The proud 2013 team and their supervisors – happy and relaxed right after the presentation at the jamboree in Lyon, France. From left to right: Thomas Stenum, Eleonora Guglielmo, Niels Christian Sandén, Nanna Lunding Jensen, Will Wright, Signe Tang Karlsen, Emil Fischer, Anna Holzwarth, Kim Ströh, Ida Marie Boisen, Suzanne Schmidt, and instructors: Associate Professor Adam Takos, postdoc Eva Knoch, postdoc Brian King and Associate Professor Björn Hamberger.

iGEM
The International Genetically Engineered Machine (iGEM) is about using synthetic biology principles to build the most original and useful biological 'device', and share its function as standardized genetic 'bricks' called BioBricks. Teams of students from many disciplines compete against teams from all over the world. A major part of the competition is about communicating the project in a fresh and creative way.

Nanna Lunding Jensen and Kim Ströh checking for growth of their magnetic bacteria.

Students win European Gold medal for Magnetic Drug Idea

11 UCPH students won a gold medal at the European championship in synthetic biology for students. They were awarded gold for their idea for a new cancer treatment approach and for making it easier for all teams to share experiences and knowledge.

12.50 pm, October 12th, 2013 in Lyon, France: A team of eleven Danish students from various scientific backgrounds at University of Copenhagen (UCPH) are anxiously awaiting their team's turn to take the stage at the iGEM Regional European jamboree for synthetic biology, and present the project they have been working on all summer.

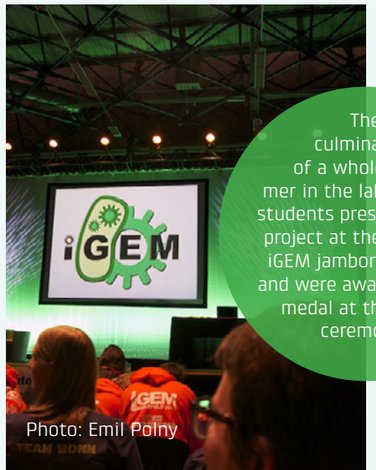

Photo: Emil Polny

The culmination of a whole summer in the lab; 11 UCPH students presented their project at the European iGEM jamboree in Lyon and were awarded a gold medal at the award ceremony.

for Synthetic Biology to develop a socially and ethically relevant solution to a problem using synthetic biology principles. The Copenhagen team impressed the judges and was thus one of the 34 teams that left the jamboree with gold medals, due to both their efforts in the laboratory, and because they impressed the judges with their orginal approach to science communication and outreach.
"This has been a many-facetted project, that time and again has found us leaving our scientific comfort zone and learn to approach granting bodies to raise funds, to do stop-motion animation and filmmaking, and to build our knowledge sharing -activities in order to enter into a dialogue with the public" says Master student in bioentrepreneurship Will Comstive Wright, who early on experienced the advantage of having a diverse set of skills and disciplinary backgrounds in the team.

The team formed in the beginning of 2013 after an info meeting at Center for Synthetic Biology. The 11 students were bachelor and master students from Biotechnology, Biology, Bioentrepreneurship, Biochemistry, Molecular Biomedicine, Natural Sciences and IT and Philosophy. The team came up with their own idea of using the tiny magnets of lake bacteria to make cancer treatment more accurate. The students therefore dubbed themselves Team Magneto.

Small Magnets With Great Promise

Magnetotactic lake bacteria were the core of the project and the team isolated their own strain from a lake in Copenhagen. In nature, these bacteria exert an extraordinary ability to position themselves in relation to the earth's magnetic field. This ability is mediated by organelle-like structures (magnetosomes) lining the inner surface of the cytoplasmic membrane. Significant amounts of the small magnetic compound magnetite (Fe304) also accumulate here, thus making enrichment of these bacteria possible by using a simple magnet. The small size and magnetic properties of the magnetosomes, combined with their surface proteins' ability to bind organic molecules of interest, opens up for a whole range of potential applications.

