to be part of the 2010 Slovenian iGEM team. Their project was entitled “DNA coding beyond triplets”. The team prepared a DNA-guided assembly line of biosynthetic enzymes in E.coli which could bind a specific DNA sequence (a ‘DNA-scaffold’) via the addition of zinc finger DNA binding domains, which enables their defined arrangement in a confined space, rather than having them “float” free in the cytoplasm of the cell. This principle can be applied for enhanced and faster production of different chemical compounds, which was demonstrated on the example of violacein. Their work was published in the journal Nucleic Acids Research in 2011. Tina’s team continued their project the next year by preparing a genetic bistable switch in mammalian cells using TAL effectors in 2012. A continuation of the said project led to an exciting publication in Nature Communications.

The hands-on research experience from Tina’s participation in iGEM equipped her with many technical skills that she carried over to her Synthetic Biology work on mammalian cells. The experience also helped her develop other valuable skills. “I think the most valuable skills I gained from iGEM were teamwork, interdisciplinarity and (as I already mentioned above) the ability to think out of the box, all of which I still try to apply daily,” Tina says.

With many years of involvement with iGEM, we asked Tina what advice she had for current iGEMers. “[Have] fun with the project you’re working on. It’s not always about winning, just try to learn as much as you can and make iGEM a memorable experience for yourself. Also, friendships made during iGEM can last for a lifetime!” We also asked Tina what advice she has for those iGEMers who are considering graduate research, given her experience. “[think] hard before you get yourself into a PhD. Talk to someone who’s been there and get some first-hand advice. If you do decide to go by this path, do not give up as soon as you get a few bad results, there’s always a way to solve things. And remember, the most exciting phrase in science is not ‘Eureka!’ but ‘That’s funny…’” says Tina.

Tina’s current work focuses on transcriptional regulation with TAL effectors and the CRISPR/dCas9 system in mammalian cells. In one project she discovered a new mode of transcriptional regulation with TAL effectors by exploiting their unique DNA-binding mechanism. In another project she has been working on enhanced transcriptional activation with the CRISPR system. Tina is working on some groundbreaking research and looks forward to publishing the findings in the near future.

From our conversations with Tina, it was clear that she has an unending passion for research. So much so that she quite literally wears her research on her sleeve; Tina has a tattoo of a TAL effector on her arm that she designed herself. We are excited to see where her passion takes her next as she looks to expand her horizons and learn new techniques in the field of synthetic biology.
It was in the Spring of my fourth year of college when I stumbled upon an event titled “Ethical Issues in Synthetic Biology.” My attention was immediately captivated. From the time I first saw Craig Venter talk on Fora.TV when I was 19 years old, I thought synthetic biology and genomic sciences as a whole was quite possibly one of the coolest concepts ever. As soon as I saw that video, I immediately researched into Dr. Venter and applied for an internship position at JCVI, and I immediately received a rejection letter. Oh well, I thought it was time to move on! I proceeded to attend my community college, was accepted into the University of Virginia, and hadn’t given synthetic biology too serious of a thought.

In 2010, I was randomly perusing the UVA web of sites when I stumbled upon the page for UVA’s iGEM team. I had never seen such an organization before and my curiosity that had been piqued years before had once again been titillated. Searching for hours through that website, I finally found the contact information for somebody who was associated with the team. Unfortunately, my email never received a response. Forlorn, I thought the team had disbanded. Imagine my surprise when two years later, the “Ethical Issues in Synthetic Biology” event was being hosted by this very same iGEM team! I couldn’t hold back my excitement.

I’VE BEEN SEARCHING FOR YOU FOR TWO YEARS WHERE HAVE YOU BEEN AND HOW CAN I BE PART OF THIS?! My enthusiasm might have startled the poor aspiring scientist coordinating the event as she politely took a step back and responded that the team had been
established and I could apply next year. Soon after, we exchanged emails in which I asked again how I could be a part of this. The response was the same. I moved on. If they didn’t want me to be a part of the team I couldn’t force them.

By that summer, I was searching frantically for a lab position. Being a 4th year undergrad in Biochemistry and moving into my 5th year, I figured I should probably have some lab experience before I graduated. In addition to emailing over 100 professors in various departments of the university, I also sent the iGEM team one last email essentially begging to be on the team:

“This is exactly where I need to be and I only have one year to do it.”

Although I received the same response to apply the following year, I was also told that a couple members had dropped out for this year’s team and they could use a couple extra sets of hands in the lab. That was it, that was my in. As my momma always said, “the squeaky door gets the oil.” I proceeded to quit my job as a pharmacy tech at a prestigious private pharmacy, moved down to Charlottesville, and slept on my friend’s couch for a month to capitalize on this opportunity.

