FONDATION INSA DE LYON

INSA LYON

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PROGRAM BOOK

EUROPEAN iGEM JAMBOREE 2013

11-13 OCTOBER 2013
LYON – FRANCE

bioMérieux 50

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BIOMÉRIEUX

ERASynBio aims at promoting the development of Synthetic Biology by structuring and coordinating national efforts and investment with the final goal of creating a sound European research community in the field of Synthetic Biology, avoiding national fragmentation from the very start. We do this by:

- Supporting the emergence of national synthetic biology programs based on a strategic research agenda
- Transnational funding activities via joint calls (1st joint call closed, 2nd call to be launched early 2014)
- Strengthening the scientific community by offering training and educational possibilities (1st summer school in June 2013, 2nd summers school in June 2014)
- Developing recommendations on governance concepts and regulatory models by integrating ethical, legal, societal and technical aspects of synthetic biology
- Promoting close cooperation between academia and industry
- Providing extensive dialogue options and exchange fora in which all stakeholders can participate

2 transnational calls for research projects

3 calls for twinning on project preparations

2 Strategic Conferences

Workshops on concomitant issues

Supporting the iGEM competition

Summer schools for young researchers

Public engagement activities

DEVELOPMENT AND COORDINATION OF SYNTHETIC BIOLOGY IN THE EUROPEAN RESEARCH AREA

ERASynBio is an ERA-NET in Synthetic Biology launched in 2012 under the 7th Framework Programme.

DURATION

36 months (1.1.2012 – 1.1.2015)

EC FUNDING

€ 1.997.022

Joint calls will be supported by additional funding from the partners

PARTNERS

16 governmental funding bodies from 12 European Member States and 2 associated countries

COORDINATOR

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Project Management Jülich (PtJ)
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NEWSLETTER

For a free subscription to the ERASynBio newsletter, please visit our website

www.erasynbio.eu

PROGRAM BOOK

EUROPEAN iGEM JAMBOREE 2013

11-13 OCTOBER 2013
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Schedule \

Friday, October 11th

Time	Event	Location
4:00 PM > 10:00 PM	Registration and Check-in	Double Mixte
5:00 PM > 8:00 PM	Practice sessions	Les Humanités
6:00 PM > 10:00 PM	Dinner	Le Galilée

Saturday, October 12th

Time	Event	Location
8:00 AM	Registration / Breakfast	Double Mixte
9:00 AM	Opening Ceremony	
9:30 AM	Travel to rooms	On Campus
9:45 AM > 11:15 AM	Presentations – Session 1	
11:15 AM	Break	Double Mixte
12:00 PM > 1:30 PM	Presentations – Session 2	On Campus
1:30 PM	Lunch	Double Mixte
3:00 PM > 4:30 PM	Presentations – Session 3	On Campus
4:30 PM	Break	Double Mixte
5:15 PM > 6:45 PM	Presentations – Session 4	On Campus
7:00 PM > 9:00 PM	Poster Reception	Double Mixte
8:00 PM > 9:00 PM	Dinner – Interpol Discussion	
9:30 PM > 2:00 AM	Social Event	La Plateforme

Sunday, October 13th

Start End	Event		Location
8:00 AM	Breakfast		Double Mixte
9:00 AM	Opening Remarks		
9:30 AM	Finalists presentations	Finalist 1	
10:00 AM		Finalist 2	
10:30 AM		Finalist 3	
11:00 AM	IGEM From Above + Flashmob / Judging		
11:45 AM > 12:15 PM	Break		
12:15 PM	Awards Ceremony		
1:00 PM	End		

Contents \

The iGEM 2013 Europe Regional Jamboree committee:

Corinne **Dorel** . . . . . INSA de LYON
Valérie **Desjardin** . . . . . INSA de LYON
Philippe **Lejeune** . . . . . INSA de LYON
Yoann **Louis** . . . . . INSA de LYON
Agnès **Rodrigue** . . . . . INSA de LYON
Laurent **Balvay** . . . . . ENS LYON
Philippe **Oger** . . . . . ENS LYON
Valérie **Bodemeyer** . . . . . INSA de LYON
Hélène **Bordelet** . . . . . INSA de LYON
Claire **Borel** . . . . . INSA de LYON
Viviane **Chansavang** . . . . . INSA de LYON
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Audrey **Masi** . . . . . INSA de LYON
Alex **Mizgier** . . . . . INSA de LYON
Laura **Pierson** . . . . . BioDocs-Lyon
Beryl **Royer** . . . . . INSA de LYON
Ioana **Sandu** . . . . . INSA de LYON
Philippe **Thomas** . . . . . INSA de LYON
Marion **Wolfovski** . . . . . INSA de LYON

Special Acknowledgment to Alain Cozzone (IBCP-Université Lyon 1) for his involvement in the organization of the Jamboree by having Geneviève Fioraso (Minister of Higher Education and Research), Jean-Jack Queyranne (Regional President of the Rhône-Alpes) and other political personalities to join us among other achievements.

Jamboree Handbook

BIENVENUE

Welcome to the iGEM 2013 Europe Regional Jamboree in Lyon!
The next few days will be full of exciting presentations, stimulating conversations, well-deserved awards, and most of all, a lot of fun.
This guide will explain the Jamboree event from what to expect at the Friday night practice sessions all the way up to the Awards ceremony on Sunday.
It contains useful instructions and information that will ensure your Jamboree experience will go as exciting and safe as possible.

LOCATION OF iGEM ACTIVITIES

The Jamboree will take place on 2 locations on the LyonTech-La Doua campus: INSA de Lyon Campus and Double Mixte Building, very close to each other.

QUESTIONS, INFORMATION, & EMERGENCY SITUATIONS

If you have any question or need help at any point during the Jamboree, you can contact the registration desk at the Double Mixte Building. You can also look for one of the volunteers or staff members on site, they will be wearing blue shirts. If you need to get in touch with someone at the organizing committee, you may contact the following people:

iGEM 2013 Europe Judging Committee :
Ariel **Lindner** • Chris **Workman** • Alistair **Elfick**

EMERGENCY SITUATIONS: MEDICAL, FIRE, POLICE...

In case of emergency and depending on your location, please contact:

- In the Double Mixte building: Laurence Demarle +33 (0)6 15 86 33 34
- On INSA de Lyon Campus:
  - From a campus phone: 55 55
  - From a cell phone: +33 (0)4 72 43 85 85
- Off-campus: 112

WIRELESS INTERNET DURING THE JAMBOREE

> Eduroam

Eduroam (**edu**cation **roam**ing) is the secure, world-wide roaming access service developed for the international research and education community.
Eduroam allows students, researchers and staff from participating institutions to obtain Internet connectivity when visiting other participating institutions by simply opening your laptop and using the account details that you usually use at your home institution. Check whether your institution participates in Eduroam on:

www.eduroam.org

Settings:

Wireless network . . . . . **802.11 g**
Network name (SSID) . . . . . **eduroam**
Network authentification/Encryption **WPA2/AES**
Security protocol . . . . . **PEAP**

> Wifi at the Double Mixte building

Network name (SSID): **iGEM-Lyon**
WEP/WPA password: **Jamboree2013**

> Wifi on the Campus

A personal guest account will be provided to each participant to be used on the "INSA- INVITE" network. Your account details should be available at the back of your badge. You are required to use your own guest account details, and you should not exchange account details with other participants.

