News Letter

NO.1

Today' topic

How to set up and operate an iGEM team

Welcome to our newsletter.
A DIY newsletter. How to set up and operate an igen team? We will show you our answers. Let's have a look.

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T O D A Y ' S T O P I C

HOW TO SET UP AND OPERATE AN IGEM TEAM

Here is the final official version
of the first special issue for 2015 Newsletter.
The first special issue is about how to set up
and operate an iGEM team.

We really appreciate the contributions from
Professor Wayne Materi and the following 11 iGEM teams
(in alphabetical order):

ETH-Zürich, NCTU_Formosa, Oxford,
Paris_Bettencourt, Stockholm, SYSU-CHINA,
Toulouse, TU-Eindhoven, USTC,
Valencia_UPV and Waterloo.

Thank you all for being so supportive!

If there are any questions
please reach us at igemxmu@gmail.com

All the best!

iGEM Amoy
2015-5-17

Contents

By: Eleven iGEM Teams

ETH-Zürich iGEM Team

ETH Zurich has been, together with Cambridge, the first European university participating in iGEM. Therefore, our professors have lots of experience organizing it!

Continuing with the established tradition, applications for the ETH Zurich iGEM team are opened in the beginning of March and by the end of the same month the professors will choose a group of students, taking into consideration their motivation, their background and their available time. Usually, half of the team is required to have a background in biology to be able to perform the experiments, while the other half is expected to have a more technical background, which is required for successful modeling. Moreover, the interaction between biology and engineering people can bring up new solutions and more creative ways of solving problems.

Once the team was established, general tasks regarding organization were divided among us. We were looking for a person responsible of the lab, modeling, safety & human practices, deadlines and medal criteria, the trip, the wiki, funding, and the meetings, respectively. However, this does not mean that only one person does everything in that area! It just means that they have to be more aware of what has to be done.

At the moment we are still in the process of looking for a project. We started by looking at

projects from previous years to get a feeling for what we think are interesting topics, what is feasible, and what ideas we can discard right away as they have already been done.
Few weeks of brainstorming were then followed by the development of the four best ideas, for which we evaluated the viability and originality of the projects, the complexity of the genetic circuit and the model, and the possible impacts of the idea, both in a scientific and a social way. At the end, only one idea can survive. Since ETH has a history of very successful and cleverly devised modeling strategies, we aim to keep up with this tradition and to come up with an idea which also brings enough challenges for our modeling people.

A big obstacle we have is that our lab is only available from July on because of organization reasons. This, however, will allow us to focus first on our modeling part to make start our experiments as well planned as possible. In the meantime, we will be able to analyze the potential risks of our project and how it can affect society.

Despite our enthusiasm, we face another big problem when it comes to recruitment of team members: final exams at ETH are in August. Due to this a lot of students fear that iGEM will take up too much of their time and they prefer to focus on the exams. In previous years, although still being a factor, this disadvantage was balanced by the Jamboree taking place in November. Nonetheless, we grow in the face of adversity! A total of 9 students from 3 departments of ETH signed up for the project. After three of them dropped out in the last minute we had to fear the premature end of our iGEM career. But the remaining six of us are highly motivated and managed to convince our supervising professors that we will do everything in our power to compensate for the small size of our team. We are very eager to prove ourselves by doing our best both in the experimental part of iGEM as well as in our lectures. Our final team features students from Biomedical Engineering, Cell Biology, Microbiology, Biochemistry, as well as Computational Biology. With the diversity of our backgrounds we have a great starting point for interesting discussions and elaboration of an interesting project that will be beneficial for both science and society!

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NCTU_FORMOSA iGEM Team

MEMBER COMPOSITION

This year our NCTU_FORMOSA will send eighteen members to attend iGEM contest in September. Initially, we recruited 70 members in last October. During those months, we held screenings to select the best members to form this year's Formosa team. From the very beginning, we were separated into small groups. By practicing last year prized teams' entire projects, we learned to become an igemer. During this process, we have realized wiki's content and presented the project. Now, our team consists of different departments of students. Most of the members major in biological technology department. Others are from departments of foreign languages and literatures, nanotechnology, applied chemistry, transportation and logistics management. Due to our diverse composition, we can provoke more novel thoughts for our project.

MEMBERS' REFLECTION

In this year, we learned a lot during the process of the selection of our team members. The

appropriate amount of pressure brought significant growth to our knowledge. Not only did we learn more about iGEM, we also understood how to work as a team, how to divide our work and how to put everyone on the right position to let them use their talent to the fullest. Everyone has to contribute in a team, that's why it's extremely important for each member to find out where he or she can be most helpful. Having good time management had us finish our goals before each deadline. Utilizing every resource was very vital, because most of us are just freshmen and sophomores. We don't know most of the information on the scientific papers, so we had to look up a large amount of information on the Internet. Luckily, we have students from different departments; therefore, we can discuss our problems with members that have diverse expertise. Furthermore, the senior students will offer guidance to us, helping us learn faster. During the process, we had each and every crisis averted. Hopefully we can overcome every obstacle and also have fun while doing it.

TEACHING ASSISTANTS

Our advisors and teaching assistants play significant roles in our team. They teach us not only professional knowledge but also give us some practical recommendations. They usually don't tell us what to do; instead, they train us to tackle the problems in every aspect. They want us to solve the problems by ourselves first then ask them if we couldn't find the solutions. They also lead us to the right direction so we won't deviate from the main project. During the learning process, they gradually know everybody's personality and talent. As a result, they could choose those who can embrace challenges and won't lose their passion no matter how tough the road will be. Furthermore, teaching assistants attach importance to people equipped with the abilities of teamwork. Through the selecting process, we can form the best NCTU_FORMOSA team.

LEADERS

Words from NCTU_FORMOSA leaders:
Hey guys, we are glad to have chance to share our experiences of being the leaders of the NCTU_FORMOSA in 2015! To be honest, leading the team is quite a challenging task for us.We would like to thank all of our supportive and self-motivated team members and teachers for their cooperation to make the team progress. First and foremost, both of us believe that listening to the voices of members while making decisions is important, because each of our members is the owner of the team no matter what role they play. Definitely, we have the responsibility and mission to bring the team to a better state. By ensuring all of us always have consensus through out the whole process, the sense of belonging among the members will become stronger and stronger. Moreover, as our members are from different fields equipped with different abilities, arranging tasks appropriately is also the key point that cannot be ignored to form an efficient and powerful team. As leaders, we must also learn to trust our members that they can play their roles in their perfect ways! In sum, without the perfect cooperation between the leaders and the members, leader will just like a sports car without fuel, which is impossible to reach the finishing line!

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Oxford iGEM Team

Oxford University had its pioneer iGEM team in 2014, then comprising 6 biochemists, 1 chemist, 1 biologist, 3 engineers, 1 lawyer, and 1 PPE (philosophy, politics, and economics)-ist. The project undertaken by the 2014 team involved research on the use of a bacterial enzyme to degrade dichloromethane into harmless waste, for which they were awarded a Gold medal during the Jamboree.

This year, the Oxford team counts 9 biochemists, 2 chemists, 2 biologists, 1 engineer, and 2 physicists among its ranks. The project they are taking on this year pertains to the development of bacterial biofilm degradation methods for medical and industrial applications.

Team Oxford invokes experiences of their own as well as those of their predecessors to address some issues related to the administration, management, and leadership of an iGEM team:

1. When to recruit team members?

A few of the founding members of Oxford iGEM got together as an interest group at the end of 2013 and managed to secure eventual support from Oxford's Biochemistry department (i.e. promise for lab space, experimental consumables etc) by April 2014, when recruitment successes also led to the final member count of 12 being achieved.

In November at the 2014 Jamboree, the 2014 team decided that recruitment for the 2015 team needs to begin as soon as they return to Oxford, in hopes of speeding up the ideas-forming process leading up to a decision on what the project will be. This is to facilitate the possibility of having some initial aspects of the experimental work being done over

the Easter vacation in April, and the data obtained can then be fed into computational modeling over the term leading up to the summer vacation such that experimental design can be properly optimized.
Recruitment for the 2015 team officially began in mid-November 2014, leading up team membership finalization in February 2015.

2. What were the things done before the actual design of the project began? Were any of these implemented as part of the selection and eventually training process?

Over the course of the Christmas vacation, our iGEMer-hopefuls were tasked with interacting with members of the public about synthetic biology and iGEM, which mainly happened in the form of surveys regarding what the public thought were essential problems in daily life that could be overcame using technologies derived from synthetic biology. The idea was to have a truly public needs-inspired project and maximum community engagement about sensitive issues in genetic engineering such as the safety aspect of things. As school reopened, the results of the survey were pooled together, and each applicant would use the information obtained to come up with a proposal for a potential project.

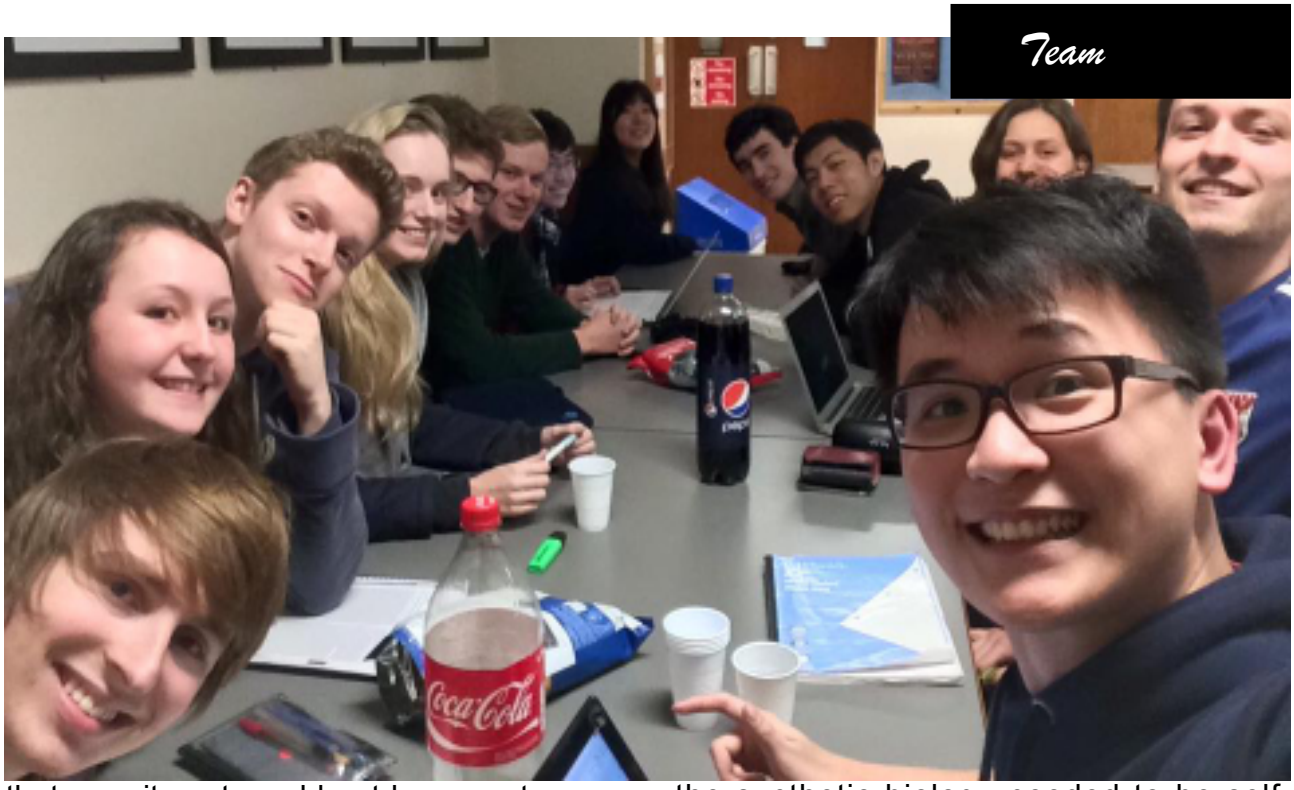
What resulted was a largely self-selecting pool of iGEMers, as only students who could fulfill the time and energy commitments required to take on the multifaceted nature of iGEM stayed on to see the project-choosing phase through. The team's mentors and advisors adopted a largely hands-free approach when it came to deciding on the specific direction of the project so that the project would be truly student-designed and student-led, only offering advice when it comes to technicalities such as whether a certain species of bacteria is known to take in a certain genetic sequence well or otherwise.

