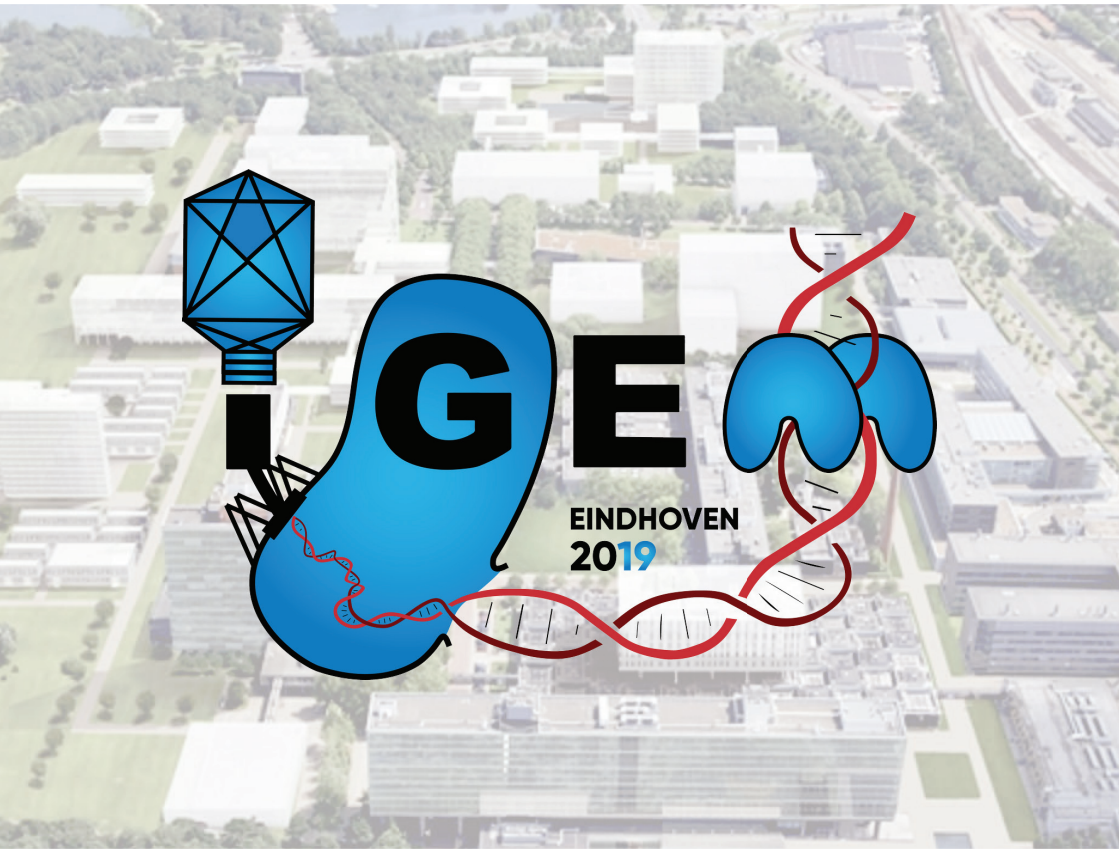
TU/e EINDHOVEN UNIVERSITY OF TECHNOLOGY

Health TECH YARD



iGEM Eindhoven presents:

BeNeLux Mini Jamboree

When: 25 October
Where: Den Dolech 2, Eindhoven

Welcome everyone

Soon to Boston

iGEM Eindhoven wants to welcome and thank everyone for being here at the BeNeLux Mini Jamboree. We hope all teams can use this event to prepare for the final presentations. From 31-10-2019 until 04-11-2019 all the BeNeLux teams will be present at the Giant Jamboree at the Hynes Convention Center in Boston.

On the right side you can find the program of today.

Program

Today in Eindhoven

9:00 – 9:30:	Walk-in (@Hubble community cafe)
9:30 – 9:45:	Introduction talk + Health tech yard
9:45 – 10:15:	Presentation MSP Maastricht
10:15 – 10:45:	Presentation Leiden
	Coffee break 
11:15 – 11:45:	Presentation Rotterdam HR
11:45 – 12:15:	Presentation TU Delft
12:15 – 13:30:	Lunch + poster session
13:30 – 14:15:	Guest speaker QAMH
14:15 – 14:45:	Presentation TU Eindhoven
	Coffee break 
15:15 – 15:45:	Presentation Wageningen
15:45 – 16:15:	Presentation KU Leuven
16:15 – 16:45:	Poster session + jury deliberation
16:45 – 17:00:	Closing ceremony
17:00 – END:	Dinner + Drinks + Discussion

Introduction

Jury members

We proudly introduce the 4 jury members that will score your poster and presentation. They will follow the official iGEM Judging Rubric, slightly adjusted by the TU Eindhoven team to match the BeNeLux Mini Jamboree format.

Niek Savelkoul

European Ambassador iGEM Foundation

Niek first participated in iGEM in the Wageningen 2017 year. This year, he is the iGEM Ambassador to Europe, where he works on the development of the iGEM Alumni network (After iGEM), as well as to widen the public knowledge on Biotech & Synbio, with a focus on safety and policy.