REGISTRATION AND CHECK-IN

Europe Regional Teams can check-in on Friday afternoon (October 11th) for the Jamboree beginning at 4:00pm. Registration will be located at the Double Mixte Building. At Registration you will pick up your team box containing team member badges, registration packets, lunch tickets, and other important and useful information. Each team leader will be responsible for picking up the team box. This means that each member of the team DOES NOT have to stand in line at Registration.
Guests can also check-in on Friday (October 11th) starting at 4:00pm and Saturday (Octobre 12th) starting at 8:00am at the Double Mixte Building. Entrance to the ceremonies and social event is not guaranteed to guests, depending on capacity of the premises.

> iGEM 2013 Europe Regional Jamboree on Social Media

Follow us on our Facebook page at "Jamboree Lyon iGEM" and on Twitter @iGEM_Lyon throughout the Jamboree! We'll be posting and tweeting news, updates and further information. Do not hesitate to share thoughts, ideas or ask any question you may have.

> Team boxes \ Your team box will contain:

- Team name badges
- Team-specific information
- A bag for each team member containing
  - Jamboree handbook and program schedule
  - Internet connection information
  - Sponsor information
  - Campus map
  - Information about Lyon
  - A surprise...

> Wear your badge

You will receive your name badge as part of your team box. Please wear your badge at all times during the Jamboree and make sure it is clearly visible. Badges will be necessary for entrance into presentation rooms, for access to food, and for the iGEM social event. If you do not have a badge, you must register in order to obtain one.

> Release form

The iGEM 2013 Europe Regional Jamboree will be a multimedia event: in addition to the team presentation videos that will be uploaded online, we will also be uploading photos and videos from the entire event so others can get an idea of what iGEM and the Jamboree is like. In order to comply with the law, all participants attending the Europe Regional Jamboree must fill out a general release form. You should have done this along with the online registration.
If you have any questions or need further clarification, feel free to ask an iGEM staff member. You may review a copy of the form at:

http://2013.igem.org/Jamborees/Release_Form

> Team spirit

At the Europe Regional Jamboree you will be representing your team, university, and country, so why not show off! Designing team t-shirts is always a good idea, and we encourage you to wear them. They also make for a great iGEM from Above photograph! Wear your school colors, your team's name, or give a nod to your team's sponsors. We also encourage you to find new ways to showcase your team spirit.
New this year at the Europe Regional Jamboree: Informal Awards Ceremony
Get a yummy award during the Social Event for showing off. The following categories will be rewarded:

Best Goodies | **Best Logo** | **Best Team photo** | **Best T-Shirt** | **Best Video**

> Message board

Looking for someone or something at the Jamboree? Wanting to leave a note to your fellow iGEMers? A message board will be at your disposal at the Double Mixte Building next to the information desk. Feel free to leave a note and have a look at what the others might have written.

> Food

All meals will be provided throughout the Jamboree. For those of you who will practice on Friday evening, dinner tickets will be provided in your team box, to be used at Le Galilée restaurant on campus.
For those who have dietary restrictions, special meal tickets will be provided individually. You will have to retrieve your meals separately.

> Luggage

If you need to check out of your hotel on Sunday morning and need to stow your luggage somewhere, you can bring it to the Double Mixte Building. However, we cannot guarantee that it will be locked or supervised during the awards ceremony. Luggage can only remain at the Double Mixte Building until 2:00pm on Sunday afternoon, so it is absolutely critical that your luggage be picked up by that time.

> Check-out

After the Awards Ceremony, each team leader is required to pick up participation certificates and medals at the registration desk. Awards certificates and prizes will be directly sent to you by the iGEM Headquarters after the Jamboree.

PROGRAM

> Friday Night Practice

Teams will be allowed to practice on Friday night (October 11th) at Les Humanités Building on INSA de Lyon Campus, beginning at 5:00pm. Directions will be given by volunteers and staff members. You can practice your presentation, and get to know fellow iGEM members. Practice sessions will run from 5:00pm to 8:00pm. We cannot match the practice room with your actual presentation room. Remember, other teams will be practicing as well, so be sure to leave your practice room on time! Please leave all presentation rooms in the condition that you found them.

Note: there will not be technical staff to help with audio/visual equipment. Be sure to bring any equipment, such as laptops and adaptors, with you.

Friday night dinner will be hosted at Le Galilée restaurant on the campus starting at 6:00pm. Regular meals will be provided from 6:00pm to 8:00pm. After 8:00pm, packed lunch will be provided until 9:30pm. The restaurant will close at 10:00pm.
Soft drinks and beers will be sold separately throughout the dinner session.

> Saturday opening ceremony

The Saturday Opening Ceremony will officially kick off the 2013 Europe Regional Jamboree! The opening ceremony will be held at the Double Mixte Building at 9:00am on October 12th, with breakfast starting at 8:00am. Be sure to attend, as we will also announce any new changes to the Jamboree and the events planned for the next few days.

> Presentations

There is a total of five presentation rooms located across the campus. Your team's scheduled presentation time slot, session, and room have all been randomly assigned. Please see your team box for information on when and where your team will be presenting. The schedule for presentations is divided into 4 parallel sessions based on tracks. If you are attending a presentation, please be courteous, stay for the whole session, and only leave the room during the scheduled breaks.
Each team has 20 minutes of presentation time, 5 minutes for questions and answers, and 5 minutes to switch with the next presenters. Please be sure to bring the necessary equipment for your presentation, such as your laptop, cables/adaptors, and power supply, as iGEM will not provide these.

> Submit your posters and presentations

In an effort to capture all of the hard work that teams have put into their iGEM projects, we ask that each team give us a copy of your presentation and a copy of your poster. To submit your files follow the instructions below.

- Save your presentation and poster as a pdf file.
- 10 minutes before the start of each session, there will be an iGEM staff member at the front of each presentation room.
- Bring your laptop with the files on it to the front and the iGEM staff member will transfer your presentation and poster to a USB key that they will have with them.

Please make sure to do this in the 10 minutes prior to the start of the session! (NOT prior to your presentation time).

> Poster reception

General Information:

- Each Europe Regional team is required to present a poster at the Jamboree to judges and Jamboree attendees.
- The poster reception will be held at the Double Mixte Building on Saturday afternoon (October 12th) starting at 7:00pm.
- Poster locations have been randomly assigned.
- Teams can hang up their poster on Friday after registration or on Saturday morning before 9:00am. Please have your poster up as soon as possible, because Poster judges will be roaming throughout the Jamboree, not only during the Poster Reception.

Specifications:

- The poster must be no larger than **vertical A0 size**, i.e. 88cm by 119cm (width x height).
- Each team may only put up ONE poster. The poster should be hung up on one of the poster boards that will be set up at your assigned location.
- Posters will be held on grids using binding clips that we will provide.

All teams must remove their posters by 2:00pm on Sunday afternoon. Any remaining posters will not be saved.

> Saturday Dinner and Interpol Discussion

On Saturday night during poster reception, dinner will be hosted at the Double Mixte Building. At 8:00pm, a discussion will be held about “The INTERPOL CBRNE Terrorism Prevention Programme and Operation SOMMET” (by Guy Collyer, Coordinator, and Ali Rached, Assistant Criminal Intelligence Analyst – Bioterrorism Prevention Unit – CBRNE Terrorism Prevention Programme – INTERPOL)

> Social Event at La Plateforme

The iGEM 2013 Europe Regional Jamboree Party will be hosted at La Plateforme from 9:30pm to 2:00am. Shuttles will be leaving from the Double Mixte Building to the party location at 9:00pm, but you might as well take your time and hop on the T1 tramway to go there (direction “Hotel de Region – Montrochet” and get off at “Liberté”).
There will be music, dancing and lots of surprises. The informal awards ceremony will be held at 10:30pm. Each person will receive 2 drink tickets as part of the team box.
A shuttle service will be provided to drive you back to some hotels locations.
La Plateforme is a barge located on the Rhône River and you may want to wander around to visit Lyon. Have a look at the tourism information provided in you team box.
More information about the Social Event at :

http://2013.igem.org/Europe/SocialEvent

LYON /

Some handy facts

> ATM's

ATM's can be found throughout the campus and city. Additional charges may be debited from your account.