The study of synthetic biology specifically was also done on a largely self-initiative basis, with members looking up facts/past projects online as and when needed to address questions that arise in the project design process. The only piece of formal educational material recommended was the book "Synthetic Biology - a Primer" by Freemont et al, which the engineer in the team especially vouches for as the book is aimed at teaching synthetic biology to people with no f ormal training in the biological sciences through a design-oriented approach.

3. How was the composition of the team decided on?

From the beginning, it was certain that the team required at least one engineer/ physicist who was familiar with computation methods to carry out the theoretical modeling required for effective experimental design. As such, recruitment notices were sent out to all undergraduates in the fields of natural sciences.

One noteworthy point is that the 2014 team had 2 members with academic backgrounds that are entirely unrelated to the natural sciences, and the idea for this at that time was that their inclusion could serve as an important check and balance when it comes to addressing human practices issues. This year, it was decided



that recruitment would not be open to non-science undergraduates, with the point of it being that it is more constructive to train scientists to be able to actively pursue good human practices perspectives and figure out how to convey messages about what is beneficial to and what is safe for society to the general public and local community.

4. How to delegate tasks and manage the team?

Every member holds simultaneously at least one research role and at least one administrative role in the team. The administrative roles are fairly standard and constant throughout the progress of the project - sponsorship and finance, website construction and management, and communications and timeline arrangement. In the planning of administrative work, tasks are automatically delegated according to the (largely) fixed roles resulting in a streamlined process.

Research work, on the other hand, requires a far more flexible approach - as most of the synthetic biology needed to be self-taught, at the early stages the delegation of research work mostly involved the team breaking up into smaller sub-groups to address each facet in a multifaceted question/problem that arises. For example, to address the question of how to have bacteria engineered to break down E. coli biofilms,the team was divided into sub-groups which conducted individual literature reviews to address the constituent questions of what are E. coli biofilms made of and what chemical bonds in the biofilm are easy to break, what biomolecules can be used to break them, and how to get said biomolecules out of the engineered bacteria to be in contact with the biofilms respectively.

From the attempts at answering these questions, the team's knowledge base grew into the specificities - the exopolysaccharide structure of E. coli biofilms, enzymes that hydrolyse said polysaccharides, quorum sensors that E. coli use to co-ordinate biofilm production and hence can be hijacked, and secretion systems that can get the required enzymes

out of the engineered bacteria, etc. Each sub-group would summarize their findings to be presented at the next research meeting to determine the subsequent work direction.

On top of that, human practices and outreach are also at the very core of the team's efforts, and the members who are not very well-versed with the biological knowledge required at this stage for the literature review and BioBrick design (i.e. the physical scientists) are tasked with covering this aspect of the project.

On one hand, the human practices sub-group establishes contact with medical practitioners to better understand practicality issues such as what it takes to package a new biotechnology into a useable medical solution, and on the other hand they also arrange for educational outreach sessions on synthetic biology and general medical/microbial topics such as antibiotic resistance catered to local secondary schools to be delivered by the research sub-groups as and when appropriate.

5. What are some notable difficulties your team/predecessors encountered? Were they successfully overcame, and if yes, how?

Being the pioneer batch, one big problem the 2014 team initially faced was the pursuit of Departmental support for their participation in the competition. One would expect that if it were a faculty member at the start who proposed for students to participate something of an international nature such as iGEM it would have been fairly straightforward to get departmental support for the team, however since the way iGEM is run in Oxford is that it is entirely student-led, the managing academics in the department found it relatively harder to be convinced to see value in an undergraduate endeavour that was slated to be so costly to run. They eventually succeeded after months of effort building a strong case and talking to the right people who were in charge, laying the necessary groundwork for all future Oxford iGEM teams to have readily-accessible financial and infrastructural support from the Department.

Another major problem faced by the pioneer batch, which persists even in the 2015 team despite having their predecessors' experience to learn from is the unreasonable optimism in terms of planning the timeline of events, i.e. never realizing how long things actually take to do and having too much expectations about what can be done in a given amount of time. Because of the fact that the finalization of the 2014 was such a belated affair, the planning and design of their project was only completed nearing the Summer vacation. This delay was compounded by details that needed to be ironed out such as the complicatedness in the process of ordering the desired gene sequences as gBlocks from IDT, an arduous task that ended up taking 9 consecutive hours to complete because of certain restrictions such as the inability to synthesize repeated sequences that could only really be identified when one reaches the stage of actually attempting to make the orders. As a result of the setbacks in the timeline of experiments and a general underestimation of how long even seemingly-trivial tasks such as waiting for the bacterial colonies to multiply to the desired concentrations can take, the 2014 team was still collecting usable data from their setup on the day of the Wiki embargo itself, and the Wiki was completed a mere

8 minutes before the embargo after which no further edits could be made.

Having the experience of the team in the year before to learn from, the team this year decided that it would be desirable for the entire timeline to be pushed earlier. Ideally, the project idea should have been able to be finalized by the end of the Christmas vacation, such that the planning of experimental work could be done in the term that followed, paving the way for the carrying out of preliminary experiments over the Easter vacation. However, reality turned out to be far from what was planned, with the project idea never being finalized up until halfway through term because the team initially went down the path of pursuing an idea was eventually deemed unfeasible for the duration of a summer project, and the actual conceptualization of the design and experiments took until the end of the Easter vacation to complete. The team is currently trying to make up for lost time by placing the necessary orders as soon as possible such that by the time the Summer vacation begins, all needed components will be already in stock and the experiments can be carried out immediately.

One final vital piece of advice that the team finds valuable is perhaps the format in which new iGEM team should order their gBlocks. The 2014 team ordered their gBlocks in a format that made it convenient for the insertion of the sequences into useful expression vectors, such that there is no need for an extra step to modify and prefixes and suffixes before having them transformed into the bacterial chassis. This proved to be a mistake, however, when the team wanted to submit the new part which they had synthesized as a BioBrick, as it proved quite difficult to have their sequences modified back from an expression vector-appropriate format to a BioBrick-appropriate format.

As the submission of at least one BioBrick was a basic Bronze medal requirement, that cause significant panic in the team and hence for future reference, it is recommended that for practical purposes all gene sequences that are synthesized should be ordered with prefixes and suffixes that fit the BioBrick base vector such that a valid BioBrick has been made in the correct format from the start.

The Oxford iGEM team wishes all fellow iGEMmers the best of luck in experiments and endeavours to come in the next few months, and hopes to see everyone at the Jamboree (if not earlier at a regional meet-up)!

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Paris_ Bettencourt iGEM Team

So you want to create your own iGEM team. Oryou did, but you want some details to go on. As ateam that has several years of experience but whosemembers are new to iGEM, we will try to give yousome advices.

Creating an iGEM team

If your team needs to be start from scratch, then you will need a lot of energy and it will require more than students. However, students can gather everything that is needed: advisors, money, lab. . .

In our case, the team is hosted by the Centre for Research and Interdisciplinarity (CRI) in Paris. It is a place where life sciences, education, new technologies and innovation meet. Its goals reflect those of the new technologies, groups of people forming clubs. . .

iGEM competition: creating, innovating and promoting science by diverse means such as courses,new technologies, groups of people forming clubs. . .

Our team is mostly composed of students from the masters program "Interdisciplinary Approaches in Life Sciences". These students already have dierent backgrounds (biology, computer science, physics, philosophy. . .) and it made sense to look for members among them. However, since during an iGEM project a lots of dierent tasks have to be completed (synthetic biology, design, communication. . .), it is necessary to bring students with yet other skills. Then we did some advertisement in Paris through several networks and people who were interested came. If you do the same, some of these people may not nd their place in the team, but others will and will constitute a very good as-set.

Further, it is great to remain open to spontaneous applications during all the summer. Indeed, particular skills to achieve certain tasks may be needed and recruiting a new member can turn out to be faster than learning something new.

Finally, having people working remotely or only part time is totally ne because they can have a slightly more detached view on the project and still get work done.

Finding a project

First, a team needs to select criteria, because it is not possible to fulll all of the following goals:win iGEM, publish papers, create a start up, help people. . . So the students have to choose a main goal. Also, not everything can be done during one summer by a handful of students, with a limited lab.
budget in a more or less limited lab.

Once all the students have the criteria in mind, they can start looking for projects. In our case, we had students who were mostly "ideas generators" (proposing lots of ideas, whether they were feasible or not) and others who were more "down to earth" (less creative but focusing on techniques). A good balance between these two types may help giving birth to ideas that are both creative and doable.

Tip 1: dealing with many ideas

Problem: Too many ideas. At a certain time, the team will produce too many ideas and will need to sort them.
Solution: Rotate the projects. Each project is being taken care of by one or two people who improve and present it the following week. Next time, other students will be in charge of this idea. If an idea is not taken, then it is discarded.

Assigning tasks

As we discussed earlier, a crazy amount of dierent things has to be done. It is not even thinkable that one person can do everything, hence the work has to be split in some way. In the mean time, here is a counter intuitive fact: a group does nothing, only individuals do. Therefore each member needs assigned tasks, along with a precise deadline.

Tip 2: dealing with tasks

Problem: The members forget their tasks or do not do their jobs.
Solution: Before the rst person leaves a meeting,assign tasks to everybody and write them somewhere public. At the beginning of the following meeting,quickly check that every one did the job.

Timing

It is likely that all of the team is not fully available before May, or even June. But it is very important that the team is ready to start ecientlyas soon as possible, especially considering that the Giant Jamboree will take place earlier this year. Hence, before having students working full time on the project, all of the members should investigate and collectively start planning the summer. It is necessary to know what you really want: improve a pathway, make an organism produce something new. . . Also, be sure to include controls and ways to check your experiments worked.

Tip 3: overview of your project

Problem: Having an overview of your project.
Solution: Draw a flow chart describing each step of your work. Include the controls (i.e.: with/without a new plasmid) and ways to check (i.e.: concentration of product before/ after transformation).

Conclusion and where to contact us


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Stockholm iGEM Team

How to start a new cross-unversity team from scratch

Finally, the registration has been confirmed - a great relief. Up to this point, it was already quite a journey for me and my fellow friends who have been joined me on the long iGEM adventure towards exploring synthetic biology and the Giant Jamboree in Boston.

I am studying at Karolinska Institute in Stockholm and for a long time I wanted to join an iGEM group. The fact that I ended up building a new iGEM team originates from not only pure fascination for the competition, but also from the lack of a distinct iGEM culture within the captial of Sweden. Everything was needed to be built up from scratch.

Stockholm is a hub for life science in Europe. Besides Karolinska Institutet, one of the world's strongest medical universities, it harbours also one of the leading engineering universities in the world, namely KTH Royal Insititute of Technology. Why not combining the strength of these two unique universities and build a cross-unversity student project?

As a first step towards this vision, I started contacting potentially interested professors at the Karolinska Institute and KTH to see whether they wanted to be a part of this project and become an iGEM Supervisor. In retrospect, I had quite positive experiences with this first step. Although not every professor could engage in the iGEM competition as a

supervisor, they were, in some cases, able to forward me to the right person. If you find an engaged and passionate supervisor willing to make this project happen with you, then you can more easily overcome administrational barriers and start recruiting students.

