iGEM 2015

iGEM COMPETITION

The international Genetically Engineered Machine (iGEM) competition is the largest synthetic biology competition for collegiate students. It aims to combine and create novel biological (genetic) parts, which can be incorporated in an organism, thereby equipping it with new functions.

This year our work will be presented at the Giant Jamboree to the international scientific community in Boston in September 2015. An iGEM project consists of lab work, modeling, policy & practice and public outreach with results being documented on a wiki page.

AWARDS

2008 **Best wiki page**
Temperature sensing *E. Coli*

2009 **Best information project**
Cell-to-cell communication system

2010 **FINALIST | Best presentation**
Cleaning oil spills with bacteria

2012 **Best debate**
A modular system for detecting volatile compounds

2013 **Gold medal**
Antimicrobial peptides to kill antibiotic resistant MRSA

2014 **Best Microfluidics project**
Detection of landmines

THE PROJECT

Different species of bacteria, algae and fungi can produce biofilms. Biofilms are microorganisms living in cell clusters on surfaces, such as dental placque. Within a biofilm the microorganism benefits from increased protection from antibiotics and the immune system.

Antibiotic resistance and insufficient methods for removing biofilms are still an issue, for example in medical implantations. Hence, profound investigation of biofilm formation and its removal is essential in medical sciences and commercial products.

We will engineer bacteria that can be linked to each other through nanowires with the goal of generating a well-defined biofilm structure using a 3D printer. The fast and efficient formation of a biofilm using a 3D printer promises improved reproducibility and experiment consistency, which may lead to advances in anti-biofilm products.

3D MICRO(BE) PRINTING

Another novel application of this technique is the immobilization of enzymes on the nanowires using affinity binding, which overcomes substrate uptake limitations by cells and improves reusability of the enzymes.

The mechanical stability and adhesive properties can be improved by integrating this technique with specific mussel proteins, which are employed by nature to attach the mussel to surfaces as an underwater adhesive. We envision this to be used in medical applications and environmental biotechnology.

THE TEAM

Our team consists of nine ambitious students with interdisciplinary backgrounds from Delft University of Technology and Rotterdam University of Applied Sciences. The team is advised by experts in the fields of biotechnology, bionanoscience and applied physics.

Max van 't Hof | Stefan Marsden
Tudor Vlas | Samantha Basalo Vázquez
Héctor Sangüesa Ferrer | Michelle Post
Liana Uilecan | Marit van der Does
Anne Rodenburg

CONTACT

If you still have questions, do not hesitate to contact us!

iGEM office
F109, Faculty of Applied Sciences (building 22)
Lorentzweg 1
2628 CJ Delft
The Netherlands
+31 15 278 1862

Fundraising
Anne Rodenburg
A.Rodenburg@tudelft.nl
+316 269 87 807
Dutch and English

Team leader
Liana Uilecan
L.Uilecan@student.tudelft.nl
+316 879 81 824
English only

tudelft.igem@gmail.com

2015.iGEM.org/Team:TU_Delft

@TUDelft_iGEM

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