> Restaurants

Lyon is recognized as the gastronomic capital of France. It is the home of very typical and traditional restaurants as well as many renowned fine chefs. Traditional restaurants serving Lyonnaise cuisine are called bouchons. If you want to have a taste of French gastronomy, wander around Rue Mercière (downtown) or Rue Saint Jean (Vieux Lyon) where you will be able to pick one of the many restaurants in Lyon.
Most restaurant kitchens are open from 7:30pm to 10:00pm.

> Shops

Most shops in Lyon are open between 10:00am and 8:00pm from Monday to Saturday, and usually closed on Sunday.

> Tipping Services

All charges are included in the bill at restaurants and bars. Tips are not required, but you may leave a little something if you want to.

Transport

Lyon is a great city to get around either by public transport, bike or foot.

> TCL

The public transit system TCL comprises 4 metro lines, 5 tramway lines, 2 funicular lines and over 130 bus lines to help you visit the city.
Several types of tickets are available at TCL agencies or vending machines. You can either take a book of 10 tickets for 14.70 € (each ticket can be used during one hour on every modes of transport including transfer and return) or a day-pass for 5.00 € for unlimited travel.
TCL network is usually accessible from 5:00am to 00:00am, depending on the lines. There are also 4 night-buses leaving at every hour from downtown to various destinations in Lyon.
More information at : **http://www.tcl.fr/en**

> Vélo'V

Renting a bike in Lyon is another great way of visiting Lyon. You can easily get short-term ticket at a Vélo'V terminal for 1.50 € for a 1-day ticket or 5.00 € for a 7-day ticket. Journeys under 30 minutes are free of charges. You can easily rent a bike at a station and return it at another station.
A pre-authorization for direct debit of 150 € will be made when purchasing the short-term ticket as a deposit in case of late return (over 24h) or theft of bike. Please note that it is just a pre-authorization, it won't be actually debited from your account.

More information at : **http://www.velov.grandlyon.com/?L=1**

Getting to the LyonTech-La Doua Campus

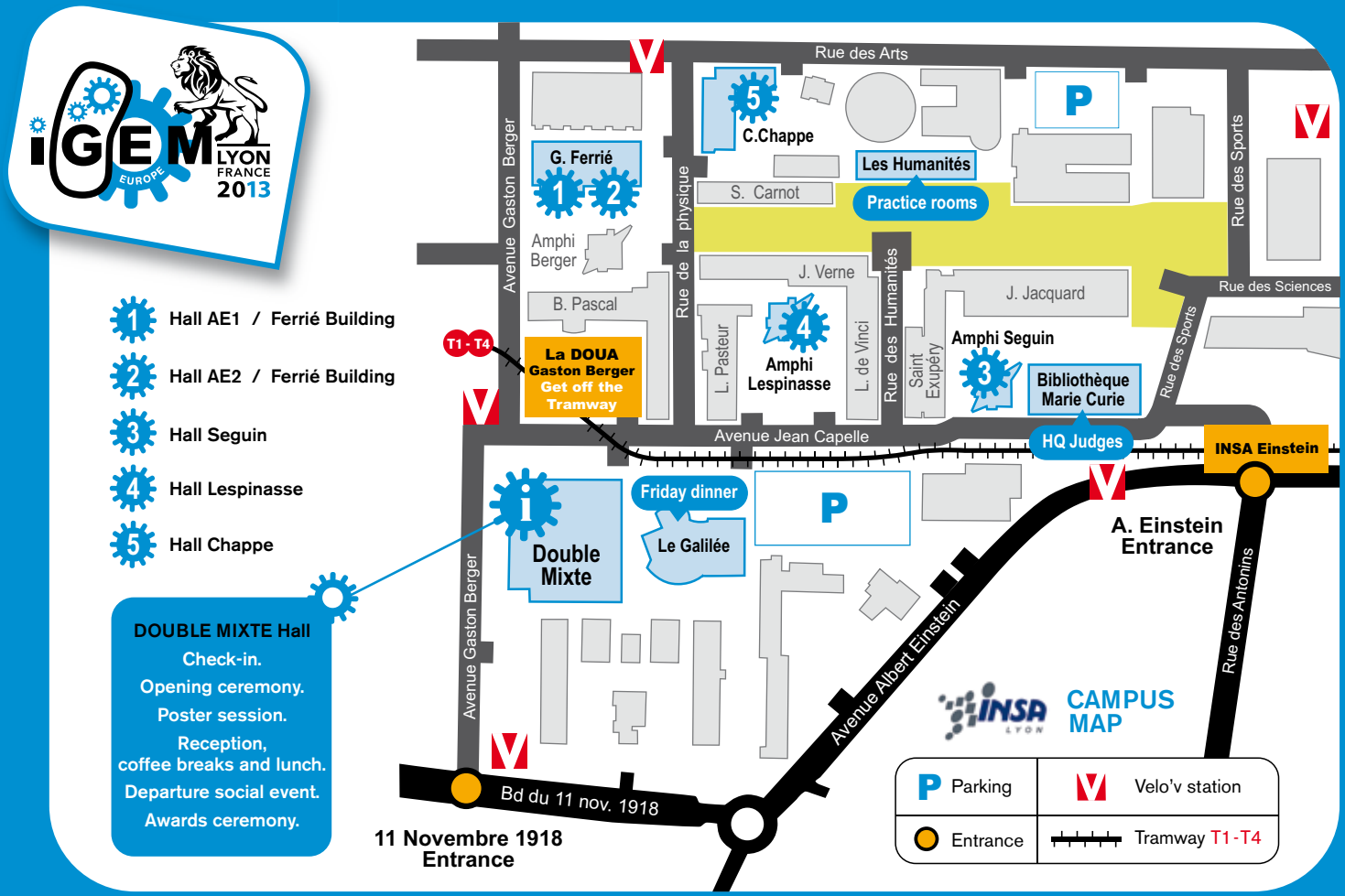
The campus is around 20 minutes away from the main train station Lyon Part-Dieu. To get to the airport, you will need to take into account an additional 30-minute ride from the train station.
The campus is accessible by different means of transport.

- **Tram T1** : direction "IUT Feyssine" – Get off at "La Doua – Gaston Berger"
- **Tram T4** : direction "La Doua – Gaston Berger" – Get off at the terminus

There are also several Vélo'V station around the campus.