After I noticed that some more of my friends had heard of the iGEM competition and were interested in joining, we started working on making the vision of a cooperative KI-KTH iGEM team become true. We started recruiting at the different universities at the beginning of the new year. We presented the competition in an open presentation for all students and tried to convey our personal fascination in order to infect more students. Every applicant was required to submit a short outline of his or her CV and a short motivational letter about why he or she was interested in joining this team and the competition.

Having all these applications in front of you, a crucial question will emerge: How many people will be able to join the team? How many are too many? How many are too few? The iGEM organization has done studies on the correlation of iGEM team size and their performance in the competition. They found that groups of ten to fifteen students normally perform the most successfully in the competition. Both universities are participating for the first time in this prestigious competition, consequently we put a special focus on sustainability of the iGEM idea and the will to engage as many people as possible. We decided on a group of twenty students consisting of a mixture from both universities. The current team members have been chosen due to their exceptional motivation and we tried to pay attention to a relatively broad variety of different educational backgrounds (e.g. studies, B.Sc/M.Sc.). I am convinced that having an assortment of students with diverse study backgrounds and scientific knowledge is an advantage in this interdisciplinary competition. Actually, you can already see during our project development that this diversity helps us to analyze technical and scientific issues from different angles and is therefore promoting our own understanding of science and the proposed projects.

Now the team is set. We have engaged supervisors. We have motivated students. What we need next is a project. But this is a story for another time. However, when you want to start a new iGEM group from scratch then I can tell you, you will need these three P's: Passion, Patience and Persistence. You will be disappointed sometimes, as everything will proceed slower than you think. Nevertheless, with a little patience and a lot of passion, you can get to the right people. Students and supervisors alike.

(Author: Felix Clemens Richter, iGEM Stockholm (May 2015) for the iGEM Amoy Newsletter)

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SYSU_ CHINA iGEM Team

Since 2011, SYSU_CHINA has participated in iGEM competition for four times. With more and more honor appeared in behind, SYSU_CHINA has attracted more teams' attention than before. Some team leaders want to know more about the formation of our team, so this time we'll introduce you the inheritance system of SYSU_CHINA in detail.

The inheritance system of SYSU_CHINA

There are several problems that puzzled SYSU_ CHINA several years. Firstly, we have around 240 undergraduates in our school, but most of them show less interest in research. So finding a man who show interest in iGEM is not a easy task. Besides, we don't have our own lab room and our funds are always limited, so we can't support a

large team and the number of iGEMers should be limited. Without a lab of our own, we have to do experiment in other professor's lab, which means we may do experiment in lab A the first year, while the next year we have to do experiment in lab B. Obviously, we can't operate a project with long experimental period and this does influence the integrity of our experiment results. So iGEMers in SYSU_CHINA always produce excellent ideas and experiment designs to make up the drawbacks in experiments.

In terms of team establishment, SYSU_CHINA provides a system called "SYSU-Inheritance" that differs from other teams. In the system, SYSU_CHINA assembles freshmen, sophomores as well as junior students via a distinctive way. In a nutshell, junior iGEMers serve as main forces that organize the team, carry out the project, proceed the experiment and participate in the competition.Sophomore iGEMers are going through a preparing stage, where they accumulate adequate experience for next year's competition by paper reading, sharing insights in our weekly conference and brainstorming, and also they are in charge of bonding friendships among team members. Freshmen are in a stage trained to be qualified for iGEM competition, where they follow sophomore members and learn from them, and those who never give up will become regular iGEMers.

For freshmen, they will be welcomed to attend an iGEM publicity, once in their first and second semester, respectively. During the public introduction, members from different grades are able to provide beginners with the most comprehensive perspective. Sophomore members will be presenting how iGEM weekly meeting is operated, as well as some ideas that begin to take shape, whereas junior members will be introducing their preparation for the coming competition.Every time of publicity will attract more than 10 students willing to enter the team. However, SYSU_CHINA are not going to give out acceptance immediately. Although plenty of students appeal to us at first, few of them persist in attending our weekly conference and sharing their ideas. And finally fewer than 5 students still keep up the pace. Those who "survive" long-term iGEM activities reveal their excellent individuality of enthusiasm, confidence and challenging spirit, which renders them to be the decisive role in iGEM's future generations, with outstanding capability of thinking out ideas, designing experiments and analyzing papers. . Such "selection" of SYSU_CHINA recruited 5 members in 2013 at last and 3 in 2014,all of whom are indispensable in the team till now.

When previous freshmen march to their second year, the concentration of campus activity of iGEM team is then moved to them. As pre-iGEMer of SYSU_CHINA, they engage in propaganda of the team and recruitment of new members (mostly freshmen and some sophomores). It is indicated through our experience that sophomore members participated at this stage tend to be more focused and prudent, with better capability on designing and conducting experiments. This might act as a weight to balance the individual characteristics among the team, since a team not only needs people of outstanding imagination but also enthusiastic member to handle the lab work.

Specifically, the freshmen blood, for most situations, are extremely fervent directly to iGEM itself, whereas a subtle difference is sophomore teammates are more motivated by desire to finish a mission that helps to augment their ability. Obviously, this cannot

be absolute, but it indeed embodies the different characteristics of the two groups and hence determines their roles in the team. For sophomore students, however, it can be a period of tough time since they lack the experience to organize the team meeting, and meanwhile have to handle with the junior group meeting while taking care of the freshmen part.

As for leader of sophomore group, it tends to be an old member joined in from the first year. Our experience indicates that such old members are apt at connecting to junior members and training the fresh blood, and it is because the existence of them can the element of team, such as style of meeting and training method, be preserved and progressed. Besides, the specialists on modeling and data analysis are usually absorbed at the summer semester of second year. At this phase, such members can participate in our meeting to extent their knowledge on biology as basis for future modeling work. We realize that the modeling specialists, if too early recruited however, take risks to sit around with nothing to do, leading to sort of subtle isolation from the team.

In the beginning, freshmen are qualified through a annual selection to join the team. After experimental training and member recruit in sophomore year, the junior students become the dominant force of SYSU_China. Our experience indicates that a mature SYSU_China team often consist of two leaders who have erudite academic knowledge to produce imaginative ideas, also, several constructors who have profuse experimental skills to accomplish the design. Meanwhile, one or two members providing aesthetic consult their knowledge on biology as basis for future modeling work. We realize that the modeling specialists, if too early recruited however, take risks to sit around with nothing to do, leading to sort of subtle isolation from the team.

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We have our own special way to determine the final idea. At about February or March, we would list all ideas, let everybody choose the one they are interested in and materials as much as possible to elaborate the framework. Then at the beginning of March, elaborated ideas would be analyzed and compared. In this way, the most

impressing and also operative ideas would be selected impartially and democratically. After idea settled, we would gather all our strength to collect relating information, build up the background story and design experiments. By the end of March, we would give a presentation to the school leaders and present some paperwork to demonstrate our design and our team's advantages based on the current situations, also, the budget. Only an accomplished and successful project could be supported and put into practice.

SYSU_China does not have a fix-site to work, in this case, we would choose and collaborate with a suitable laboratory to finish our project. Though we could always find a laboratory which fits best, changing places every year makes it impossible for us to carry on any project lasting over a year. In the future, we will try to apply for our exclusive research room, and using professors' research fields and resources to finish our project.

The features of students from each grade indicate that SYSU_CHINA has a strict “inheriting” system. Every expire of iGEMers can learn from the last for at least a year, which promotes close contact between members from different grades. Therefore, experienced iGEMers can be found in every expire, which guarantees the excellence of our inheritance. In addition, several sophomore members, all of whom will be the core of next year’s iGEM team, will follow junior members to final competition. Such system ensures a skilled and practiced SYSU_CHINA each year in iGEM competition.

Strict inheritance, delicate design and systematic demonstration have led SYSU_CHINA to continuous glory. Although we can’t ignore the defective aspects of SYSU_CHINA’s inheritance system, it is confirmedly ascertained by all the members that such distinctive system makes the team stand out to be competitive among the mediocre.

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Toulouse iGEM Team

We can indeed share our experience on the creation of an iGEM team in Toulouse! It is true that it must be different from a region or country to another, and we are always willing to help beginners.

In Toulouse, there are agreements with two institutions: University of Paul Sabatier (sciences) and the National Institute for Applied Sciences (engineering school). Teachers and researchers from these two are here to hire and lead up to 11 students into the iGEM Competition (7 students from the engineering school and 4 from the University this year). The iGEM compe--tition is taken into account into their study program, so that it does not take them too much time in comparison to their colleagues.So you can see in this case, the iGEM team creation in Toulouse relies both on teachers/researchers free time and will, and on students choosing to commit on the project, but at first it comes with the teachers' initiative. It has been working for 3 years like that until now.

Here is a short interview of our Team Supervisor, Brice Enjalbert, teacher and researcher at INSA Toulouse (engineering school).

Q1: For how long have you been taking care of the Toulouse iGEM Team?

Enjalbert: This is now my second year as a participant to the IGEM competition

Q2: What brought you to take part in that project?

Enjalbert: IGEM is a unique opportunity to work on a project with students from the very basic idea, to gathering of suitable conditions for its achievement and eventually its valorization. The international context is very challenging and exciting for both the trainees and their supervisors.

Q3: How do you settle the recruitment for the iGEM competition each year?

Enjalbert: We advertise for the IGEM opportunity in November and organize audition for the trainees in January. Then, the first brainstorming session starts in February.

At the end, we would like to share a last intervention from our current team leader: Marine Pons, master student at the University of Paul Sabatier.

"Many teachers talked about iGEM to us since the 2nd year of Bachelor in Biology. What brought me into it was the fact that I will do a PhD thesis, and that this competition is a good way for training myself. Sadly, for us students from the University (unlike the engineers students), the iGEM project is not taken into account in our Master program, it is additional."

iGEM Toulouse 2015

https://www.facebook.com/pages/iGEM-Toulouse-2015/1604834019761538

https://twitter.com/toulouse_igem

igemtoulouse2015@gmail.com

TU_Eindhoven iGEM Team

Back in November, we were invited to join a presentation of our current supervisors about iGEM and the emerging field of synthetic biology. Coupled to this invite was the promise of free pizza. Naturally, we couldn't resist – who says no to free pizza?! During this meeting, one of our supervisors gave a clear overview of the iGEM competition itself and the exciting field of synthetic biology. What really appealed to many of us was the chance to be working on a project in which you could design virtually anything. We understood that within iGEM, the sky's the limit.

Even though this observation was really exciting, it was also a bit frightening… We thought that having to come up with your own ideas and being creative would be a major obstacle, since we had no previous experience with setting out a whole new project. Luckily, however, some of the previous iGEM participants of our university, who were also present during this meetup, were able to reassure us. Many of the practical problems we foresaw, were actually no problems at all, and they assured us that in the end, everything would come together. Having the opportunity to talk to the enthusiastic members of last year's team might actually be the factor which brought many of us on board.

Subsequent to this presentation, we were given the opportunity to apply for a place within Eindhoven's iGEM team. Based on these applications, the current team was selected to be this year's iGEM team. The composition of our team is rather homologous in contrast to other iGEM teams: all of us take part in bachelor programs within the faculty of Biomedical Engineering. Such a composition might seem disadvantageous, since we in essence all have similar backgrounds. However, since biomedical engineering is such a broad field, we have deviated more or less from one another. Additionally, we all have of course different talents and specialties. Our backgrounds are thus not exactly the same.In some ways, we also benefit from the relative uniformity of our team. For example, many of us knew each other already, albeit only by face. Additionally, planning a meeting is fairly easy, since we have quite similar schedules and lectures always take part on the university campus.