Pieter van Boheemen

Researcher at the Rathenau Institute

Pieter's specialization is the use of co-creation in the study of the social aspects of science and technology. He is also a member of the Human Practices Committee of the iGEM competition and has experience in judging at the Giant Jamboree.

Jury members

Lilian van Hove

Researcher at the Rathenau Institute

Lilian is investigating social issues in the field of 'smart society'. She is currently working on projects in the field of (bio)technology. Together with the RIVM, she organized the iGEM Meetup in The Hague this year. She thinks it is amazing to see so many enthusiastic students work together as a team and fully focus on their project.

Korienke Smit

Policy Advisor and Coordinator Safe-by-Design in Education for RIVM

Korienke has been a great help in the Save-by-Design assignment to all the Dutch iGEM teams. Because of her great knowledge about Safety and the iGEM competition she will be a great attribution to the Judges.

Introduction

Student teams

Team: **MSP Maastricht**
Project: **The RocKit**

The Receptor Open Community Kit, or RocKit, takes an innovative new approach to synthesize customised receptors. The RocKit provides researchers with a way of creating receptors for any target and access to a database containing information about all receptors made with the RocKit. Our kit is easy to use, containing all the cells, DNA and buffers to utilise this technology. The system is carried out in yeast which are transformed with the genes for all components in the genetic circuit. We use a system of directed random mutation to simulate accelerated evolution to the binding site of the receptor until it evolves an affinity for the specific target molecule of choice. Our base receptor is designed in such a way as to allow for easy extraction for use in experimentation. All receptor sequences can then be uploaded to the RocCloud to facilitate the creation of an open, information-sharing scientific community.

Starting 9:45

Student teams

Team: **Leiden**
Project: **S.P.L.A.S.H**

Suckerin Polymer Layer to Achieve Sustainable Health

Severe burn wounds constitute a major public health problem causing 300,000 casualties annually. Besides fatalities, 11 million victims are hospitalized, of which many are left with lifelong disfiguration and disabilities. Donor skin, used in current treatments, is scarce due to specific characteristics and many processing steps leading to high demand for alternative treatments. One interesting alternative is the use of a novel biomaterial recently found in the Humboldt squid suckerin protein. Suckerin assets unique features such as flexibility, strength and ability to self-assemble into β-sheets, making it ideal for hydrogel formation. Since molecular engineering enables cheap, fast and high-yield production within microorganisms, we thrive to produce a suckerin-based hydrogel as a donor skin substitute. Introducing a linker system enables the joining of antimicrobial peptides, numbing agents and wound healing stimulators. Therefore, our suckerin-based hydrogel can improve the prognosis for burn wound victims by both preventing infections and promoting skin healing.

Starting 10:15

Introduction

Student teams

Team: **Rotterdam HR**
Project: **Health Risk Detection Kit (HRDK)**

Imagine that you`re so sick that you can`t leave your bed. Or that you have anxiety for the doctor or even physical impairments are making it impossible to go to the doctor. You have to take a medical test in order to know what kind of disease you have. We got the solution! Our system works with aptamers that are specific to detect a certain target. The aptamers are bonded to zinc finger targets. The zinc fingers are attached to the split TEV enzyme. When the aptamers detect a target, the whole system starts to come together. The two TEV (N and C TEV) will form one TEV enzyme and B-lactamase will become active after TEV has cleaved of the fused inhibitor. If B-lactamase is active, a color change from yellow to red will occur due to activity on the Nitrocefin compound. This means a positive result.

Starting 11:15

Student teams

Team: **TU Delft**
Project: **Sci-Phi 29**

Enabling orthogonal replication and predictable expression to expand the repertoire of engineerable bacteria.

Engineering non-model bacteria is extremely laborious and expensive, which restricts the scope of synthetic biology to a small subset of the bacterial cosmos. In our project, we developed a tool that aims to expand the repertoire of bacterial species and broaden the range of substrates and environmental conditions which is currently used in synthetic biology. Sci-Phi 29 is a tool used to express genetic circuits independently of the bacterial host. Orthogonal replication of an exogenous DNA molecule is performed by the phi29 bacteriophage DNA replication system based on only four proteins. Furthermore, we developed a predictable and transferable expression system across multiple bacterial species. Our approach is based on an incoherent feed forward loop that ensures independence to DNA copy number and is robust to transcriptional and translational variations Sci-Phi 29 is a versatile platform to further explore the bacterial diversity providing new opportunities for the advancement of synthetic biology.

Starting 11:45

Introduction

Student teams

Team: **TU Eindhoven**
Project: **dCastect**

Fast detection of bacterial pathogens with the use of specific bacteriophages and dCas9-NanoLuc.