Chief Medical Consultant: "This is a dream compound"

One of the ideas of the iGEM team was to use the magnets to make cancer treatment more accurate. The idea, which is based on the fact that blood vessels between cells in cancer tumors are more leaky than between normal cells, excited one of Denmark's leading experts in radiological medicine, chief medical consultant at Herlev Hospital, Dr. Michel Nemery who explains: "Appropriately sized magnets may accumulate in the spaces between cancer cells, either by spontaneous diffusion throughout the body or by us focusing a strong magnetic field in the cancer patient's tumor. This can lead to chemotherapy with much fewer unwanted side-effects.
If it becomes possible to accumulate the magnets in the cancer tissue, Dr. Nemery anticipates that the small magnets have the potential to become a dream compound: "A technology based on this could elegantly improve cancer treatment with regards to diagnostics and treatment, as well as follow-up observation" he says.
The team also had original ideas outside the lab that might be very helpful to future iGEM teams.

'Bricks of Knowledge' will make everybody smarter

The 2013 team is the first iGEM team from University of Copenhagen win gold medals. To qualify for gold, teams need to fulfill a strict set of criteria including how they improve and build new BioBricks, but also on how well they convey their research through public outreach initiatives.
The team was particularly praised for its Bricks of Knowledge initiative, inspired by iGEM's open sharing of knowledge via biobricks. Bricks of Knowledge is an online library of video-tutorials on 'how-to-iGEM' made and submitted by iGEM teams from all over the globe. The project still lives on and will hopefully grow in the iGEM competition's future. The goal is to empower all future iGEM-aspirants, especially from less resourceful countries, to become part of the great global iGEM student community – as well as give all future iGEM'ers a head-start.

iGEM fosters creative and entrepreneurial researchers

Back home, Team Magneto have been celebrated for their gold medal and have now resumed normal student life – though loaded with valuable experiences on how to plan and execute lab work, approach fundraising and how to collaborate across disciplines.
"This iGEM-project has shown me that the great innovations may lie in between disciplines, such as engeering and biology within the field of synthetic biology", says Will Comstive Wright. He is confident that his future career in bio-entrepreneurship will benefit greatly from the versatile set of skills that he has attained as a part of the iGEM-team.

Join the 2014 team

The preparations for next year's team have already been launched and the ambitions are even higher. The aim is to both qualify for European gold and to be selected to enter the world championship at MIT, Boston. The iGEM team of Paris-Bettencourt has analyzed the successful teams of the past and found that diversity is a factor for success: Being on a large team with gender balance and members coming from different disciplines will boost your chances of winning. Imagine forming a team with students from e.g. arts, web design, and IT to build the best wiki homepage; mathematics for modeling; philosophers for considering ethical aspects; media, film and literature students for communications and PR; sociologists and anthropologists for public engagement and outreach projects; and don't forget those with a background in economy and business for product/market analysis and fundraising. The core of students actually running the wet-lab activities benefits from a diverse background in life sciences. Therefore we are recruiting from all faculties for the 2014 team.
From a societal perspective, iGEM's strong focus on non-scientific "Human Practices" represents the top category for one of the prestigious special prize awards. Here, the students deal for example with implications of their projects for the environment, security, safety and ethics and/or ownership and sharing.

Af Emil Polny, humanbiolog & Maya Bonde, biokemiker

Q:

How did you become involved in supervising and judging the iGEM?

A:

I joined last year thinking that it sounded like "fun". Helping highly enthusiastic students to bounce off wild ideas that eventually led to their own innovative project was a great experience. This year we had a group of excited instructors ready long before the kick-off event – and we are already looking forward to host the 2014 team. The invitation from the iGEM Headquarter to help as judge in the competition came rather unexpected, but it turned out to be a great and very useful experience

Q:

How do you think crossdisciplinary collaboration benefits research projects?

A:

Bridging across different disciplines often requires learning a new vocabulary, but once you can talk to the people in other fields you may be rewarded with new perspectives and technologies. These new tools may lead to unconventional solutions and iGEMers for sure love those. So, crossdisciplinary approaches are the first step for a great iGEM-project, and can add applied aspects to basic research projects.

From good karma to industrial impact

Q:

What kind of impact do these student projects have?