Centrally located on this campus is an institute in which we have a room available exclusively for us. We have dubbed this place 'het kantoor', which roughly translates to 'the office'. We have really benefited from having space available to us. For example, there is almost always someone in the office to have a chat with and to discuss iGEM-related issues with. On a less serious note, having a space available also enabled us to have meetups besides iGEM meetings. We sometimes have dinner within the office space and recently used it as our operating base for more fun activities. Having a place available as an iGEM team has really helped us in becoming a team, rather than just some people collaborating together on a project.

Currently, we are cooperating in small groups within our iGEM team. We have groups for modeling, a lab team, a team for policy practices, a team for sponsoring, a safety team and last but not least a wiki team. Working in small teams, means it is easy to lose the overall picture of our iGEM project. To prevent this from happening, we tend to brief each other and plan regular larger meetings to discuss important developments and problems we should be tackling. Moreover, we have also appointed someone to fill in the starring role of cracking the whip during these meetings and ensuring that everyone keeps the overview – looking at you, Esther.

In the end, we believe there is no magic formula yielding a successful iGEM project. A diverse composition of a team might be important, but so is becoming a team. Having regular meetings – especially informal meetings! - can help in becoming a team. Having space available as an iGEM team might also help. Moreover, it is of the greatest importance not to lose the overview of your iGEM project after having elaborated your idea. Appointing someone to make sure this does not happen might seem redundant, but can certainly help. We wish you all the best!

http://www.facebook.com/EindhoveniGEM
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USTC iGEM Team

Firstly Found in 2007, USTC received second runner-up at and best fundamental advance price, which became a glorious legend in our university. As time goes by, team members in USTC iGEM turn younger and younger, from the first year all graduates, to junior and senior in 2010 to sophomore and junior in 2012 and to mostly freshman and sophomore this year.

Every year, we welcomed all guys who were intrigued in iGEM and joined our training camp on biological knowledge and biological experiment. Because of some of our members coming from school of chemistry, physics, CS, EE and earth science, basic background for them matters a lot. Then we would deliver some works for them to finish, some would quit by themselves, others showed their ability and love on iGEM, who we were sincerely appreciated.

Inheritance always is the most important job for our team at first. President would be elected at the first group talk and the previous president will try his best to help the new team to establish.

By the way, owing to heavy schoolwork in USTC especially for sophomore and freshman, it is difficult to take our whole spare time on iGEM project during the semester. So we cherished every brainstorming and training. At the beginning, we would invite our advisors to introduce the knowledge of synthetic biology, guide members to search and read papers, generate their critical thinking ability, how to conduct team work efficiently. In the spring semester, we open our group discussion every week, about 2~3 hours presentation and brainstorming, which provide ideas and modeling knowledge for iGEM project. During our discussion, scientific methods and scientific significance are our major critical centers on a presentation or a idea.

We also tightly cooperate with USTC iGEM software. They sometimes need much biological background and alsnetheisoftware to better assist our research. Many human practice also will be delivered by us.

All in all, we love iGEM, for its sharing friendship and knowledge. No matter how difficult it will be, we are all confident to handle it and make our world better.And USTC iGEM will continue develop to make our contribution to synthetic biology.

https://www.facebook.com/2014ustcchinaigem?ref=bookmarks

yjt2013@mail.ustc.edu.cn

Information Of iGEM Team Valencia_UPV

We are Valencia_UPV and we represent the Universitat Politècnica de Valencia, in Spain.

In Valencia we started participating in iGEM competitions in 2006. At the beginning, Biocampus and UPV started as a unique team, but for several years we have acted separately, despite of that, iGEM tradition is long and strong.

This year, our team is composed of 12 undergraduate students from different faculties: biotechnology, industrial engineering & medical engineering.

1. When to recruit team members?

As last year's results were so good, getting a gold award medal and the first place in "Best Parts Collection", we decided that the earlier we started the better for the team.

So in February, all the students in the faculty were given some conferences explaining what iGEM is and previous projects performed by our university to the students.

Valencia_UPV 2014 Team presented their project, the "Sexy Plant" to students in third degree in order to encourage them to participate in this year's project.

Thanks to this, more than 30 students from different faculties applied to join the team and all of them were accepted.

2. How to select?

This year, we didn't perform a selection among our students; those ones that were interested were encouraged to continue doing the project. Some conferences given by other year's team members, advisors and instructors showed everything that surrounds an iGEM project, all the time required and all the work that is needed.

The only task that we gave to the remaining students (more or less 20) was to make them choose from the iGEM database a PowerPoint they liked from other year and make them present it in front of the other team students, advisors and teachers in order to measure their English level. Also personal interviews were done with each student to confirm that they had a yen for being part of the team.

The number of students merged until the current number of students while days passed by for several reasons; the most common was that they found practices in businesses, so they could not spend the time necessary to be an active member in this huge project.

3. How to assign tasks and how to cooperate?

This depends on how do the students work and the percentage of students from each faculty, in our case; we try to create small groups (3-4 people) with at least 1 engineer per group. Due to the quantity of biotechnologists this year, some basic synthetic biology was taught to other students in special extra classes in order to equilibrate the knowledge level. First of all, looking for information and getting a first draft of what the project will be is a

shared task, everyone in the team exposes his idea in a brainstorming meeting and among all ideas. The ones with more potential are continued.

The small groups described above, deepen one in each project and try to find the pros and contras for each project. This is discussed in another season with instructors and advisors.

Finally, when the best idea is selected, teams are reordered.

Labwork is usually biotechnologist's task due to their experience in practical lessons and because they usually are comfortable surrounded by laboratory material; the part that includes modelling is given to the engineers as their knowledge is wider in those aspects of science.

4. What is the composition of the team? Are the members of different majors or from diverse faculties?

This year, the team is composed by 9 Biotechnologists, 1Medical engineer and 2 Industrial engineers, the faculties they are from are agronomies and engineering, but all remains inside UPV.

5. What difficulties have you encountered in previous years and how to solve the problems?

This is a very tricky question, time for running all the experiments is usually the main problem, things don't usually work properly and need to be fixed, that makes time limiting factor for the experiment, but coordination and, of course, decide the main idea of the project quickly are the best ways fix this problems, not easy, but necessary.

Our main goal in this project is to learn and have a good time in the laboratory; we expect to meet a lot of people in the Jamboree and to exploit this opportunity the university has given to us.

Best wishes to all iGEMers!

Written by: Daniel Pellicer, Member of Valencia UPV Team in 2015

We encourage you to contact us!

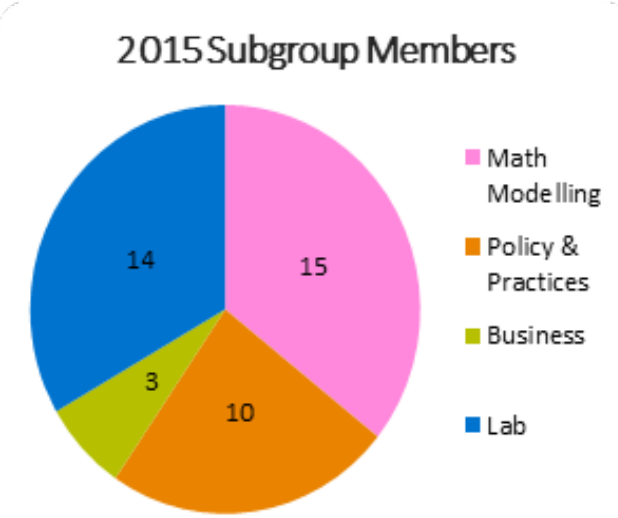
www.facebook.com/ValenciaUPViGEM2015
https://twitter.com/UPVigem
https://plus.google.com/u/2/110318939646477138807/posts
http://2015.igem.org/Team:Valencia_UPV
Valencia.upv.igem@gmail.com

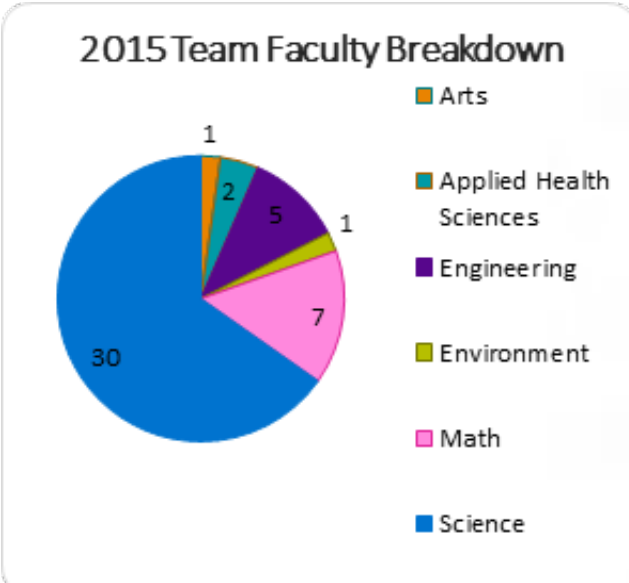
Waterloo iGEM: Composition & Recruitment

The University of Waterloo is unusual among North American universities for its emphasis on co-operative education—Waterloo students are encouraged to alternate four month school semesters with four month internships throughout the years of their undergraduate degree. Most members of the Waterloo iGEM team find time for our project between classes or after work, though a couple of students will choose to forgo a paid co-op internship in the summer (May-August) to focus on iGEM.

Composition

Since most of our members work only part time, the team is quite large to compensate. We typically have between 30 and 40 undergraduate students divided into four subgroups: Lab & Design; Mathematical Modelling, Policy & Practices, and Business. We divide the team up into subgroups because of the different skills required for the different aspects of the project:a Lab & Design member has to be handy with a pipette, while many Mathematical Modelling members know far more about Python code than genetic code.The number of students on each subgroup is shown below, along with the breakdown of our team by faculty:





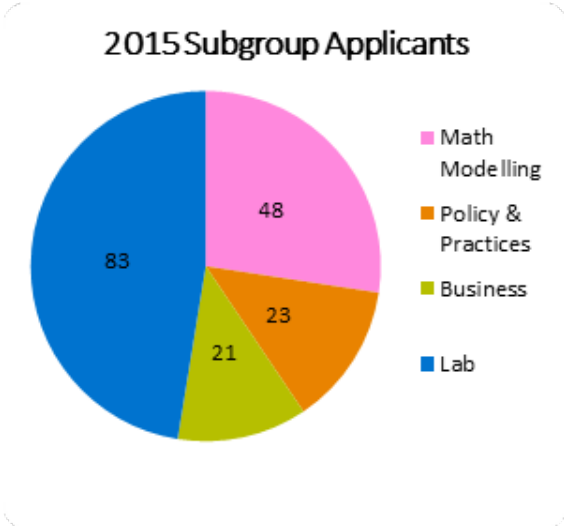
Getting the Word Out

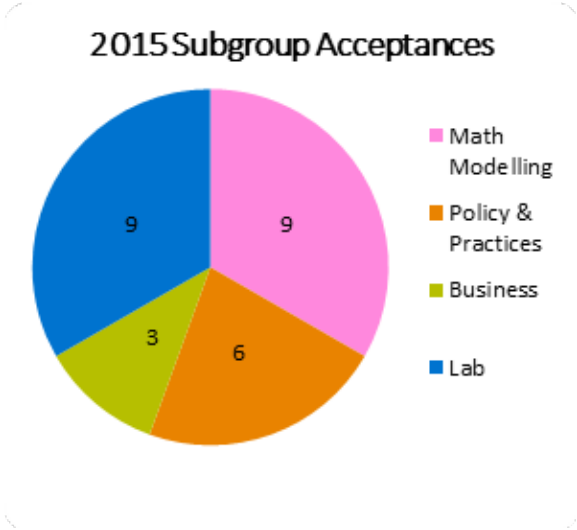
We usually recruit new members for the team in January, before we've decided on our project. Each subgroup is led by one or two students who worked on the previous project and these subgroup leads decide how many students they'd like to recruit. This year, the subgroup leads and other returning team members went to different classes to speak about the team and held an open house, which was attended by over 150 students.

