2016

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SPONSORSHIP PACKET

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Synthetic Biology Project Team

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Our Team Letter

by

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2016 Team Leader

Thank you for your interest in sponsoring the 2016 Cornell International Genetically Engineered Machines (iGEM) Team. Cornell iGEM is an international award-winning synthetic biology-inspired team composed of thirty-three students drawn from various disciplines and levels of expertise across the university. Each year, our mission is to design and construct a novel solution incorporating genetically modified organisms in everyday systems to compete at the world's premier synthetic biology competition in Boston. The iGEM competition brings together high school, collegiate, and entrepreneurial teams, each of which plans and implements novel genetic circuits to help solve the many needs of our industry, economy, or environment. However, without our generous sponsors, we wouldn't be able to continue spearheading synthetic biology research and contribute to the scientific community that is eager for new applications of biological systems.

Thanks to the support of our wonderful sponsors, we have done very well at competition, receiving the Gold Medal at competition for the past 5 consecutive years. This past year, we reached new levels of success, taking home Best Undergrad Environmental Project along with Best Applied Design and Best Supporting Entrepreneurship. From being published in various publications including Popular Science and Elsevier to having a strong presence in the local Ithaca community through science education outreach programs, Cornell iGEM strives to embody a team that gives back and reaches higher each year.

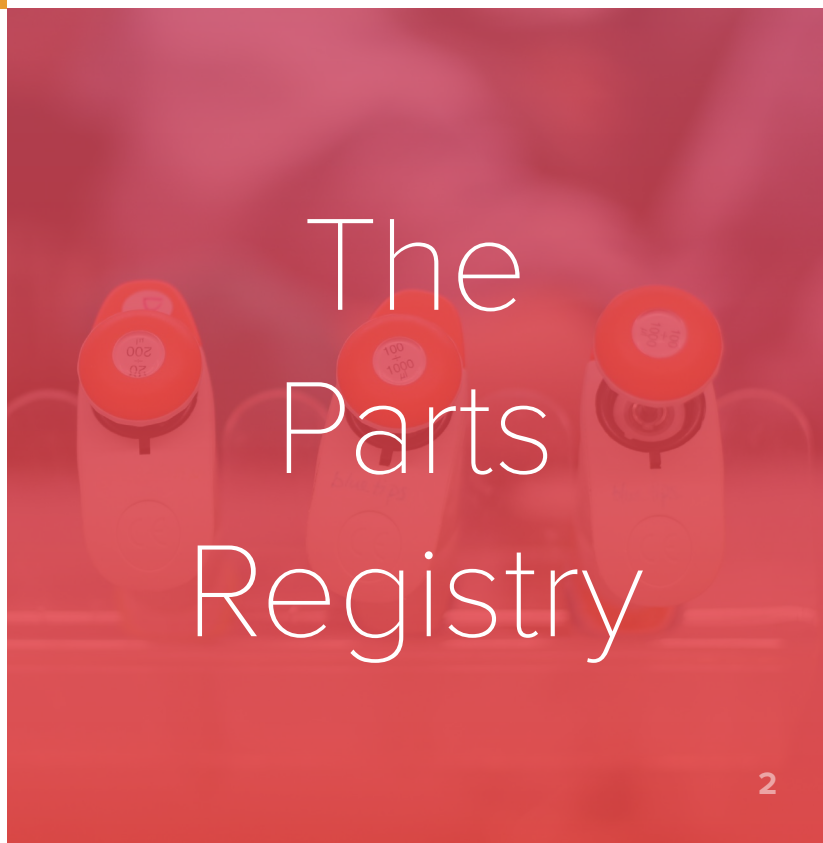
By supporting us, sponsors have access to an ever-increasing audience of teams, researchers, and industries both in and around the scientific community. Last year, over 280 teams participated in the iGEM competition in September, and each year this competition only expands to include more teams and organizations. Our team's sponsors are featured prominently on our project presentations, competition posters, team apparel, and website. Our website offers a comprehensive overview of our past projects and can be found online at http://igem.engineering.cornell.edu. In addition, the following packet contains an extensive breakdown of our team, budget, and past accomplishments for the Cornell iGEM team.

Sincerely,

What is **iGEM?**

The Competition

iGEM began in 2003 at Massachusetts Institute of Technology, and has since grown into the world's largest synthetic biology competition, now hosting over 280 teams from around the world in 2015. At the beginning of the season, each team receives a kit plate of synthetic DNA parts from the iGEM headquarters. Using these and parts of their own design, teams integrate synthetic DNA components to create novel, engineered organisms to solve various engineering problems. Teams participate each year at the international competition and are judged based on the quality of their biological work, the significance and applicability of their project, human practices and safety components, and the presentation of the work via their website, poster, and a formal oral presentation.