A:

From good karma to industrial impact: You can find a lot of great visions, when reading the team's wiki pages. There is probably no project without a direct application and those can range from intriguing attempts at disease control to saving endangered orangutans by providing a viable alternative for production of palm oil. These approaches can be very close to industrial applications with commercialisation and spin-outs lurking around the corner. The impact on science itself is rather obvious: community building, excellent training opportunities for students and the shared open source Registry of Standardized Biological Parts (a.k.a. BioBricks).

Q:

What skills do the students gain by participating?

A:

The most important skills they gain in order of appearance during the summer: crossdisciplinary communication, team building and dynamics, project design, selling your project and fundraising, deep and broad lab experience, frustration resistance against that one reluctant cloning reaction, outreach and PR, time management, international networking and finally presentation skills.

Q:

What was the best experience with this year's team?

A:

There were actually three experiences worth highlighting: support by a major foundation gave the students a much-needed boost in confidence for the project, seeing a little magnetotactic bug isolated from a lake in Copenhagen under the microscope really wiggling towards a magnet and finally the trip to the competition in Lyon, where we had two really intense days with an amazing atmosphere.

Q:

Does hosting the team contribute to the research at the department?

A:

Yes – there is a big inspiration of working with highly curiosity-driven students.

Q&A with Associate Professor Björn Hamberger, Department of Plant and Environmental Sciences, supervisor for Team Magneto and judge at the European Jamboree.

Synthetic Biology - repurposing biology

Synthetic biology is the combination of molecular plant biology, pharmacology, biophysics, and nanoscience in order to engineer or redesign existing systems into new, sustainable production systems for producing e.g. biomaterials, high-value natural products, biofuels and personalized medicine. To accomplish this, synthetic biology follows rational engineering processes based on highly characterized genetic parts, the so-called BioBricks. Further, a variety of modern measuring techniques and computational tools are applied in the design and tests of new systems. At UCPH such research is conducted at the crossdisciplinary research center Center for Synthetic Biology, which includes researchers from the faculties of Science, Humanities, Law and Health Sciences.

Synthetic Biology. Do you want to learn the basics of this novel and crossdisciplinary research field?

Then consider signing up for this course in block 3 (7.5 ECTS)
Crossdisciplinary course at Master level for students with background in e.g. biology, biochemistry, biotech, nanotech, chemistry, physics or medical science.
You will obtain knowledge on the basic concepts and perspectives of synthetic biology and the prospects of combining biology to engineering and/or technology. After the course you will be able to understand and apply the concepts and techniques of synthetic biology. Topics covered by this course: lipid membrane nanotechnology, light-driven biosynthesis of compounds, nanodisc assembly, single molecule fluorescence microscopy and spectroscopy, applications of silver nano-cluster technology, intact mammalian cell function on semiconductor, biophysical analyses using scattering and thermal methods and much more.
Find more info in the course catalogue (LBI-K10207U) or send an e-mail to Seong Wook Yang swyang@life.ku.dk and sign up before December 10th.

Social Media

Homepage: 2013.igem.org/Team:UNIK_Copenhagen

Tweets: twitter.com/iGEMCopenhagen

Facebook: facebook.com/pages/IGEM-Copenhagen-2013/1393917120824679

Bricks of Knowledge Youtube kanal: IGEM team Magneto

Build with Biology!

- Become a part of UCPH's crossdisciplinary team for iGEM 2014!

- Gather a team and create your idea
- Build a biological machine
- Reach out: Is the idea ready for society?
- Travel to the iGEM jamboree and meet teams from around the globe!

International Genetically Engineered Machine:

- The iGEM competition is about using synthetic biology approaches to build a biological device programmed by genetic parts from the open source BioBricks registry. Students from many disciplines compete and collaborate with teams from all over the world. A major part of the competition is about communicating science in an original way and engaging the public.
- Teams in the undergrad division can have no members over 23 years. Teams with older members compete in the overgrad division.

More info:

- stay tuned on synbio.ku.dk/igem
- Or sign up for info-mails: Send an e-mail Emil Polny: epolny@life.ku.dk
- Students from all faculties are welcome to apply!