We spent 2012 building a diagnostic system for bacterial infections by leveraging the natural specificity of the bacteriophage with the sensitivity of the household pregnancy test. With this device that didn’t need electricity, clean water, or any lab tools, we could revolutionize diagnostics for millions of people across the world. I had a purpose! I’ll never forget the exhilaration that was coursing through my veins as I went to my first iGEM competition. These were some of the smartest people in the world doing some of the most incredible projects that could fundamentally reshape our interaction with nature. Additionally, every single person I met was kind and humble! It was an unforgettable experience that played a pivotal role shaping me into the person I am today.
Our team ended up getting to the top 4 projects in our region and was awarded the prize for best experimental measurement. When I returned to Charlottesville, I learned about an entrepreneurship competition hosted by our school. High from the excitement from iGEM, I enthusiastically suggested to my team that we apply to the competition. The response was lackluster: “We’re scientists, not businessmen.” So I said forget it I’ll do it anyways! Needless to say, their curiosity was piqued when we were accepted into the semifinals and grew when we won the semifinals, until they were downright exuberant when we won the whole competition! I suppose it helped that along with the adoration, we received a nice $20,000 check from our school! Within six months, iGEM allowed me to transition from a wandering soul to a scientist/entrepreneur with passion and purpose.

With our bacteriophage based diagnostic we called PhageFlag, my team was able to raise $250,000 over the course of two years in non-dilutive grant funding from our school, which enabled us to continue R&D. I had graduated and was accepted into the McIntire School of Commerce at UVA for my Masters (McIntire is one of the best business schools in the country, and I only received a 2.71 GPA from my undergraduate degree. I suppose winning the entrepreneurship competition somehow played into my acceptance)! While I was continuing R&D on PhageFlag, I was the only team member from the previous year that was also part of the following year’s team, although I played more of a team leader/managerial role this time around. After the iGEM competition, we presented our project, Minicell Therapeutics, to the entrepreneurship competition at UVA again, this time winning 3rd place.
I started to think I had a knack for this whole translational research thing. Simultaneously, I wondered why other students from my university had yet to start biotech companies while the entrepreneurship theme in other disciplines was beginning to thrive. Somehow, we had figured it out. I began dreaming of a massive center in which we had a laboratory and would teach science and business, and spin out companies and be this massive factory that would churn out innovation that could help the world! But how in the world was I going to build this thing? After consulting many many people within the university and beyond, I decided to first focus on what I knew best: developing concepts and helping them get enough traction and momentum where they could sustain and grow themselves. I pitched the idea to Alex Zorychta, one of my PhageFlag teammates as well as Ian Rahman, one of my commerce school mates, and the organization BioTrep (Biotech Entrepreneur) was born. Our first class of students was in the Spring of 2014, where 15 students were gathered in a room with us as we progressed step by step through how to build a project and build the use and business case around it. From that organization, two businesses grew out of it that are still alive and thriving today, and have raised over $8M cumulatively: Contraline and AgroSpheres (the reincarnation of the 2013 iGEM team’s project Minicell Therapeutics).

All the while, I was still associated with the iGEM team, this year as an advisor to our team. I knew this organization was special and it wasn’t something I was going to let go. When I went back to the competition in 2014, I met Ellen Jorgensen and discovered the next pivotal concept that has transformed my life: DIY Biology and the rise of Citizen Science.

That year, I learned about the existence of the DIY Bio Laboratory. It’s a makerspace for science. I was flabbergasted. This was everything I wanted: science, business, and AUTONOMY! I wanted to join one so bad, but there were none in Charlottesville. So there was only one thing to do, I had to build one. During December 2014, I established a meetup page to gauge the interest for a DIY Bio laboratory in Charlottesville. I hosted a meetup every other week until by May the
online group had grown to over 100 people with an average of 15-20 attendees every meeting. Success: there was interest and there was excitement!

Things were going so well, until that summer. PhageFlag, our flagship project that had launched me into the world, had exploded. There was an irreconcilable misalignment of vision between some of the team’s founders that ended up in disaster for us all. By the end of June 2015, I would be unemployed. I had to make some decisions and fast. On one hand, one of my advisors had offered me an international business development position in a small and rapidly growing biotechnology company. On the other hand, I had this nebulous concept for a community science space and a population of people that were interested in this weird new world of DIY Biology.

PhageFlag broke apart and our trio of student team members went their separate ways. Rachel Smith went on to become a student of Neri Oxman’s in the MIT Media Lab. Alex was hired by UVA to begin an undergraduate innovation hub called Works in Progress. Within 3 months of unemployment, I had developed a rough sketch for what this business was going to look like, registered a company, and leased a space. Open Bio Labs was born. It was everything I was looking for: synthetic biology, autonomy, decentralized networks of learning and project development, global impact, the hacking mentality, and much much more. Now the only small, tiny, insignificant question was, how in the world was I going to actually make this work?

Open Bio Labs, as well as other community labs, have so much potential to transform their community. But how was the space actually going to be used and who it was going to be used by? Various niches within the community could benefit, including undergraduate students wanting to play in lab, graduate students and professors that wanted to start their own company outside the umbrella of the university, professional scientists that wanted to tinker around on their own concepts, and K-12 students that needed more hands-on science experience. I had no idea which direction to go in that would
allow the lab to sustain itself and grow, so I tried them all! After a year and a half of exploring the market, it turned out all avenues had the potential for success. However, the K-12 education component stood out as the most impactful and rewarding and with the highest chance for sustainability.