Students at the 2015 Waterloo iGEM Open House in January.

Applying to the Team

After the open house, we created an online application using Google Forms, which allowed us to ask targeted questions for each subgroup and ensured we had similar information about every applicant. As usual, we had far more applicants for the Lab & Design team than any of our other subgroups; however, the number of applications for mathematical modelling really picked up this year! The number of applications received by each subgroup is shown below, along with the number of applicants each subgroup accepted after interviews.

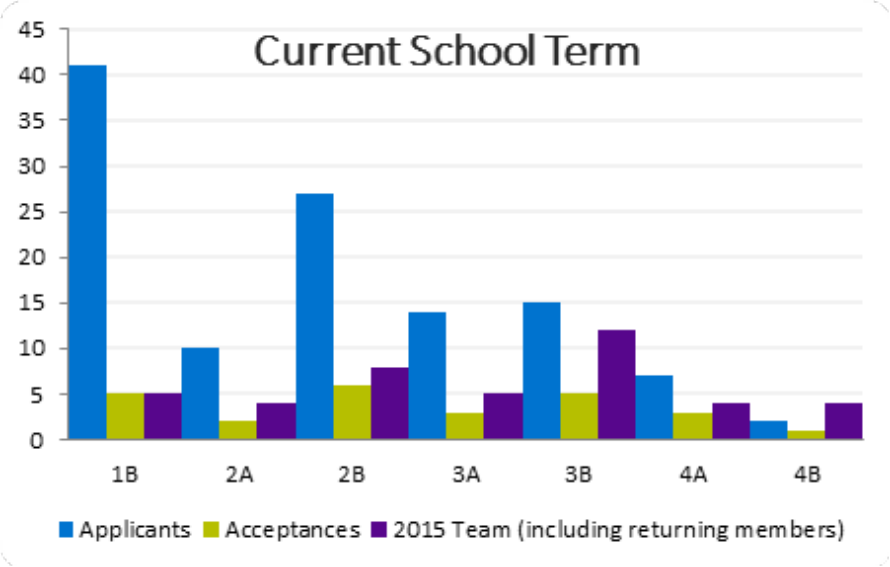




We wrote a script to export the Google Forms results into anonymized HTML documents. The anonymized applications were easier to read than the CSV output by the form and we were able to avoid bias and conflicts of interest caused by recognizing the applicant names. The returning members of each subgroup ranked the applications and we then de-anonymized them and contacted the top-ranked students for interviews.

Interviews and Selection

Having a single giant block of interviews seemed like the most hassle-free way to schedule them, so we booked two rooms (in addition to our office) for an entire Saturday and hunkered down. The subgroup leads conducted 15 minute interviews composed of mostly technical questions. The final set of new team members were chosen during the weekend after the interviews. You can see the year of study for each team member in the graph below:



1B = first year, second semester, 2A = second year, first semester, 2B = second year, second semester, etc

The process of recruitment took up the month of January. You can read a few more details of our recruitment on the Waterloo iGEM blog. During February and March, the new members were introduced to the team and trained in lab protocols and GitHub commits.

In parallel, the new members contributed to our brainstorming. Around twenty project ideas were proposed in a sprawling Google Doc shared across the team. In successive meetings we narrowed them down to five ideas, several of which originated with a class on Synthetic Biology Project Design taught by the iGEM team advisors. After three weeks of research, we consulted our advisors and polled the team members on the feasibility, interest and “wow factor” of our final five ideas. At the end of March, the team lead decided on our 2015 project: adding CRISPR immunity to Arabidopsis and improving CRISPR as tool for iGEM teams.

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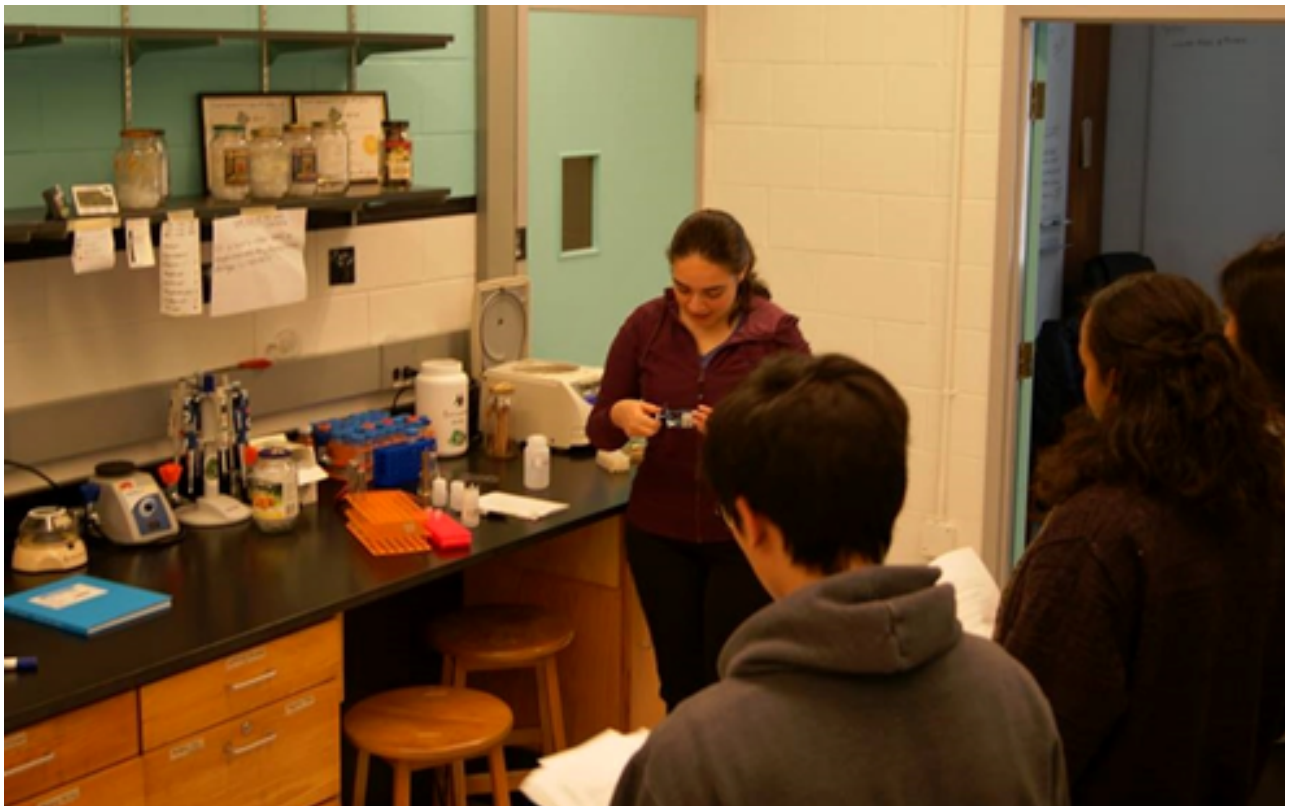
Going into May, we've ordered our constructs and are ready to hunker down and get our project built. The process of building the Waterloo iGEM team keeps getting more and more formalized and we think this is a combination of the increasing interest in the team (though it remains at a roughly constant size) and the attitudes of the leadership. We'd be interested in learning how other iGEM teams organize their recruitment process.



Training new Lab & Design subgroup members in the Waterloo iGEM lab.

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By: Wayne Materi

Leading a Successful iGEM Team

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Abstract:

The International Genetically Engineered Machines (iGEM) competition allows undergraduate teams to develop projects in synthetic biology within the context of a large, international Jamboree. Organizing and managing a successful iGEM team is an exercise in advanced agile project development. While many of the principles applicable to such teams are derived from management of agile software teams, iGEM presents several unique challenges.

Key words:

iGEM,
synthetic biology,
iGEM Jamboree,
International Genetically Engineered Machines

1. Introduction

1.1. What is iGEM?

The International Genetically Engineered Machine competition (iGEM) is an annual undergraduate competition in Synthetic Biology which culminates in a Jamboree in early November (see the 2009 iGEM site for more information - http://2009.igem.org/Main_Page). Since its inception in 2003, the Jamboree has been held at the Massachusetts Institute for Technology (MIT) in Cambridge, USA. The first competition was local to MIT but grew to involve 5 teams in 2004, 13 teams in 2005 (the first international year for the competition), 32 teams in 2006, 54 teams in 2007, 84 teams in 2008 and over 100 teams involving more than 1,200 competitors in 2009. Over time, projects have spanned a large range from the fun (e.g. bacteria that smell like bananas or wintergreen, buoyant bacteria) to the serious (e.g. a bacterial arsenic biosensor, a bacterial red blood cell substitute, bacteria flagellar display of H. pylori epitopes for vaccine development).

Many projects build upon previously developed Standard Biological Parts, known colloquially as BioBricks. Early in the iGEM cycle, teams receive a kit of biological parts from the Parts Registry (http://partsregistry.org/Main_Page), which can be used, supplemented or extended by their projects. Available parts include cloning and expression vectors, promoters, reporters, sensors, regulators, and genetic circuits, among others.

1.2. What is Synthetic Biology

The goal of Synthetic Biology is the application of engineering principles to biological entities.
The www.syntheticbiology.org website has the following definition:
A. the design and construction of new biological parts, devices and systems.
B. the re-design of existing, natural biological systems for useful purposes.

1.3. What is success?

The goal of this document is to help your iGEM team to be successful. Our aim is to help teams achieve Gold or Silver medal status. If a team comes up with a great project, executes it well and happens to catch the eyes of the Judges, they may even make it into the Finals and/or win one of the named awards. However, it is impossible to predict what may interest the judges in any particular year, and nothing can guarantee your team being selected as an iGEM finalist or winner. Nevertheless, it is our hope that the suggestions contained in this document might increase your team's chances.

In addition to doing well in the competition, other, perfectly valid measures of success might include the following:

- getting publicity (locally or nationally)
- continuing the research in a more highly funded way
- recruiting graduate students

1.4. The iGEM Competition Cycle

The iGEM cycle starts and ends with the Jamboree held in early November of each year. After reviewing the results of the Jamboree, you should start organizing for next year's team almost immediately. While it is possible to assemble teams just before the start of summer semesters (i.e. April or May), this only gives enough time to pick a project, perform a bit of modeling and maybe make a part or two. Successful iGEM teams actually accomplish much more than this, so starting early is a good idea. A useful first step is reviewing what the most recent winning teams have done and identifying the best characteristics to emulate.

2. Team, Advisors, Skills and Project

2.1. Recruiting team members, instructors and advisors

By definition iGEM teams are comprised mainly of undergraduates (this includes Masters students) though high-school students are also welcome. PhD students, Research Associates, Professors and others are considered to be Advisors or Team Instructors and their role should be primarily instructional.

1. There are many ways to recruit iGEM team members. Some student groups self-organize after hearing about iGEM, while others are recruited through advertising.

2. If your university has courses on Synthetic Biology, this would be a natural group of students to recruit from.

3. The most successful iGEM teams contain members from a variety of disciplines, including (but not limited to) life sciences, biology, biochemistry, cell biology, microbiology, pharmacology, chemistry, chemical engineering, electrical engineering, computer engineering, computing science, web programming, mathematical biology, business, graphic arts, social science, and philosophy.

4. A broad advertising strategy is likely to helpful in recruiting a well-rounded team.

5. An iGEM open house in mid-January, with a presentation by the previous year's team and instructor, followed by a mixer provides a natural focus to a recruiting strategy.

6. Advertising should be directed towards having a good turnout at the open house as this provides an excellent place to describe Synthetic Biology, iGEM, the kind of people required for the team and the general level of commitment required.

7. The optimal team size is probably between 8 to 12 members in total, but successful teams have had from 6 to over 30 members.