> Access by car

Via "Rocade Est" ring road: exit 1B then "Croix Luizet", follow "la Doua", then "Domaine Scientifique de la Doua".
Via the Boulevard Laurent BONNEVAY: exit 6 "Porte de Croix Luizet", then follow direction "Campus de la Doua".
Several parking areas are available on campus and are indicated on the campus map. You can leave your car parked on campus for free throughout the Jamboree.


iGEM
EUROPE
LYON
FRANCE
2013
1 Hall AE1 / Ferrié Building
2 Hall AE2 / Ferrié Building
3 Hall Seguin
4 Hall Lespinasse
5 Hall Chappe
DOUBLE MIXTE Hall
Check-in.
Opening ceremony.
Poster session.
Reception,
coffee breaks and lunch.
Departure social event.
Awards ceremony.
Rue des Arts
Avenue Gaston Berger
G. Ferrié
1
2
Amphi Berger
B. Pascal
5
C.Chappe
Les Humanités
Practice rooms
S. Carnot
Rue de la physique
J. Verne
L. Pasteur
4
Amphi Lespinasse
L. de Vinci
Rue des Humanités
Saint Exupéry
J. Jacquard
Amphi Seguin
3
Bibliothèque Marie Curie
Rue des Sports
Rue des Sciences
T1 - T4
La DOUA
Gaston Berger
Get off the Tramway
Avenue Jean Capelle
HQ Judges
INSA Einstein
A. Einstein Entrance
Friday dinner
Le Galilée
Double Mixte
Avenue Albert Einstein
Rue des Antonins
INSA LYON
CAMPUS MAP
Bd du 11 nov. 1918
11 Novembre 1918 Entrance
Parking
Velo'v station
Entrance
Tramway T1 - T4

SCHEDULE – Saturday, October 12th | EUROPEAN iGEM JAMBOREE LYON 2013

TIME							LOCATION
8:00 AM		Registration / Breakfast					Double Mixte
9:00 AM		Opening Ceremony					
9:30 AM		Travel to Rooms					On Campus
HALLS ▶		Hall 1 (AE1- G. Ferrié)	Hall 2 (AE2 - G. Ferrié)	Hall 3 (Seguin)	Hall 4 (Lespinasse)	Hall 5 (C. Chappe)	
9:45 AM	Session 1	Kent (40)	Warsaw (39)	Paris Bettencourt (30)	EPF Lausanne (12)	Bonn (7)	
10:15 AM		DTU-Denmark (53)	Frankfurt (5)	Goettingen (24)	Valencia Biocampus (58)	UCL PG (6)	
10:45 AM		BGU Israel (13)	Bordeaux (55)	TU-Delft (25)	Grenoble-EMSE-LSU (18)	Newcastle (31)	
11:15 AM		Break					Double Mixte
12:00 PM	Session 2	Uppsala (47)	Heidelberg (36)	TU-Eindhoven (16)	Baskent Meds (15)	KU Leuven (11)	On Campus
12:30 PM		Gdansk-UG (34)	Freiburg (21)	UNIK Copenhagen (57)	Groningen (17)	TU-Munich (14)	
1:00 PM		Manchester (45)	Exeter (1)	Braunschweig (43)	NTNU-Trondheim (37)	Paris Saclay (56)	
1:30 PM		Lunch					Double Mixte
3:00 PM	Session 3	SDU-Denmark (48)	Tuebingen (28)	UGent (32)	UNITN-Trento (10)	ATOMS-Turkiye (50)	On Campus
3:30 PM		Imperial College (19)	Valencia-CIPF (49)	INSA Toulouse (23)	York UK (59)	NRP-UEA-Norwich (42)	
4:00 PM		Wageningen UR (38)	UniSalento Lecce (8)	AMU-Poznan (20)	Bielefeld-Germany (41)	Evry (27)	
4:30 PM		Break					Double Mixte
5:15 PM	Session 4	Linkoping Sweden (26)	UCL (51)	TU Darmstadt (3)	Edinburgh (54)	ETH Zurich (2)	On Campus
5:45 PM		Leeds (44)	ITU MOBGAM Turkey (22)	Dundee (52)	Westminster (33)	Poznan-BioInf (46)	
6:15 PM		–	Marburg (35)	METU Turkey (9)	Leicester (29)	–	
7:00 PM - 9:00 PM		Poster Reception Dinner					Double Mixte
8:00 PM - 9:00 PM			Interpol Discussion "The INTERPOL CBRNE Terrorism Prevention Programme and Operation SOMMET"				
9:00 PM - 2:00 AM		Social Event					La Plateforme

KEY

Environment	Foundational Advance	Information Processing	New Application	
Food & Energy	Health & Medicine	Manufacturing	Software	Team (Poster)

Team tracks, presentations, posters and abstracts \

Overview \

Team	Track	Poster #	Page	Start	Room
AMU-Poznan	Software Tools	20	75	4:00 PM	3
ATOMS-Turkiye	Health & Medicine	50	50	3:00 PM	5
Baskent Meds	Health & Medicine	15	51	12:00 PM	4
BGU Israel	Environment	13	18	10:45 AM	1
Bielefeld-Germany	Food & Energy	41	32	4:00 PM	4
Bonn	Foundational Advance	7	42	9:45 AM	5
Bordeaux	Food & Energy	55	33	10:45 PM	2
Braunschweig	New Application	43	69	1:00 PM	3
DTU-Denmark	Environment	53	19	10:15 AM	1
Dundee	Environment	52	20	5:45 PM	3
Edinburgh	Environment	54	21	5:15 PM	4
EPF Lausanne	New Application	12	70	9:45 AM	4
ETH Zurich	Information Processing	2	64	5:15 PM	5
Evry	Health & Medicine	27	52	4:00 PM	5
Exeter	Foundational Advance	1	43	1:00 PM	2
Frankfurt	Food & Energy	5	34	10:15 AM	2
Freiburg	Foundational Advance	21	44	12:30 PM	2
Gdansk-UG	Food & Energy	34	35	12:30 PM	1
Goettingen	Health & Medicine	24	53	10:15 AM	3
Grenoble-EMSE-LSU	New Application	18	71	10:45 AM	4
Groningen	Health & Medicine	17	54	12:30 PM	4
Heidelberg	Foundational Advance	36	45	12:00 PM	2
Imperial College	Manufacturing	19	66	3:30 PM	1
INSA Toulouse	Foundational Advance	23	46	3:30 PM	3
ITU MOBGAM Turkey	Health & Medicine	22	55	5:45 PM	2
Kent	Environment	40	22	9:45 AM	1
KU Leuven	Environment	11	23	12:00 PM	5

Team	Track	Poster #	Page	Start	Room
Leeds	Health & Medicine	44	56	5:45 PM	1
Leicester	Environment	29	24	6:15 PM	4
Linkoping Sweden	Health & Medicine	26	57	5:15 PM	1
Manchester	Food & Energy	45	36	1:00 PM	1
Marburg	Health & Medicine	35	58	6:15 PM	2
METU Turkey	Environment	9	25	6:15 PM	3
Newcastle	Foundational Advance	31	47	10:45 AM	5
NRP-UEA-Norwich	Health & Medicine	42	59	3:30 PM	5
NTNU-Trondheim	Health & Medicine	37	60	1:00 PM	4
Paris Bettencourt	Health & Medicine	30	61	9:45 AM	3
Paris Saclay	Environment	56	26	1:00 PM	5
Poznan-BioInf	Information Processing	46	65	5:45 PM	5
SDU-Denmark	Manufacturing	48	67	3:00 PM	1
TU-Delft	Health & Medicine	25	62	10:45 AM	3
TU-Eindhoven	New Application	16	72	12:00 PM	3
TU-Munich	Environment	14	27	12:30 PM	5
Tuebingen	Environment	28	28	3:00 PM	2
TU Darmstadt	Food & Energy	3	37	5:15 PM	3
UCL	Health & Medicine	51	63	5:15 PM	2
UCL PG	Foundational Advance	6	48	10:15 AM	5
UGent	Foundational Advance	32	49	3:00 PM	3
UNIK Copenhagen	New Application	57	73	12:20 PM	3
UniSalento Lecce	Environment	8	29	4:00 PM	2
UNITN-Trento	Food & Energy	10	38	3:00 PM	4
Uppsala	Food & Energy	47	39	12:00 PM	1
Valencia-CIPF	Environment	49	30	3:30 PM	2
Valencia Biocampus	New Application	58	74	10:15 AM	4
Wageningen UR	Manufacturing	38	68	4:00 PM	1
Warsaw	Food & Energy	39	40	9:45 AM	2
Westminster	Environment	33	31	5:45 PM	4
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Abstracts \ **Environnement**

BGU Israel

P.A.S.E. - Programmable Autonomous Self Elimination

Presentation room: Hall 1 (AE1 - Gustave Ferrié Building)
Presentation time: 10:45 AM
Poster: 13

Bioremediation and biosensors often require the release of genetically modified organisms (GMOs) to the environment. After being released, these GMOs are no longer under direct control. As their effect on the environment is unknown, they pose a potential threat. In order to eliminate this threat, we are developing a genetic circuit, using *E. coli* as a model GMO that limits the lifetime of a bacterial population after it is released to the environment. Our goal is to allow the end user to program a GMO population to survive in the environment until it has completed its task, after which the entire population will disappear without any further external intervention. We employ two approaches to achieve this goal: One relies on the dilution of a synthetic control element through cell division, and the second is based on the lifetime of an essential protein containing an unnatural amino acid.