The following year, Open Bio Labs was transformed into Charlottesville’s Education and Entrepreneurship laboratory. Our methodology of Learn>Build>Grow is a pipeline that transforms students into biotechnology entrepreneurs. We have worked with hundreds of students conducting classes, workshops, and field-trips, providing mentorship and guidance, and educating the public on the role of synthetic biology and DIY Biology in transforming our world. We have worked closely with the University on various projects to promote synthetic biology within the University. We have worked closely with schools to provide opportunities for their students to familiarize themselves with synthetic biology. We have taken the initiative to coordinate all the various DIY Bio groups in Virginia by creating the Virginia Coalition of Community Labs. Lastly, we have proven out our Learn>Build>Grow pathway by growing a company completely from scratch inside Open Bio Labs: Kombucha Biomaterials is transforming the way we produce materials by leveraging the byproduct of Kombucha fermentation to create high value materials such as tree-free paper and animal-free leather.

It’s 2018 now, and the vision I had back in 2013 is finally materializing. I have every year since participated in iGEM as a judge, and every time I come back with more opportunities, a renewed energy, and deeper friendships. iGEM and synthetic biology has become my world and has allowed me to thrive. My goal is to enable this same pathway for as many people as possible so they can also find the sense of purpose that I found. My goal is to coordinate a network of community labs around the world that can empower people to actually act upon and execute their wild dreams of how to make the world a better place. My goal is to facilitate intense dialogue as we wade through some of the toughest issues at the convergence of technology and society, so that we can avoid destroying ourselves and move forward as a cohesive whole. My goal is to make everybody an iGEMer, because this is who we are.
iGEM integrates multidisciplinary approaches to develop, enhance and expand the scientific knowledge. It also, allows great minds to connect, share ideas collaborate, and work out on how to bring those ideas to life.

The diversity and infinite possibilities which iGEM can bring inspired me to want to spread it in my country as well.

In my first iGEM year I learned a great deal about myself and it helped me grow. The challenges which it brought to me helped me see things from a different perspective and gave me the confidence to take on new challenges.

After iGEM provides me a platform to develop a collaborative environment at the back drop of Synthetic Biology and help countries utilize the new technology to solve local their problems. I am most excited about the development of a Mediterranean Consortium of iGEM projects from Cyprus, Greece and Southern France and Spain.

Ambassador Highlights

Thea Chrysostomou
iGEM Ambassador to Europe

Having participated in the iGEM competition over the past 8 years, it is easy to understand how much the iGEM Foundation has helped in the advancement of synthetic biology and the development of an international community. From the iGEM competition, I believe there is one area that should be specially commended, and that is the human practices, one very important aspect that differentiates iGEM from other student competitions. iGEM motivates students to take into consideration the social, cultural and political situations of the communities they live in. By acknowledging those situations, teams obtain a broader understanding of the realities they live in and allows them to analyze the implications of their project with more diligence.

Another important aspect of the competition is iGEM’s encouragement for collaborations. In this way, teams find they are no longer limited by their regions, but can also obtain assistance and mentorship in finding ways to solve their own local problems.

I also believe this approach is a very important first step towards the path of improving their current limitations. We now have alumni participating in international forums, serving as UN delegates, pushing innovation by founding their own companies, representing the needs of their regions and voicing out their opinions and commentary on the future of synthetic biology. All this is happening one alumni at a time, but supported by the much community of synthetic biologists.

Ricardo Camilo Chavez
iGEM Ambassador to Latin America

In 2012, I begrudgingly stepped into an iGEM lab, in the hopes of quickly getting some research experience and hanging out with my friend. Did I mention, my area of focus was physics? Well cut to six years later, and my friend is a nurse in Alaska, and I have shifted my entire attention to iGEM. Through iGEM, I learned how to curate a research project, but more importantly, I discovered the power of multidisciplinary scientific collaboration to solve community problems. Now, I could have ended my iGEM involvement after I graduated, but I decided to be apart of After iGEM because I wanted to solve world problems. Thanks to After iGEM my collaborators are now from all over the world. And, with their knowledge and experiences combined, it has been possible to not only address the problems in my community, but it became possible to dream and work bigger. Now, the work that I am doing thanks to After iGEM is not just centered around solving world problems and establishing international collaboration networks, so that in the long run I am improving the future of the community I love.

Holly M. Bowman
iGEM Ambassador to North America

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In our next issue...

Alternative Methods of Working in and with Synthetic Biology!

MindFuel: Local Organizations Supporting Local Teams

A Day in the Lab
By Shaheer Sabz Ali

Beats, Bacteria, Biotech, Camera, Community
By Dr. David Kong

iGEMers vs. Zero Gravity
By Amy Chen

Stay tuned!

Interested in writing for The iGEM Digest? Get in touch at after@igem.org.

We’re looking for stories from the community as well as volunteers to join us as writers, reporters, and editors.