8. In the formative years of iGEM at your university, you may receive only a few applications and choose to invite all of them onto the team.

9. As the popularity of the iGEM competition increases, you will face the decision to either make membership competitive or split applicants into two or more teams. Many applicants may see this as an attractive research addition to their c.v.'s.

10. Each additional team will require its own resources, so the number of teams one area can support may be limited. In addition to specific skill sets, successful iGEM team members are also required to exhibit considerable initiative, ingenuity and innovation, so selecting for these personality traits may as important as good grades and experience.

11. Teams also need to have the right group dynamic or chemistry, so it might be wise to use the recruitment process to have a brainstorming session and watch how different groups of people work together.

12. You may want to use a brief questionnaire like the following to help in the selection process:

-iGEM Team Application-

(1) Name (Last, First):

(2) e-mail address:

(3) phone:

(4) Year/Program:

(5) GPA from two most recent terms:

(6) Relevant course experience:

(7) Career/education aspirations:

(8) Why you want to participate in iGEM:

(9) Why you think you would make a good iGEM team member:

(10) What problems you would like to solve with this technology:

13. A critical element for successful iGEM teams is a high-level of technical and scientific support. Teams require such support to assist with complex molecular biology and instrumentation. In addition, considerable training is required in the field of Synthetic Biology and in the many support activities an iGEM team engages in.

14. These support activities may include wiki construction (and HTML), giving presentations, making posters, proper scientific documentation, communication among team members, organizing teams, fundraising, etc.

15. Thus, the iGEM organizers require a minimum of two team instructors to provide support and training activities. In addition, other scientific and technical advisors or instructors will greatly enrich the iGEM experience for everyone.

16. It is important to recruit additional instructors and advisors as appropriate for each team. Instructors are required to commit a fairly large portion of time to the team in order to maximize training effectiveness and many of them will want assurance that their considerable investment will be worthwhile. Instructors benefit greatly from their iGEM participation as it may help them to identify potential grad students that demonstrate exceptional ambition and initiative. In addition, iGEM projects frequently can be extended and expanded into excellent projects for grad students or post-docs as they raise many interesting scientific and engineering questions. Particularly strong projects could bring in new grant funding or form the basis of commercial ventures.

17. Besides the active members for the current year, successful iGEM teams are

always thinking about the future. Building upon the past experiences of iGEM team members can substantially increase the team's odds of success. You might consider recruiting two or three second-year students to the team with a specific mandate to just learn about Synthetic Biology and iGEM and to help form the core for the team next year. Ideally, each team should have some senior members from the previous year, who will propose the majority of realistic ideas and perform much of the actual work on the current team, and some junior members whose primary responsibility is to learn.

2.2. Full-time or part-time, volunteer, course or paid

1. One important issue in formulating the iGEM team is whether it will include both full-time and part-time members. Full-time students working over the summer and/or fall semesters will be able to accomplish more in the lab than volunteer part-timers, so most teams include full-time people for at least part of their duration. The risk of mixed teams (both full and part-time) is that it is possible to create two classes of students on the team, leading to clique formation and resentment. On the other hand, having only paid, full-time team members is beyond the reach of most institutions.

2. A balanced approach is most likely to be successful. However, all students should commit to an equal amount of volunteer time for the team and, if they are lucky enough to be able to work full-time on the project over the summer, that volunteer commitment should not be changed. In addition to time over the summer, students will need to spend time in the winter/spring learning about Synthetic Biology and iGEM and planning their project. Also, the fall semester leading up to the Jamboree requires a substantial time commitment so presentations and posters can be prepared and perfected. Students' first priority should generally be to their course work, so incorporating a Synthetic Biology course, directed studies or project course into the iGEM cycle can be an excellent way to encourage their participation and to reward them for their efforts.

2.3. Team Agreement

The commitment from team members is sizable, though the potential rewards are substantial. Students participate in team-oriented, multi-disciplinary research and have an opportunity to exhibit and develop scientific entrepreneurial skills. They participate in an international meeting with substantial public exposure and may even publish their results. Team members will also have expectations about what they will get from the experience, including gaining hands-on experience in molecular biology, bioinformatics, mathematical modeling, presentations, and public speaking, as well as learning about Synthetic Biology, in general. In order to avoid disappointment and possible recriminations, it is important to develop an agreement among team members, advisors and instructors that outlines the commitment of each to the other. We provide the following template:

Students:

· to commit our intellect and energies to the fulfillment of the team goals

· to learn the principles of Synthetic Biology and the science behind our project

· to conduct ourselves and our research to the highest scientific and ethical standards

· to represent the ideals of Synthetic Biology and iGEM in a fair, balanced and open manner to the general public

· to work a minimum of xxx weekly volunteer hours during the project planning phase

· to attend a full weekend Basic Molecular Biology course held <dates>

· to work a minimum of xxx weekly volunteer hours during the project execution phase

· to work a minimum of xxx weekly volunteer hours during the Jamboree preparation phase

· to attend all group meetings and learning sessions or to notify coordinators if impossible

· to travel to the Jamboree (and other local events) and participate joyfully

· to work hard, learn lots and have fun

Instructors/advisors

· to commit our intellect and energies to the fulfillment of the team goals

· to learn and teach the principles of Synthetic Biology and the science behind our project

· to train students in all the skills and techniques required in the project or to find suitable instructors, where required

· to conduct ourselves and our research to the highest scientific and ethical standards

· to represent the ideals of Synthetic Biology and iGEM in a fair, balanced and open manner to the general public

· to work a minimum of xxx weekly volunteer hours throughout the project

· to attend all group meetings and learning sessions or to notify coordinators if impossible

· to travel to the Jamboree (and other local events) and participate joyfully

· to work hard, teach/learn lots and have fun

Signed: Date:

2.4. Building Synthetic Biology and iGEM background

Many consider a Synthetic Biology course as the best way to teach undergraduates about Synthetic Biology principles. For institutions lacking such a course, we recommend that the first few team meetings be used to teach some relevant basics. A large number of review articles are available that discuss Synthetic Biology principles including those listed in the References section.

1. In addition, past proceedings of some Synthetic Biology conferences are available online. For example, web-casts from the international Synthetic biology conferences SB1.0 to SB4.0 are available by following the Conferences links at www.syntheticbiology.org.

2. The best way to learn about iGEM is to participate, but the second best way is to review previous competitions. Fortunately, presentations, posters and wikis are available online through the most recent iGEM.org website (e.g. 2009.iGEM.org). We recommend spending a few planning sessions in January or February to review past projects.

2.5. Getting project ideas

1. Generating iGEM project ideas is not necessarily all that difficult once some familiarization with Synthetic Biology has been achieved. Using a Directed Readings or Synthetic Biology course as a source of good project ideas is also likely to result in better conceived, scientifically more sound ideas with more application potential.

2. Following some basic instruction on Synthetic Biology and past iGEM projects, your team should hold focused brainstorming sessions to generate some basic ideas.

3. Individual team members or groups of two or three should then elect to champion

some of the ideas. This process should entail conducting deeper literature searches and developing one or two page proposals.

4. Project champions can then making brief presentations to pitch their ideas to the rest of the team in subsequent meetings. Several meetings may be required before the team selects its favorite or best project.

5. A team should only have one project, although it may contain multiple sub-projects. If a team cannot settle on just one project, consider splitting into two separate teams.

6. The most successful iGEM projects contain elements of mathematical modeling or simulation, molecular biology, assays of results (perhaps, with instrumentation development) and thoughtful examination of EEELS (ethical, environmental, economic, legal and social) issues.

2.6. Team Building

1. It is important that the iGEM Team actually work like a team. Getting individuals to commit by signing the above agreement is only the first step.

2. Conducting brainstorming sessions during the Winter/Spring meetings is also a key element in building team spirit.

3. Consider holding some of these sessions in a more social environment (but one which permits some work to be done) to help build interactions and trust between the team members.

4. Team members also need to work in a rich communication environment, which can be difficult with young scientists and engineers.

5. Establish standards for documentation and encourage team members to share their results, problems and thoughts among each other and with their advisors.

6. Operating a journal club where team members read and discuss a single paper can help facilitate this, depending on the time available.

7. Also, project milestones and deadlines can help heighten the sense of urgency and adventure, which will often help teams to coalesce.

2.7. Building support networks

1. In addition to the team instructors, successful iGEM teams reach out to the academic, commercial or general community when they need to recruit additional expertise.

2. The more extensive and effective the network of specialists and consultants, the less likely the team is to become bogged down in problems and the more they will feel part of something important.

3. Network building should be encouraged by having team members identify professors or companies that may have valuable relevant information, then contacting those people to ask for help or just to invite them for a chat.

2.8. Lab space

1. Lab space may be contributed by team instructors or a sponsoring department/ company.

2. In order to provide a workable environment, lab space should be available from the start of May to the start of September at minimum.

3. If at all possible, try to find permanent lab and meeting space for the team as this will permit year-round use. This will be especially important in the Fall as the Jamboree approaches and lab work needs to be finished in a hurry.

2.9. Funding

1. There are a large number of funding sources available to assist with the iGEM

team and many ways to approach the funding question.

2. One fundamental question each team will need to answer is how much fundraising to attempt and what sources to focus on.

3. Some projects are very suitable to approaching specific industries, such as biotech, energy, or pharmaceutical companies. Other teams will have easier access to more traditional forms of academic funding.

4. Some element of fundraising should exist in all iGEM projects, as the entrepreneurial experience is an important element of iGEM. Cynical team members will be surprised at how receptive potential funding sources are to contributing to their projects.

2.10. Publicity

Publicity can be a key element for teams as a recognition of effort, promotion of their school or institution, attracting new team members, rewarding sponsors and sourcing new ones, developing new course programs, etc.

3. Planning

3.1. Planning the project

1. After acquiring some familiarity with Synthetic biology, in general, and the iGEM competition, specifically, and after selecting a project, a detailed planning process should begin.

2. A successful iGEM project has an incredible number of elements, parts and circuits to be designed and made, models to be written and tested, data to collect and analyze, presentations, posters, T-shirts, wiki pages, fundraising, travel, etc. This would be overwhelming for any one person, so it is important to delegate (see below) and coordinate.

3. A dedicated Project Manager elected from the Team, might help this process and subsequent execution of the plan considerably.

4. Start with a broad plan. The general Project should already be defined and the team should have a good idea of all the many things that need to be done to accomplish their goals. The Plan can be fleshed out in more detail either by the whole team or by small

working groups dedicated to particularly parts of the entire project.

5. Some parts of the project, such as the poster or presentation, will need to be planned at a later stage, once progress has been made and (perhaps) data collected.

6. Planning along with progress reporting should be a continuous process driven by the Project Manager.

7. The scientific portion of the project is the most likely to contain the greatest challenge for the team and will likely require considerable input from advisors and instructors. Effort expended at this point in the project will not only greatly enhance the chances of a successful conclusion, but also reduce the amount of work required throughout the summer and fall.

3.2. iGEM requirements

1. The iGEM organizing committee changes the requirements every year, so it is somewhat of a moving target. However, certain constants remain.

2. The basic requirements for a minimally successful project usually involve completing a team wiki, presenting a poster and talk at the Jamboree, and submitting a BioBrick part.

3. Higher levels of achievement require making and characterizing an existing or novel working part and contributing to the Synthetic Biology or larger community.

4. It is important to review the Judging Criteria each year on the iGEM home site and to plan team activities to meet those criteria.

5. In past years iGEM has awarded Bronze, Silver and Gold medals to teams based on their published Judging Criteria.

6. In addition to these, a number of named awards are presented (including the Grand Prize

aluminum BioBrick) based on various criteria, such as Best Poster, Best Presentation, Best New BioBrick, Best Model, etc.