DTU-Denmark

Requiem for a Stream: From Ammonia Pollution to Energy Production via Denitrification

Presentation room: Hall 1 (AE1 - Gustave Ferrié Building)
Presentation time: 10:15 AM
Poster: 53

Global demand for fixed nitrogen has increased to the point that half the human population now relies on chemical fertilizer to grow their food. While fertilizer is a requirement for modern life, runoff from over-fertilized farmland can cause eutrophication. In the presence of abundant ammonia, algae overgrow and consume much of the available oxygen in the water. This results in decreased biodiversity throughout the watershed. Within Europe, 53% of lakes are eutrophic. Using two *E. coli* mutants built with genes from *Nitrosomonas europaea* and *Pseudomonas aeruginosa*, we provide a system to reverse nitrogen fixation. Our mutants consume ammonia and produce nitrous oxide, and release a sustainable source of energy when decomposed into nitrogen and oxygen. We also provide a prototype of a bioreactor that could be scaled up and deployed in the field to simultaneously clean the water and produce energy.

Abstracts \ **Environnement**

Dundee
ToxiMop

Presentation room: Hall 3 (Seguin Building)
Presentation time: 5:45 PM
Poster: 52

The ToxiMop project attempts to tackle the problem of freshwater algal blooms by detecting, reducing, and reporting the levels of the algal toxin microcystin. This toxin causes liver damage and is also speculated to be a carcinogen. Microcystin's toxic action lies in its ability to bind to the human Protein Phosphatase 1 (PP1), which is a major regulator of cell division, protein synthesis and other essential processes. Using synthetic biology techniques, we engineered bacterial chassis (*E. coli* and *B. subtilis*) to express PP1, which covalently binds to microcystin. The engineered bacteria can then be used as a molecular mop, the ToxiMop, to remove microcystin from contaminated water. Applying mathematical modelling to our experiments, we optimised our prototype ToxiMop. Additionally, we attempted to develop a biological detector for microcystin, which was combined with our electronic device, the Moptopus. This device has the potential for real-time monitoring and analysis of water bodies.

Edinburgh
WastED

Presentation room: Hall 4 (Lespinasse Buiding)
Presentation time: 5:15 PM
Poster: 54

The Edinburgh iGEM 2013 team, WastED, is focusing on remediation and valorization of industrial waste streams, with a particular focus on Scottish leather and whisky industry waste waters, containing toxic heavy metal ions as well as fermentable organic components. Using *Bacillus subtilis* as chassis, we are engineering organisms to capture ions using chelators and metal binding proteins, and to ferment organic components to produce biofuels. We are also testing a new assembly procedure, GenBrick, based on the Genabler assembly system. GenBrick allows assembly of multiple RFC10-compatible BioBricks in a single reaction, and is also well suited to the preparation of fusion proteins and addition of terminal tags. Enzyme fusions may enhance metabolic pathways through substrate channeling. We are testing the effect of protein fusions on fermentation efficiency for biofuel production. In addition, we are examining the implications of possible Scottish independence, following the 2014 referendum, for synthetic biology in Scotland.

Kent

No to NO: A novel approach to reduce greenhouse gas

Presentation room: Hall 1 (AE1 - Gustave Ferrié Building)
Presentation time: 9:45 AM
Poster: 40

In today's rapidly changing environment greenhouse gases such as NO are an issue that need to be addressed. NO has been proven to have a detrimental impact on the environment and iGEM Team Kent 2013 will provide a solution that focuses on reducing the amount of NO formed in waste water. Our system will utilize an engineered strain of *E. coli*, which will be capable of converting this excess NO into ammonia. Our Biobricks have been designed to enable the detection of NO using the *norV* promoter. The NO can then be converted into ammonia via the nitrite reductase enzyme encoded by the *E. coli* gene *nrfA*. Our solution will have many advantages over the current approaches to waste water treatment such as reduced cost and risk of contamination. Our system will provide a source of recycled ammonia and could be a greener alternative to the Haber Bosch process.

KU Leuven

E. coligy: Plants with BanAphids

Presentation room: Hall 5 (Claude Chappe Building)
Presentation time: 12:00 PM
Poster: 11

Aphids, the little green plant-sucking bugs, can pose serious threats to a farmer's proceeds. Not only physical damage to the crops caused by the sucking is a problem, but aphids also transmit harmful viruses to the plants. The magnitude of loss is difficult to quantify as it changes with aphid species, crop species, location, year and other factors. The use of insecticides to control aphid population is contested, as it has a negative effect on the natural predators and aphids grow resistant. That's why we, the KU Leuven iGEM 2013 team, decided to do something about it in a sustainable way, using an insecticide-free controlling mechanism. With E. coligy: Plants with BanAphids we will teach *E. coli* cells to hack into insects signaling systems to drive off the aphids and attract the natural predators, such as the ladybug.

Abstracts \ **Environnement**

Leicester
Biological routes to recycling, re-using and re-purposing polystyrene

Presentation room: Hall 4 (Lespinasse Buiding)
Presentation time: 6:15 PM
Poster: 29

Polystyrene is a useful material, but also a visible pollutant that locks up oil-derived hydrocarbons. For 2013 we are diversifying, to reduce polystyrene's various environmental impacts: Recycling - Building on 2012's project, we are adapting the toluene degradation pathway from *Pseudomonas* species to work on polystyrene, in *E. coli.* Re-using - Consumer 3D printers use a variety of thermoplastics but virgin plastic is usually required. Recycled polystyrene can be a support for making complex 3D shapes, and removed later. Polystyrene is soluble in limonene (an environmentally friendly solvent) so we are adapting limonene biosynthesis biobricks, to enable biological 'finishing' of 3D printed objects. Re-purposing - Polystyrene is a great building insulator, but needs to be flame retardant. Currently this involves adding halogenated hydrocarbons, proven environmental pollutants. Recently DNA was shown to be an effective flame retardant, so we are using synthetic biology to generate cheap DNA, for flame retardant polystyrene.

METU Turkey
Bee subtilis

Presentation room: Hall 3 (Seguin Building)
Presentation time: 6:15 PM
Poster: 9

Taking a major role in pollination, bees are one of the most important organisms within an ecosystem. However their populations are in serious decline. Colony Collapse Disorder has been found as the most common cause of the disappearance of bees in large numbers. In this study, we aimed decrease the number of hives affected by chemical compounds such as imidacloprid. Our plan is to turn the mutualistic bacteria living in bees' guts into a shield mechanism to protect the bees against these factors. A protein CYP6G1 found in *Drosophilia melanogaster* has the ability to degrade imidacloprid into harmless substances. Moreover, coumaric acid increases the general immunity of bees against harmful components and we aim to increase the level of coumaric acid in bees' guts. The main objective of this study is the transformation of the genes coding for these two proteins to *Bacillus subtilis*, which mutualistically live in bees' guts.