The discovery of new antibiotics lags behind the continuing increase in antimicrobial resistance (AMR), a process heavily accelerated by the misuse of antibiotics. Antibiotics are misused in a preventive manner (mainly cattle), misused to treat non-bacterial-related ailments and misused by unspecific treatment of bacterial infections. With our fast and specific diagnostic method for bacterial infections, this will become a problem of the past. Our modular method uses the specificity and amplification speed of bacteriophages in combination with the specificity and sensitivity of the dCas9-NanoLuc-complex to revolutionize the diagnosis of bacterial infections. Our method enables the diagnosis of infections within an hour, making fast and specific use of antibiotics possible. Moreover, the application of this method is broad; from fast specific diagnosis of infections, both in human as well as in veterinary medicine, to going beyond the diagnosis of infections by detecting bacteria in drinking water or in the food industry.

Starting 14:15

dCastect

Introduction

Student teams

Team: **Wageningen**
Project: **Xylencer - silencing Xylella fastidiosa**

A devastating plant-pathogen, Xylella fastidiosa, is spreading through the Mediterranean. This pathogen is wiping out economically important crops, including olives and grapevine, with no effective cure found yet. Currently, the containment methods for this disease are pre-emptively burning trees and using high doses of pesticides. Our team, Xylencer, develops an effective solution for this disease by using bacteriophage therapy for X. fastidiosa. To overcome current limitations, including UV degradation of bacteriophages, we design a protective carrier bacterium that produces bacteriophages upon sensing X. fastidiosa. Bacteriophages will lyse the bacteria, while simultaneously triggering a plant immune response with specific peptides, forming an alliance between plant and bacteriophage. In order to have the bacteriophage spread to all infected plants, we mimic X. fastidiosa`s spread by fusing chitin-binding proteins to the bacteriophage capsid, facilitating their spread by insects. Using our modular approach Xylencer, we believe we can eradicate X. fastidiosa.

Starting 15:15

XYLENCER

Student teams

Team: **KU Leuven**
Project: **OCYANO**

The development of two low-input photosynthetic systems for sustainable protein production.

Traditional biosynthesis platforms such as E. coli and yeast require external energy supplies, commonly in the form of sugars or starch. Besides the economic cost associated with these energy sources, such systems are often not considered durable. Indeed, the production processes of sugars and starch are energy inefficient and farmland intensive. To circumvent these issues, photosynthetic systems like cyanobacteria and algae have been gaining increasing interest for biosynthetic purposes as they require only light and CO_2. With our project, OCYANO, we present two new cyanobacterial technologies for protein production. The first design comprises the production and secretion of proteins in an ultra-fast growing cyanobacterium. The second system relies on a cyanophage for the conversion of its host`s biomass to the protein of interest. Along with wet-lab exploration of these platforms, the economic and ecological relevance of both systems were investigated and compared to state of the art biosynthesis platforms.

Starting 15:45

KU LEUVEN

Schedule Boston

Below you can find the presentation schedule for the Giant Jamboree in Boston. It gives an overview when and where all the student teams will present their poster.

Team	Day	Room	Time	Poster
Leiden	Friday	312	3:30 PM	Zone 2 - 216
TU Eindhoven	Saturday	311	10:00 AM	Zone 1 - 60
HR Rotterdam	Saturday	309	3:00 PM	Zone 1 - 89
Groningen	Saturday	310	5:00 PM	Zone 1 - 108
KU Leuven	Sunday	306	9:30 AM	Zone 2 - 117
MSP Maastricht	Sunday	311	2:30 PM	Zone 2 - 153
Wageningen	Sunday	210	5:00 PM	Zone 2 - 131
TU Delft	Sunday	311	5:30 PM	Zone 2 - 150

iGEM 2019

Guest speakers

Jean-Paul Pirnay

The Queen Astrid Military Hospital (QAMH) in Brussel is the hospital of the Belgium Military. It is a spacious hospital so it can be used for disasters and military emergencies. In June 2009 the new burns center opened which is one of the biggest burn center in Europe.

Jean-Paul Pirnay graduated as Industrial Engineer in Biochemistry and Biotechnology in 1993 and subsequently performed his mandatory military service, but he could not walk away and served since then as a researcher in the QAMH. He currently works as head of the Laboratory for Molecular and Cellular Technology where he does research in tissue engineering, cell therapy and microbiology. His current project is Phage Therapy. Phage therapy is the use of bacteriophages to treat bacterial infections.

In his guest lecture he will talk more about phage therapy and the use of this therapy in their burns center.

Health tech yard

The Health Tech Yard is a living lab in the Eindhoven region where high-tech, healthcare, academic knowledge and development come together with regional SMEs. The different parties are invited to device, test an develop a good idea in co-creation and turn it into a concrete innovation, with the help and facilities of the test platform.

A living lab with an extensive network, support and facilities.

The health Tech Yard is not just about new ideas. Because you may be looking for support for the further development of a prototype, for example, of in the search for a place to test your innovation. Here, too, the Health Tech Yard can help you.

Health
TECH
YARD

where **IDEAS GROW**
into innovations

Thank you all!

See you soon

We, the iGEM TU Eindhoven team, would like to thank our sponsors, because without them we could never win our fight against antimicrobial resistance.

TWIST BIOSCIENCE

Health TECH YARD

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