7. These also change from year to year, so it is important to check the Judging Criteria for the current requirements. Generally only Silver and Gold medalists are considered for named awards, though this is not a set rule.

3.3. Synthetic biology project

Planning the science and engineering that will comprise the project will require several members of the team to understand the project principles and the tools that will be used to execute the project. These may include cells, DNA, BioBrick parts, plasmids, enzymes, molecular biology, genetics, biochemical assays, microscopy, software, programming languages, etc. Where possible, instructors should include specific small courses or reference material that will help team members acquire the knowledge and skills they require. Clearly, though, the individual drive and initiative of team members will greatly determine their success in acquiring the necessary knowledge. To a large extent, this explains the importance of these characteristics even over background and knowledge in determining the success of the team.

3.4. Modeling

A number of modeling tools are available and may cover a large range from basic biochemistry texts to Mathematica or other simulation software. Having modeling expertise available is critical to the success of this portion of the project. Some good introductory texts are given in the References section.

3.5. Instrumentation

Characterizing a BioBrick part is an important component of any iGEM project. Several more often used assays of gene expression include lacZ, Fluorescence Activated Cell Sorting (FACS) of GFP-expressing cells, Northern blots, Western blots and other biochemical assays. A variety of instrumentation may be available to your team but specialized instruction is often required to operate an instrument safely and reliably. Seek help from team instructors and advisors. Some iGEM projects may need to develop their own instrumentation. For example, digital cell tracking systems consisting of cameras and software have been developed by past teams.

3.6. Open source

iGEM projects, BioBrick parts, and wiki documentation are all considered open source, that is belonging to the community at large. There is a debate as to whether wiki’s should be used as ongoing documentation tools or uploaded on the due date. We believe that secrecy, even for the sake of protecting your project from possible competitors, has little place within iGEM and should be actively discouraged. We, therefore encourage teams to utilize their wikis as active, public documentation of their efforts.

3.7. Documentation

Good documentation serves multiple important purposes: it provides support for any intellectual property claims; it provides factual support when writing papers; it tells both you and other team members what to do to repeat an experiment; it helps to organize your thinking and planning. Most importantly, documentation is the public property of the entire team and it must be written for the entire team. Standards of documentation will reduce the amount of work that is required

for one team member to understand the work and the thinking of another. All work should be documented so that any team member can understand it easily.

1. The basic goal of good documentation is to communicate as efficiently as possible. Write everything that needs to be written; but nothing more. In particular, do not repeat what has been previously written, when a simple reference to a book and page number will do (plus a few notes remarking on what is changed in the current experiment).

2. Use the appropriate lab book or wiki. While most documentation is kept in diary form, having the ability to organize it by project, sub-project or person is very useful for finding data quickly.

3. Document your thinking (Rationale or Purpose) along with the Experimental Protocol or Procedure before you begin the experiment. A hard copy lab book should always accompany you in the lab, except when performing the most mundane and repetitive of tasks.

4. All constructs should first be “assembled” electronically in silico. This greatly reduces the number of errors, as computers can easily check conflicting restriction sites and reading frames for fusion proteins. The BioBrick web site, among other available tools, provides construction capabilities.

5. As you perform an experiment (or make a construct) any changes to the expected protocol can be entered, along with the results.

6. Standard or obvious steps need not be entered. However, standard protocols should be referenced, as should protocols adapted from published work. These references greatly simplify the task of writing articles based on your work. There are far fewer “obvious”

steps than one might think. Most of these are (or should be) in some standard protocol. Almost everything else should be written down.

7. Many steps in protocols involve the mixing of a number of reagents in a standard reaction such as a restriction digest, PCR, ligation, etc. While it is not necessary (or even desirable) to write a detailed description of how each reagent was added to the tube (this is either “obvious” or left to personal preference), it is critical to always list all the reagents and amounts used in this particular experiment. As reagents are added, they should be checked off in the lab book so as not to lose one’s place. This practice also helps focus the experimenter on their work. Other reaction conditions, including times and temperatures, should also be recorded. Running conditions, such as percent agarose gel, voltage and time should also be recorded.

8. Supporting documentation produced by lab equipment should usually be included in the documentation. Electronic images or scanned images may be uploaded to the wiki. Documents that are not uploaded due to space limitations, should be filed carefully and cross-referenced in the wiki. Chromatograms may be held in binders, for example. Attached documentation should be annotated so that it is clearly related to the information in the wiki. For example,

gel lanes should be marked and any bands cut-out should be marked. Electronic copies should be stored and the file name and computer and folder (or directory) should be marked in the wiki.

9. Lab notebooks often reference material that is online on some computer file. In this case, the lab book and computer documentation should be cross-referenced and must be in agreement. At the very least, the same name must be used to describe the same construct in both sources.

10. Every experiment should end with some conclusion. Either something was made, verified, proven, disproven or inconclusive, needing further work. In the latter case, problems and subsequent or alternate approaches should be discussed. At the very least, when no solid conclusion is possible, a link to the next page that continues the experiment should be included.

11. Most experiments (and all projects) take place over a number of days and may be interrupted by other work. The inclusion of “continued to” and “continued from” fields on each wiki page should assist in providing continuity, as should a table of contents.

12. Complete documentation standards should be developed on a continuous basis by the team.

Good labeling and storage of plasmids, glycerol stock, plates, intermediate constructs, etc. is absolutely crucial in enabling team members to find and identify the reagents they need. In addition to being correct and complete in their descriptions, you also need to ensure that using the labeling and filing systems does not become the major work activity; systems must be effective but efficient.

3.8. Presentation and Poster

Planning these is fairly straightforward. Review the efforts of successful past teams and try to emulate them. The standard for both presentations and posters at the iGEM Jamboree is very high. A thorough understanding of the subject material is only the starting point. iGEM teams are frequently more creative and have more fun with their presentations than what would normally be seen at most scientific conferences, so it is important to take this into account.

3.9. T-shirts and memorabilia

Keeping with the theme of having fun at the Jamboree, team T-shirts and other memorabilia should be designed to be uniquely eye-catching and memorable. T-shirts are almost a required part of the Jamboree as it makes finding each other in the hub-bub that much easier. Also team colors allow members to easily find their team in the traditional “picture from above.” T-shirts have ranged from fairly standard forms, to soccer jerseys to kimonos. Even other forms of clothing have made their appearance in some competitions, including hard hats. Other memorabilia include baseball caps, drink coasters, pens, pocket protectors, wrist bands and almost anything inexpensive enough to give away and small enough to transport to the Jamboree. Although not required, the memorabilia make a very nice secondary competition.

3.10. Raising funds

The team needs to set funding goals and decide who will be approached for support. A short portfolio, describing the project, iGEM, Synthetic Biology and the team should be compiled by the Funding focus group.

3.11. Publicity

At any early stage, the team should appoint a focus group to deal with publicity. Although it may seem premature to seek PR before

anything has been accomplished, successful teams raise awareness (responsibly) at any early stage. Without over-inflating expectations, a team should approach its institutional and student newspapers and tell their story. If teams are seeking more members, advisors or instructors or if they will be conducting public surveys, this is a good vehicle for raising awareness. Stress the general problem being addressed, the basics and purpose of Synthetic Biology and iGEM at this stage. As the team desires, local news agencies (and, especially, science news agencies) may also be contacted.

3.12. Delegating and coordinating work

Even in the planning stage, the energy level and coordination required to put together a successful iGEM team far surpasses almost any other undergraduate experience. Obviously one person cannot do it all, so work needs to be taken up by team members, either as individuals or small groups. This section has briefly described some of the activities that will need to be considered and planned. While overall planning should be done by the team as a whole, specific areas, such as modeling, lab work, fundraising, presentations, posters, etc. are best done by smaller working sub-groups.

3.13. Team meetings

1. Team meetings should be held on a regular basis; we recommend weekly meetings. During the Planning phase, the team meetings will help everyone to share in the basic project ideas and to flesh out some details, as well as outline the other work required for the team. Team meetings will likely require 1 to 2 hours, especially if instructional time is required. Team members who are enrolled in specific classes (e.g. Synthetic Biology or Computational modeling) may be excused from specific instructional modules but, otherwise, everyone should attend. Instructors and advisors should attend the business portion of the meeting and may opt to attend the instructional sessions as well.

2. Instructional sessions may be held either first or last in a meeting. We would recommend carrying out instruction first then moving on to a brisker-paced business meeting afterwards. We realize that the weekly meeting load, including the Focus group meetings (below) may take 3-4 hours per week in this stage and this is a fairly heavy workload on students at this stage. Our advice is that this will not only greatly enrich the iGEM experience for all team members but will reduce the meeting time required over the summer. Obviously, if everyone on the iGEM team can enroll in a course (e.g. directed research option) then more time can be spent that is directly relevant to student members. The actual number of hours and, perhaps, a plan for the meetings at this stage, can be part of the Team Agreement.

3. Meetings can be held at any mutually agreed-upon time and place. To a certain extent, one of the criteria for participating on an iGEM team should be the availability to attend weekly meetings. Because most iGEM teams contain 6 – 12 members, it can be difficult to arrange a convenient meeting time. We recommend a weeknight during regular semesters and the summer, with special weekend meetings during the Fall to prepare for the Jamboree. A commitment to attend meetings is crucial to team spirit and to its eventual success. Nothing is more discouraging than team members who can’t bother to show up for a weekly meeting.

4. A wide variety of instructional sessions could be held during the planning period, making a mini-course in Synthetic Biology

and iGEM. Instruction would preferably be for the entire team, with expanded discussion to focus groups. Some selected topics are suggested below:

- Introduction to Synthetic Biology
- Introduction to iGEM
- Review of past iGEM competitions
- Literature searches and reading primary literature: Pubmed, Google Scholar, patent literature
- Maintaining a literature database
- EEELS issues and studies
- Genetic circuits
- Protein engineering
- Metabolic engineering
- Molecular biology basics (digests, gels, ligation, transformation, sequencing)
- Mathematical modeling
- Bioinformatics and support tools (Entrez, BLAST, Vector NTI, Primer design)
- BioBricks and the BioBrick Foundation
- Biochemical assays and analysis
- Instrumentation (FACS, microarrays, microscopy, etc.)
- Advanced molecular biology (PCR, Northerns, Westerns, microarrays, etc.)
- Fundraising
- HTML and wikis
- Powerpoint and Photoshop
- Basics of presentations and posters
- Keeping a lab notebook
- Documentation of parts
- Navigating the Registry of Biological Parts
- Team work and leadership strategies.
- How to run a meeting.
- Lab safety

3.14. Focus group meetings

Focus groups are subsets of the entire with specific interests and/or skills that can meet separately to address specific sub-tasks. Smaller groups make for tighter working relations and more effective exchange of ideas. We recommend making focus groups to handle planning, execution and management of most portions of the iGEM project. Focus groups can either meet following the general weekly meetings or at some other time convenient for the group.

3.15. Team socials

Even at the early planning stage, iGEM teams are already working hard to be successful. It is important that the team reward itself with some time for socialization. Pizza or snacks in the first half of the weekly meetings before getting down to work is recommended. After the weekly meeting, the team may want to get together for beer, coffee, tea, etc. Obviously, having the team members get along socially is almost as important as getting along intellectually if they are to work as an effective, dynamic team.

4. Extreme execution

Planning is nice, but eventually something real has to be produced. The most effective teams realize that communication at this stage is paramount. Appointing a full-time team manager to maintain a schedule of the many tasks to be done will go a long way towards maintaining everyone’s sanity. Taking a pause once a month (or even more often) to ask everyone how the structure of the team and the division of tasks is working may help identify and deal with problem areas. It is also a good idea to check in with how well team members’ expectations of each other, of the project and of the instructors are being met. This self-reflective exercise can highlight potential problems at an early stage. If the question is met with silence (rather than with overwhelming

cheers of how great everything is) then the team is in real trouble and needs a serious review of its goals. Silence usually indicates that things are not going particularly well and that the team members don't trust each other enough to admit it.