Abstracts \ **Environnement**

Paris Saclay
PCBbusters

Presentation room: Hall 5 (Claude Chappe Building)
Presentation time: 1:00 PM
Poster: 56

PCBs (Polychlorobiphenyls) are synthetic chemicals widely used during the late 20th century. These compounds are extraordinarily stable, not readily biodegradable and have accumulated in the environment. PCBs also accumulate in animal fatty tissues including human tissues. As PCBs are probably carcinogenic and some are endocrine disruptors, they constitute an important health issue. Although PCBs have no natural equivalents, some bacterial communities have developed the capacity to degrade PCBs. Highly chlorinated PCBs undergo anaerobic reductive dechlorination, lowering the chlorine atom number. Lightly chlorinated PCBs are then degraded via the aerobic biphenyl degradation pathway. Our project is to construct an *Escherichia coli* strain capable of degrading PCBs by introducing in the strain genes involved in PCB degradation in various bacteria. Because some steps are anaerobic and others aerobic, we want to use an oxygen-based regulation of gene expression. We also want to develop a sensor system to detect PCBs in the environment.

TU-Munich

PhyscoFilter – Clean different

Presentation room: Hall 5 (Claude Chappe Building)
Presentation time: 12:30 PM
Poster: 14

The contamination of aquatic ecosystems with multiple anthropogenic pollutants has become a problem since the industrial revolution. Antibiotics, hormones and various noxious substances threaten environmental health and are not effectively removed by conventional wastewater treatment. We propose to employ transgenic plants, which produce effectors for enzymatic degradation (BioDegradation) or specific binding (BioAccumulation) of pollutants. The autotrophic, sedentary, aquatic nature of the moss *Physcomitrella patens* makes it an ideal chassis for a self-renewing, low-maintenance and cheap water filter. A light-triggered kill switch prevents unintended environmental spreading by limiting viability to places where the spectrum of sunlight is appropriately filtered. Furthermore, we have developed a device to implement this biological filter in an aquatic environment, investigated the application of this new technology and examined its economic feasibility. Based on our results, PhyscoFilter may become a game-changing approach to improve global water quality in an affordable and sustainable fashion.

Abstracts \ **Environnement**

Tuebingen

Tuebingen Yeast Based Progestin Measurement System

Presentation room: Hall 2 (AE2 - Gustave Ferrié Building)
Presentation time: 3:00 PM
Poster: 28

Detrimental alterations caused to water bodies by endocrine disruptive chemicals are an increasing problem in our environment. Especially steroid hormones influence the development and generative behavior of fish. The binding of those hormones to progestogen receptors can mistime the reproductive behavior of aquatic organisms and thereby endanger population balance. Our aim is to construct a yeast-based measurement system for progestin concentration in water samples. Many currently used methods are either very expensive or significantly slower than our method will be. We take advantage of membrane bound receptors in order to achieve high specificity and to speed up measurement. The binding of the ligand to the receptor stops inhibition of the reporter and thereby initiates its expression through a sensitive signaling-chain. This transcriptional switch allows measurement of very small amounts of substrate. To improve our system we use different interchangeable parts for assembly to get a high variety of possible applications.

UniSalento Lecce

NICKBUSTERS: developing a nickel detection and remediation platform

Presentation room: Hall 2 (AE2 - Gustave Ferrié Building)
Presentation time: 4:00 PM
Poster: 8

Nickel is one of the most widespread heavy metals in the ecosystem and, though essential, its excess could be toxic, leading to various noxious effects; nowadays bacteria-mediated bioremediation from inorganic substances seems to be a considerably relevant frontier in microbic biotechnologies. Our project aims to develop a living system in two easy monitorable bacterial platforms that would work as a Nickel detector and a Nickel remediation system. The devices are based on genetic parts from *Helicobacter pylori*: from the nickel sensing device, *H.pylori* NikR protein, to the Nickel storage system, Hpn protein, whose role is to store the Nickel ions inside the cell. The two devices are split in two separate populations, which intercommunicate through Quorum Sensing. The system allows to remove the Nickel ions from polluted environmental substrates through bioaccumulation and could be easily implemented in purification plants.

Abstracts \ **Environnement**

Valencia-CIPF
Project - Freshellent Yeast

Presentation room: Hall 2 (AE2 - Gustave Ferrié Building)
Presentation time: 3:30 PM
Poster: 49

Our team will try to develop a project based on the production of aromas and repellents. The aim is to create a biological platform within a model organism, such as common yeast, to develop an alternative method for production of several aromatic monoterpenoids. The advantage of this organism as producer lies in its capabilities of genetic modification, robustness and culture simplicity. We can also control the production of these compounds using different promoters, so we can choose our favourite aroma while there is repellent activity. The microorganism is completely harmless as it is responsible for fermenting bread and beer. The project aims to establish the basis for future production of repellents in a sustainable and organical manner in developing homes that are under the risk of pandemics caused by mosquitoes and other insects.

Westminster
Hungry for chitin

Presentation room: Hall 4 (Lespinasse Buiding)
Presentation time: 5:45 PM
Poster: 33

This year the Westminster iGEM team is tackling the growing bed bug problem. *Serratia marcescens* has been identified as an efficient chitin degrader, however as it is a pathogenic organism it cannot be used as a biocontrol agent. Our idea is to use the chitin genes from this bacterium and create a chitin degrading *E. coli.* We will test the efficiency of the activity of chitinase, which is expressed by our engineered *E. coli* compared to that of *S. marcescens* by using a chitin azure assay.

Bielefeld-Germany

Ecolectricity – currently available

Presentation room: Hall 4 (Lespinasse Buiding)
Presentation time: 4:00 PM
Poster: 41

There is a growing interest in the use of ecologically friendly alternative energy sources because of the depletion of fossil fuels and an increasing environmental pollution. Therefore, we are developing a Microbial Fuel Cell (MFC). The goal of this project is to generate electricity with a modified *Escherichia coli* in a self-constructed fuel cell. Besides the technical optimization of the fuel cell, we investigate different genetic approaches like integrating porines and cytochromes as well as endogenous mediators. Using heterologous expression of pore-forming transmembrane proteins, we are able to enhance the extracellular electron transfer, leading to higher membrane permeability. Direct electron transfer can be achieved by integrating cytochromes into the cellular membrane, whereas a production of endogenous mediators enhances the electron transport to the electrode. With different aspects for technical and genetic optimization we enable Ecolectricity, the use of *E. coli* for direct energy production.

Bordeaux
The Dairy Planet

Presentation room: Hall 2 (AE2 - Gustave Ferrié Building)
Presentation time: 10:45 AM
Poster: 55

The economical stakes of food-processing industry have always been a concern in society. Technological innovations have improved the yield and production costs of daily use products. Advances in health sector and biotechnology made it possible to offer food products rich in substances that are nutritious and possess medicinal properties. Our project aims at producing a new range of lactic cultures able to produce natural flavours and colouring substances in a yogurt; including ones producing resveratrol, a molecule responsible for the red wine beneficial effects, implicated in the 'French paradox". Necessary routes of biosynthesis will be introduced in *Lactobacillus bulgaricus* and *Streptococcus thermophilus,* agents of lactic fermentation. Thus, a work of optimization on the genetical modifications of lactic bacteria has been done. This project will allow an easier production of custom yogurts with beneficial and healing properties, avoiding the use of substances derived from expensive chemical synthesis harmful to the environment.