The Parts Registry

One of the iGEM competition's greatest goals is the development and cultivation of the Standard Registry of Biological Parts. This parts registry contains thousands of synthetic DNA components designed to be modular: every part in the registry can be interchanged within common DNA backbones, allowing researchers to easily create novel genetic circuits for important engineering purposes. After every competition season, iGEM teams submit their genetic parts (called "BioBricks") to the parts registry for future teams and researchers to use. This collaboration is essential to the iGEM competition and research in synthetic biology in general, and it ensures that any research done by our team can be utilized by the scientific community as a whole.

Our Team

Cornell iGEM is an undergraduate biology team and has solidified itself as a perennial contender at iGEM competitions. The team is still relatively new, but recent successes have helped the team gain prominence at both the university and the iGEM competition. Our team is composed of 33 undergraduate students from four colleges across the university (Engineering, Arts & Sciences, Agriculture & Life Sciences, and Human Ecology). This diverse group of students uses their different expertise to complete a complex and novel project each year. Cornell iGEM provides dedicated students with an interest in biological research and engineering an opportunity to gain experience in a professional work environment, hone their practical engineering skills, and pursue their own research goals. As evidenced by our recent human practices accomplishments, our team prides ourselves on sharing our research and promoting safety with regards to the controversial field of synthetic biology. In doing so, we are developing the next generation of responsible scientists with the potential to bring synthetic biology to the forefront of modern engineering solutions.

What We've Accomplished

2009-2010

Cadmium Biosensor/OMG OMVs

- Competed at iGEM international competition for the first time
- Presented projects on a cadmium biosensor and outer membrane vesicles

2011

Biofactory

- Created a cell-free method for synthesizing complex biomolecules
- Won best manufacturing project at iGEM international competition

2012

SAFE BET

- Invented a real-time biosensor for arsenic detection
- Awarded top 4 finalist regionally, won Best Wiki and Best Human Practices Advance awards
- Top 16 finalist worldwide, won "Best Solution to an Oil Sands Problem" from the Oil Sands Leadership Initiative

2013

Organofoam

- Designed a comprehensive toolkit of genetic parts to facilitate fungal engineering
- Won Best Human Practices Advance at North American iGEM competition
- Won Best Human Practices Advance at iGEM international competition

2014

Lead it Go

- Manufactured a continuous water filtration system to sequester heavy metals
- Achieved gold medal classification for fourth consecutive year in iGEM

2015

fishPHARM

- Constructed a novel drug delivery system and probiotic treatment for Bacterial Cold Water Disease and an app for monitoring nutrient content in fish hatcheries
- Achieved gold medal for fifth consecutive year in iGEM
- Won Best Supporting Entrepreneurship, Best Environmental Project, and Best Applied Design

Project 2016: **Mastitis**

Project Summary

Bovine mastitis is a potentially fatal mammary gland infection and the most common disease in dairy cattle in the United States, causing a $300 billion dollar loss in the dairy industry annually. Mastitis causes inflammation of udder tissue in cows, and occurs when white blood cells are released in the mammary gland as a result of bacteria infecting the teat canal. Current treatment practices rely on broad-spectrum antibiotics. However, the need for continuous dosage and the prevalence of antibiotic resistance make this treatment method undesirable and ineffective, with some studies indicating a mere 52% cure rate of the disease. Lastly, traces of the antibiotics used remain in the produced milk so it cannot be sold, which is where the largest losses are incurred.

In order to solve this problem, Cornell iGEM is working toward implementing a novel treatment schema. Our solution is to create a bacteriocin probiotic treatment for the causative agents of mastitis, such as *Streptococcus uberis*. We are working with antibiotics, specifically nisin and lacticin, which are inhibitory to many Gram-positive, mastitis-causing pathogens. All of the bacteriocins used will be safe for human consumption. The intramammary bacteriocin treatment will be implemented using a bacteriocin-infused alginate hydrogel, which are biocompatible and cost-effective. We further plan to implement a controlled drug release system in order to mimic periodically delivered doses of antibiotics.

This project aims to help solve a disease that is highly detrimental to the dairy industry, and to help those in the agricultural industry cut expected costs of production. The successful implementation of this project would create healthier cattle, higher dairy yields, and a new treatment for a disease previously only treated through antibiotics. This has great potential to improve treatment of cows on farms, and improve efficiency of the agricultural industry.

Policy & Practices

Policy and Practices is broadly defined as the incorporation of any economic, ethical, legal, or social dimensions into an iGEM project. The team continues to create Policy and Practices components that contribute to and complement the work our team is doing, as well as foster a meaningful impact on our local and global communities. To this end, we complete the following: (1) engage in extensive outreach, (2) learn about the environmental, social, economic, and political issues that shaped the world of the biochemistry we are tackling, (3) develop a social media platform called Humans and SynBio in collaboration with teams from across the world, (4) put together surveys to understand the factors underlying opinions about synthetic biology, (5) facilitate collaborations within our university and with outside agencies to put together a portfolio of possible applications of our genetically engineered technologies, and (6) consider the bioethical and safety implications of our work at large.