4.1. In the lab

A major goal of the iGEM project is to produce functional, well-characterized BioBrick parts. This will require wet lab work. Because iGEM members come from a variety of backgrounds and levels, experience with molecular biology and other required techniques will vary considerably. It is important to pair more-experienced members (or advisors) with less-experienced members so that transfer of skills and knowledge can take place. We find that it is usually best to hold a Basic Molecular Biology course for all team members that will be conducting wet work. Because of the time required to conduct many basic molecular biology experiments (e.g. digests, gels, PCR, sequencing), it may be most convenient to run a basic weekend course on molecular biology lab basics, realizing that this will not be adequate for people to work successfully in the lab. They will still need assistance for their first few experiments.

Molecular Biology is still a labor and time-intensive activity, though many procedures have seen order of magnitude improvements in efficiency over the past decade. Full-time students will be capable of producing more results than part-time volunteers, so they confer an obvious advantage to any team. However, considerable work can be accomplished by a committed volunteer team with good ideas and good support. The best of both worlds has a core of full-time summer students supporting a larger group of volunteers. This may require full-timers to work some evenings and weekends during the summer months. Such a commitment should be spelled out in the Team Agreement, remembering that being a full-timer does not remove the obligation to carry out volunteer activities as well.

4.2. Maintaining focus and energy

Eventually all lab work falls into a rut, either because it becomes easy but has to be repeated multiple times on different samples, because nothing is working and the researcher is frustrated, or because science has large mundane stretches of work required to verify reliability. iGEM projects are usually so short and intense that there is little danger of this happening until well into the summer. One important thing to remember is that scientists and engineers are just people. We get discouraged by failure; we fall into patterned modes of thinking; we enjoy staying within our comfort zone. Lab work can often be reinvigorated by shuffling tasks among team members and by cross-training. Although this may reduce overall efficiency, it will make for happier team members.

4.3. Surpassing failure

Psychological security is important during execution as well as in the planning stages. Science is hard and many things will not work out the first time or two (or three, etc.). Plans and schedules are not intended simply to make it easier to blame the responsible person when things go wrong. The early recognition of mistakes and failures should be encouraged and congratulated as this will enable the team to get back on track most quickly. Admitting error is much less costly than trying to hide it.

4.4. Nearing completion

After the summer, when students return to classes, the project will experience a lull of two or three weeks. It is important to continue to hold weekly meetings to help get past this point and to settle the team in for the finishing kick. This lull may be even a bit longer if full-time students decide to take some summer vacation before heading back to classes. Instructors need to remember that a student's first priority is to their educational program and to their intended career path so some time for re-invigoration is very important.

4.5. Course or volunteer

At the end of the summer, it is easy to think the project is done, but really it is only getting started. Usually there will be lab work to complete, documentation to finish, and the Jamboree to prepare for. The most effective way to maintain student interest in the project is to make it worth their while. This will usually mean some course credit for their iGEM work, either through a specific iGEM course or through a Directed Studies or Project course. Encourage your students to register in such a course and encourage their home departments to recognize this effort.

4.6. Document to win

1. Apart from the poster and presentation, iGEM projects must be fully documented on the wiki and BioBricks parts submitted. Wiki pages from past competitions are available on the web and reflect an amazing amount of talent and creativity. Because formatting and imaging as well as more interactive features are limited with the standard wiki formatting, teams may want to enhance their wikis with advanced HTML scripts.

2. Winning wikis contain well-formatted pages with many interesting images. The main page should briefly describe the project, the institution, the home city, sponsors, etc. Other pages can include more detailed descriptions and photos of the team and its members. It is good to include actual photos of the team at work and at play here; the Team Manager may also want to take on the role of documenting (and blogging about?) team activities. The Project details page documents the ideas, relevant references and explains basic concepts of the project. A modeling page can include formulae and modeling results along with source code for simulation. A parts page could include an overview of BioBrick parts for the project, including their design, construction and characterization. Full parts descriptions should be documented in BioBricks though judges may only look at the "favorite" parts. Colorful, well-designed images which clearly convey the important information are the goal for these pages.

3. Daily wet lab progress is to be documented in the Notebook pages. This may contain detailed information and act as an electronic lab notebook or it may be diary-like summaries of lab work. While we prefer a more detailed approach, it is not clear that this is important to the judges. The standard wiki comes with a calendar-like notebook, which is minimally useful. Many groups replace it with summary pages but others enhance it to provided better browsing capabilities (e.g. day-by-day flipping, project or researcher cross-references, etc.) Some groups include scans or gels and other such machine-generated raw data, while others do not. Above all the wiki must be clear, attractively-formatted, easy to navigate and complete.

4.7. Organizing the presentations

Presentation teams are generally fairly small, usually 3 to 5 team members when all members speak English. Presenting your research is an important part of the scientific

and engineering enterprise, so being on the presentation team is a valuable enhancement to an individual's experience. However, it will require considerable extra work. Not only are presenters required to really know the project (or at least their part) thoroughly, they must be able to communicate it clearly and speak with authority. This is one of the most visible aspects of the entire competition and it is easy to be judged harshly. A typical presenter will require 12 hours of team practice and at least as much individual practice in order to competently present their portion. The reason for this is that presentations are only 20 minutes, so there is no time to hesitate or stumble. Speaking quickly but clearly and correctly with confidence and authority requires a lot of rehearsal; longer talks are actually easier, in general.

The presentation should include the following:

· present the team and institution (maybe city and country)

· outline the reason the project is important,

· discuss the basic background science,

· describe the approach to solving the problem,

· present the model and its predictions,

· describe BioBrick parts made, sequenced, submitted and characterized,

· describe assays and results

· draw conclusions of what worked and what didn't

· talk about future plans

· thank advisors and instructors

· thank financial supporters

· all in about 20 – 30 slides (at one minute or less per slide)

4.8. Poster

Posters are also an important part of the competition and previous posters should be examined for ideas on producing successful posters.

4.9. Team meetings and Focus-group meetings

As students return to classes, it can be very difficult to maintain regular meeting schedules. Most teams begin planning and preparing their Presentations and Posters during this time period. This is unfortunate as many students do not have enough free time to easily contribute to the project during the Fall. As mentioned previously, having students register in a class to allow them to get credit for their iGEM work will ensure they have some time available to continue working on completing the project.

5. The iGEM Jamboree (and after)

5.1. Publicity

Before leaving for the Jamboree, inform your various news agencies that your team has been working hard and is ready to compete. Not only will this raise local interest and team spirits, judges are impressed by team efforts to promote Synthetic Biology and iGEM.

5.2. Organizing – working the program

As with any conference, download and read the program and any abstracts before you get to the Jamboree. As a team, you should plan to look in on other teams' presentations and posters to use the Jamboree as a learning experience. Preparation for attending the Jamboree begins a few weeks prior when wikis are frozen. At this point the team should gather for a few hours to review what other teams have

accomplished and to determine whether any last minute changes to the Presentation or Poster need to be incorporated.

5.3. Practice talk

Upon arriving at the Jamboree, practice times are arranged for the night preceding the next day's competition. This will give team members a chance to practice in a room similar to the one they will actually use and, most importantly, someplace outside their comfort zone. Try to keep the tone of the presentation relaxed but serious. Minimize anxiety by being polite to other teams, who may be running a little late. Be kind and considerate. Feel free to sit in on other teams' practice talks but be appreciative and respectful that they are likely as anxious as you are. Your team should try to convey that they are ambassadors of good will and interested in others' success as much as their own. Be supportive.

5.4. Attending other talks

Team members should try to take in a fairly wide variety of other talks, both within and outside their stream, to enhance their iGEM learning experience. Certainly attend as many of the "big school" talks as possible, but try to take in a few of the lesser-known schools' efforts as well. Try to think of questions to ask the presenters. Culture your curiosity about other teams' work and frame your questions from curiosity rather than from a challenging perspective. Don't try to make others look bad.

5.5. Viewing other posters

Everybody likes to have others express interest in what they are doing. So the team should make an organized effort to visit a large number of posters and talk to team members there about their project and their iGEM experience. In addition to enjoying the Jamboree more, this will enhance the learning experience.

5.6. Team presentation

Arrive at the presentation room on time or early and be prepared to set up for your presentation quickly. Each team needs to bring its own computer and remote presentation device or laser pointer but the Jamboree provides the projector and sound, along with technical support. The key technical consideration in public presentations is to minimize surprises. Run the presentation on known hardware with known software, whenever possible. Bring more than one copy of the presentation (and possibly more than one presentation computer) to the talk. Be prepared for any equipment failure.

5.7. Finals

If you are fortunate enough to make it into the finals presentations, the first thing to remember is DON'T PANIC! You will be presenting your talk in front of a very large group of 600 to 1,000 people and you will be being judged by everyone present, so some nervousness is to be expected. Stick to your training and remember that you rehearsed for this, so just give your presentation as always and you'll be fine. Beyond that, the selection of the final winners is a mystery, so don't worry about it.

5.8. Debriefing initial impressions

Immediately after the Jamboree begin to collect impressions from your team about how it went. Either on the plane ride home, in the airport or over breakfast the next day try to collect some initial ideas of what worked and what didn't and what can be improved next time. Collecting these ideas while they are fresh is crucial to annual improvement. Don't just talk and listen

though, write them down and include them in your final report.

6. Follow-up

6.1. Post-Jamboree

So the Jamboree is over and you have returned home. You may think your work is done for a few months, but successful iGEM teams get to work almost immediately on the next year. As soon as possible, write a final report on your achievements for your sponsors, thanking them and discussing next year's plans. Immediately contact your news agencies to report on your success and strike up interest in the next team. Plan a celebratory gathering and the kick-off Open House to help recruit the next team.

6.2. Detailed debriefing

Team members should review all finalists' (and many Gold medal winners') projects from the iGEM results page in detail. Ideally, a number of team members will conduct this review, though the Team instructors may have to do the majority of the work as final exam time will be fast approaching. Review all team wiki's, their presentations and posters, and try to determine the winning criteria. This will be very difficult, but informative. If the team has proposed hypotheses as to why some teams did very well, try to collect objective statistics to evaluate these ideas. Although arduous and time-consuming, this will help the next year's team considerably.

6.3. Celebration and re-initation

After all the work is completed, the Jamboree is over and final reports have been written, it is important for the Team to take a moment to celebrate their achievement and reflect on the entire experience. One excellent way to do this is to hold an Open House, inviting Advisors and supporters of the current team. A small presentation of the project can be made and serving food always helps people to mingle. The Open House should be coordinated with advertising and publicity in advance so that recruiting for the next iGEM Team is part of this event. And so, the iGEM cycle begins again, setting your Team up for another successful year.

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Feed
Back
Thanks for your support

Feedback

1.Is this issue useful for your team?
A. Yes. It may help.
B. No. I cannot see any important reference value to my own team, because each situation differs.
C. Maybe a little.

2. How many passages are suitable for each issue?
A. Not more than 5.
B. 6-8
C. 9-12
D.13-15
E.15-20

3. How often should we publish Newsletter?
A. Weekly.
B. Biweekly. (The same as last year)
C. Triweekly.
D. Monthly.

4. Is is necessary to add new content besides project & update?
A. Yes. (Run to 5)
B. No (Run to 6)

5. What contents can be added in Newsletter (multiple-choice) ?
A. Discussion on bioethics.
B. Experts' interviews.
C. Summary information for Biobricks.
D. Wiki technology.
E. Art & Design.
F. Others _____(Please let us know your idea)

6. Are there any problems you have encountered? Would you like to write them down on Newsletter so that other readers can help you?

7. Any suggestions after reading this issue? Help us to make the Newsletter better!

Thank you for your support.
Please complete the feedback form and send it to us: igemxmu@gmail.com