Frankfurt

Steviomyces - sweeter than sugar

Presentation room: Hall 2 (AE2 - Gustave Ferrié Building)
Presentation time: 10:15 AM
Poster: 5

The Stevia plant produces several sweeteners known as Steviolglycosides, which have only recently been admitted as a food additive in the European Union. The iGEM-Team Frankfurt 2013 searches for ways to transfer the pathway of the plant into *Saccharomyces cerevisiae* in order to make stevia production possible with both lower effort and lower costs. Several of known problems with carbohydrate sweeteners like diabetes or caries could be overcome by the Steviolglycosides, which are produced by *Stevia rebaudiana*. We're building upon results gained from last year's competition, which gave us the possibility to transfer a mevalonat plasmid into yeast to increase the production of a steviol-precursor Geranylgeranyl-diphosphate. This year we're searching for a further reconstruction of the pathway and transfering the 2nd plasmid for synthesis of Steviol from Geranylgeranyl-diphosphate into yeast. Thus the whole pathway can take place in a microbial organism and easify the production by lowering the costs.

Bordeaux
MetOli

Presentation room: Hall 1 (AE1 - Gustave Ferrié Building)
Presentation time: 12:30 PM
Poster: 34

The aim of our project was to construct a biological system that would be able to detect methanol in ethanol solutions. Our idea was to create a test that could be performed not only in the laboratory, but also at home. We believe that such test would reduce the rate of intoxications by methanol during ethanol consumption. To achieve it, we used a methanol-dependent promoter from *Methylobacterium organophilum*, which would control the production of a dye, for instance GFP, or an enzyme that would produce visible product, such as catechol oxidase. Our eventual goal is to find a bacterium that would not only react to methanol, but also survive in high concentrations of ethanol.

Manchester

E. c(oil)i; The Lean, Green, Fat-Producing SynBio Machine

Presentation room: Hall 1 (AE1 - Gustave Ferrié Building)
Presentation time: 1:00 PM
Poster: 45

From food products, to cosmetics and biodiesel, palm oil is the world's most widely used vegetable oil. Its demand is ever increasing; however the current method of extracting palm oil is severely unsustainable. Massive deforestation is required to build oil palm plantations, ruining the land of locals in Malaysia and Indonesia. Manchester iGEM aims to combat this by providing a more eco-friendly source of the four main components of palm oil. We reengineered the fatty acid biosynthesis pathway of *E. coli* to overproduce palmitic and stearic acid and introduced two new genes Δ9 desaturase and Δ12 desaturase, to yield oleic and linoleic acid. To explore the scale-up potential of synthetic palm oil production in *E. coli*, we developed a fully parameterised kinetic model of the engineered fatty acid biosynthesis pathway.

TU Darmstadt
Hunting Fungi

Presentation room: Hall 3 (Seguin Building)
Presentation time: 5:15 PM
Poster: 3

The danger of fungal contamination of grains and cereals but also other food sources has severe consequences. Undetected contaminations can render large quantities of food stocks useless – with detrimental effects on the economy and the food supply. We want to develop a handy device, which allows an easy, fast and reliable detection of mycotoxins. For that our team uses various methods from the fields of synthetic biology, electrical engineering and information processing. Our system relies on *E. coli* with modified TAR receptor interacting with specific mycotoxins. If these are present in the sample they induce a conformational change of TAR and thereby generates a measurable FRET-beacon by bringing two fluorophores in close distance to each other. The modified *E. coli* will be embedded in exchangeable capsules. Together with a handheld-device and a controlling Smartphone App they will guarantee that measurements can be done quickly, easy to operate and secure.

UNITN-Trento

B. fruity

Presentation room: Hall 4 (Lespinasse Buiding)
Presentation time: 3:00 PM
Poster: 10

B. fruity envisions an environmentally friendly way to control fruit ripening by exploiting an engineered, light regulated strain of *B. subtilis.* The system works by synthesizing ethylene or methyl salicylate (MeSA) upon photoinduction. Everything is housed in a vending machine-like enclosure that regulates fruit ripening in response to consumer demand. Ethylene is a natural plant hormone that is widely used to ripen fruit, such as bananas and kiwi. However, the synthesis, handling, and storage of ethylene is expensive and dangerous. In contrast, B. fruity produces ethylene from inexpensive material by exploiting a TCA cycle intermediate, 2-oxoglutarate, and the activity of *P. syringae* 2-oxoglutarate decarboxylase. The inhibition of fruit ripening results from the synthesis of MeSA via a pathway built with wintergreen parts. As a proof of concept, we engineered *E. coli* with the above systems plus the YF1/FixJ blue light receptor device.

Uppsala
LactoNutritious

Presentation room: Hall 1 (AE1 - Gustave Ferrié Building)
Presentation time: 12:00 PM
Poster: 47

Malnutrition is today a major global problem that affects people both in affluent and developing countries. Even if you get the right amount of calories, if these do not contain sufficient amounts of micronutrients, like vitamins and minerals, serious illness and even death can be the result. The goal of our project is to alleviate this problem by applying synthetic biology to probiotic bacteria. With our project, we will make the *Lactobacillus* genus the new probiotic platform for metabolic engineering of nutritional compounds. We will engineer probiotics to produce for example beta-carotene, resveratrol, p-coumaric acid, miraculin and saffron. To exemplify what this combination of probiotics and metabolic engineering can accomplish we used our modified bacteria to create nutritionally enriched yoghurt. We have also put great effort into addressing the ethical and safety issues that naturally follow when creating GM food.

Warsaw
FluoSafe

Presentation room: Hall 2 (AE2 - Gustave Ferrié Building)
Presentation time: 9:45 AM
Poster: 39

We are presenting to you FluoSafe- a biosensor for acrylamide, known for its carcinogenic and neurotoxic effect! This compound is present not only in biological laboratories but also in starch-based food products (fries, chips etc.). We aim to construct a bacterial strain that would serve as a detector of acrylic amide. This will be attempted in two ways: through the use of roGFP (redox sensitive GFP) fused with glutaredoxin 1 (the presence of acrylamide is known to affect the cellular gluthatione pool) and by expressing hemoglobin α and β subunits fused with split fluorophore (adducts formed by acrylamide on the N-terminal valine are known to affect interactions between subunits). We also constructed a BiFC toolbox in BioBrick standard. We sought to find out what was the effect of acrylamide on a variety of human cell lines and assess the toxicity of different concentrations of this compound.

York UK

Electricus Aureus: Our greatest source of power comes from the smallest organisms on Earth

Presentation room: Hall 4 (Lespinasse Buiding)
Presentation time: 3:30 PM
Poster: 59

We envisage a world where your mobile phone my one day be powered by synthetically engineered microorganisms, when non-renewable energy is a thing of the past. Our project comes at a time when all sources of energy are fighting to be the lesser of many evils; we would therefore like to propose a cheaper, greener and more effective source of energy. Currently, fuel cells do not produce sufficient power to be used for household appliances. Our genetically engineered organism will help us change this and be the first step in the Renewable Revolution. Bacteria are the most abundant form of life on Earth, they survive in harsh environments and they divide rapidly. Thus, they can be a renewable, sustainable source of energy. Our organism will deposit gold nanoparticles on the battery to increase its conductivity. These gold ions come from toxic pharmaceutical waste, which is extremely harmful to the environment.