2015 Project Budget

Project Expenses

Expense	Cost
OligoPrimer and gene synthesis	$2,000
DNA Sequencing	$350
Molecular biology chemicals and reagents	$3,000
Plasticwear and other lab supplies	$3,000
Product Development and Electrical Supplies	$1,000
Software Licensing	$5,000
Outreach supplies	$50
Training Fee, Printing	$400
Total	**$14,800**

Competition Expenses

Expense	Cost
Team Registration Fee	$4,000
Individual Registration Fee $695/person X 5 people	$3,475
Travel Expenses	$882
Lodging 4 rooms x 4 nights	$7,536
Total	**$15,893**

Overall Total - $30,693

fishPHARM

Our 2015 project in review

We have **created a comprehensive solution** to Bacterial Coldwater Disease (BCWD) to increase the productivity and health of aquaculture.

We have **developed genetically engineered bacteria** to produce a treatment for the disease and a novel time-dependent drug delivery system with **minimal environmental impact**.

We have also **developed a nutrient monitoring system** which will make it easy for fish farmers to **prevent BCWD** in their fish.

We have received **gold medal status** at the **international competition** and awards for best supporting entrepreneurship, best environmental project, and best applied design. We were **one of two American teams to win three awards**.

We have **made a significant impact** on our local community through participation in the YOURS mentorship program and local events to **promote public awareness**.

Sponsorship Benefits

Competition Visibility

Each year, Cornell iGEM competes at the largest international synthetic biology competition (over 280 teams in attendance with over 2300 participants). All of our sponsors are featured prominently on our competition poster, competition presentation, and project Wiki. Our team website and competition Wiki from this past competition season (on which all of our sponsors are featured) both receive around 500 hits per month. Due to our success the past couple seasons, our team has been featured in various publications including Elsevier, the Cornell Chronicle, the Cornell Daily Sun, IDT's Decoded, and Popular Science, as well as newsletters from our past and current sponsors.

University Networking

Cornell University is a highly respected and well-regarded research university. At the university, sponsors can gain publicity through interactions between the team with other students and research labs. As a relatively new team, we have a very young and active alumni network with which we share the names of our sponsors. Each year we have graduating members who are eager to pursue careers in biology and engineering — quite possibly with a sponsor.

Your Sponsorship

Gifts in Kind

- Centrifuge Tubes (2 mL, 15 mL, 50 mL) and micropipette tips
- PCR Reagents (DNA polymerase, dNTPs, etc.)
- Cloning Enzymes (EcoRI, SpeI, PstI, XbaI, NotI, DNA Ligase)
- Antibiotics (Chloramphenicol, Kanamycin, Ampicillin)
- Gel Electrophoresis Materials (Agarose, TAE Buffer, DNA Ladder, Ethidium Bromide)
- Molecular Biology Kits (Plasmid minipreparation, DNA clean and concenttion)
- Electroporation Cuvettes
- Media Components (LB Broth, Yeast Extract, Tryptone, various salts)

Monetary Support

In addition to gifts in kind, we also accept any monetary support. There are many items we cannot receive in kind, so monetary support is vital to the success of our team. In addition to purchasing those items listed above, contributions will be put towards custom primers, DNA sequencing, iGEM registration fees, travel and lodging for competition, and savings funds for future Cornell iGEM teams.

Intellectual Partnership

In 2013, Cornell iGEM made great strides in bridging the gap between the iGEM competition and industry. Our collaboration with Ecovative proved to be the most meaningful and in-depth partnership between an iGEM team and a corporation to date. Such partnerships depend greatly upon our project each year, and as a team we are open to working with businesses to solve problems with synthetic biology.

Donation Form

Cornell iGEM provides promising undergraduate scientists and engineers the opportunity to pursue their own research interests in a supportive team environment. While Cornell does provide our team with laboratory space, access to some of its outstanding facilities, and funding for competition fees and travel, funding for individual components of our project must come from generous, outside sponsors.

If you are interested in supporting our efforts this year and becoming a part of an exciting and successful synthetic biology team, please fill out the following form and return it to the provided address. Checks can be made payable to “Cornell iGEM” and attached to this form. If you have any questions about our team or specific support we could use, please don’t hesitate to contact us. We greatly appreciate support of any kind. Thank you for your time!

Mailing Address:
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Ithaca, NY 14853

Contact Information:
Team Leader: Saie Ganoo
(901) - 604 - 5013
cornelligem@gmail.com
igem.engineering.cornell.edu

General Information:

Name of Organization: _____
Mailing Address: _____
City: _____ State: _____ Zip Code: _____

Contact Information:

Contact Name: _____ Contact Title: _____
Phone Number: _____ Email Address: _____

Donation Information:

Gift in Kind:

What is the gift in kind? _____
What is the market value of the gift in kind? _____

Monetary Donation:

What is the donation amount? _____

Donor Signature: _____ Date: _____

Thank you to our 2015 sponsors!

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