Bonn

LOV Wars - May the light be with you

Presentation room: Hall 5 (Claude Chappe Building)
Presentation time: 9:45 AM
Poster: 7

A reliable, yet easily adaptable mechanism for controlling protein activity is key to most areas of life and medical science research. Still, the most common approaches suffer from various flaws. iGEM Bonn 2013 aims to overcome these drawbacks by engineering a novel tool based on blue light-inducible degradation of targeted proteins. The use of a modified ClpXP protease system allows a significant increase in rate and scale of activity change while keeping the modification of the target protein to a minimum. Combining this system with a tool for photo-activatable hetero-dimerisation based on a LOV domain results in a superior tempero-spatial control. To demonstrate the capabilities of our device, we designed a photosensitive kill-switch. This contributes to the security of synthetic biology in such a way that bacteria accidentally brought out of a safe work environment, for example a red-light-hood, would be killed by sunlight within a short period of time.

Exeter

Paint by *coli*: Creating a Colour Bio-camera Using *Escherichia coli* via complete optical control

Presentation room: Hall 2 (AE2 - Gustave Ferrié Building)
Presentation time: 1:00 PM
Poster: 1

Synthetic biology has lead to microorganisms being pushed into an unprecedented range of novel functions. Many bacterial systems currently rely on external stimuli to induce transcription. One-dimensional protocols often require constant monitoring of applied chemical concentrations, leading to them becoming inept for more complex systems. A triplet of NOT gated photoreceptors in *Escherichia coli,* will be used to create a system which is finely controlled using only light. This will be showcased using magenta, cyan and yellow pigments as outputs. Varying the intensity and wavelength of light projected onto *E. coli* will control the shade and colour produced, respectively. Hence, this will show the versatility of the optical control by creating a full colour bio-camera. Additionally, using bacteria to produce an image vastly increases the resolution when compared to conventional cameras, due to the micrometre scale of bacteria.

Freiburg
uniCAS - The Toolkit for Gene Regulation

Presentation room: Hall 2 (AE2 - Gustave Ferrié Building)
Presentation time: 12:30 PM
Poster: 21

Our Team developed a universal toolkit, termed uniCAS, that enables customizable gene regulation in mammalian cells. Therefore, we engineered the recently discovered and highly promising CRISPR/CAS9 system. The regulation is based on the RNA-guided CAS9 protein, which allows targeting of specific DNA sequences. Our toolkit comprises not only a standardized CAS9 protein, but also different effector domains for efficient gene activation or repression. We further engineered a modular RNA plasmid for easy implementation of RNA guide sequences. As an additional feature, we established an innovative screening method for assessing the functionality of our uniCAS fusion proteins. Single genes and even whole genetic networks can be modified using our uniCAS toolkit. We think that our toolbox of standardized parts of the CRISPR/CAS9 system offers broad application in research fields such as tissue engineering, stem cell reprogramming and fundamental research.

Heidelberg
THE PHILOSOPHER'S STONE

Presentation room: Hall 2 (AE2 - Gustave Ferrié Building)
Presentation time: 12:00 PM
Poster: 36

Several secondary metabolites, such as commonly used antibiotics, pigments and detoxifying enzymes, are synthesized by non-ribosomal peptide synthetases (NRPSs). These enzymes beautifully reflect one of the fundamental principles of synthetic biology, as they are remarkably modular. We will assemble new NRPSs by combining individual domains and modules of different origin, thus setting the basis for novel and customized synthesis of non-ribosomal peptides. To make the use of NRPSs amenable to a wider community, we will devise a new software-tool, called "NRPS Designer", which predicts the optimal modular composition of synthetic NRPSs for production of any desired peptide and outputs a cloning strategy based on Gibson assembly. As an application relevant to society, we will engineer *Escherichia coli* to recycle gold from electronic waste in a cost- and energy-efficient way through the heterologous expression of the NRPS pathway of *Delftia acidovorans* that naturally enables precipitation of gold ions from solution.

INSA Toulouse
E. calculus Project

Presentation room: Hall 3 (Seguin Building)
Presentation time: 3:30 PM
Poster: 23

The *E. calculus* project consists constructing a full n-bits adder capable of transmitting a carry to the next step. The designed strain contains specific devices that should ensure a relatively precise calculation and will be decomposed as follows:

– Various logic gates using specially designed recombinases and recombination sites to avoid reversibility of the gates states.
– A strict control of the expression of recombinases via a tight riboregulation control of the translation of recombinases genes
– A general inducer, switching the strain from inactive to active counting.
– A carry system based on the diffusion of a messenger molecule to the second bit.
– An artificial input system based on photoreceptors sensible to blue and red lights.

The envisioned system should approach as much possible the reliability of an electronic two-digit device and may help the Synthetic Biology community designing strong and robust Genetic Boolean Operators.

Newcastle
L-forms: Bacteria without a cell wall a novel chassis for synthetic biology

Presentation room: Hall 5 (Claude Chappe Building)
Presentation time: 10:45 AM
Poster: 31

L-forms are bacterial without cell walls that are still able to divide without the normally essential cell division machinery. The lack of a cell wall imparts a range of interesting properties and we show that L-forms can be used as a novel chassis for a range of fundamental applications in synthetic biology. We produced a BioBrick for *Bacillus subtilis* that allows cell morphology to be toggled from normal to L-form. We have explored some of the interesting opportunities that L-forms provide including cell fusion, genome shuffling and the generation of differently shaped cells using microfluidics. L-forms are thought to exist naturally within plant tissues and we also studied their use as agents for delivering novel functionality into plants. For project outreach, we created a game as an Android application and considered the implications rose by our project and also look at the exciting relationship between synthetic biology and architecture.

UCL PG
Spectra

Presentation room: Hall 5 (Claude Chappe Building)
Presentation time: 10:15 AM
Poster: 6

Spectra aim to use a novel configuration of synthetic gene networks (SGNs) to drive evolution of a fluorescent protein with dramatically improved spectroscopic properties. In future we intend to use the capabilities this enhanced fluorescent protein will provide to enable better dissection of differentiation pathways in stem cells.

UGent

A new model for chromosomal evolution: Eliminating antibiotic resistance

Presentation room: Hall 3 (Seguin Building)
Presentation time: 3:00 PM
Poster: 32

The main goal of industrial biotechnology is to increase the yield of biochemical products using microorganisms as production hosts. This includes engineering large synthetic pathways and improving their expression. Overexpression of genes has hitherto mainly been achieved by using high or medium copy plasmids. However, studies have demonstrated that plasmid-bearing cells lose their productivity fairly quickly as a result of genetic instability. Therefore a new method was developed for the overexpression of a gene of interest in the bacterial chromosome: Chemically Inducible Chromosomal evolution (CIChE). In this technique the chromosome is evolved to contain a higher number of gene copies by adding a chemical inducer. The original model for CIChE, however, results in bacterial strains containing a large number of antibiotic resistance genes. To make this valuable technique more widely applicable in the industry, we developed a model for chromosomal evolution based on a toxin-antitoxin system instead of antibiotic resistance.

Abstracts \ **Health & Medicine**

ATOMS-Turkiye
Project Oncoli

Presentation room: Hall 5 (Claude Chappe Building)
Presentation time: 3:00 PM
Poster: 50

According to the World Cancer Research Fund, the estimated number of cancer cases around the world every year is 12.7 million and is expected to increase up to 21 million by the year 2030. Taking this widely popular and alarming obstacle into attention, we have devised a system, which is aiming to tackle cancer from a very different perspective to before. Our choice of bacteria Nissle 1917, a probiotic strain of *Escherichia coli*, once inside the body will secrete a cancer tracing protein, which recognizes and builds up around the cancer cells. Using the quorum sensing system, *E. coli* Nissle 1917 detects the bacteria inducing substance AI-2 produced by the tracing proteins. Nissle 1917 bacteria motion towards the region of AI-2 and once in the region, produce our cancer killing protein called apoptin. Apoptin enters the cancer cells and induces apoptosis thereby eliminating their existence.

Baskent Meds
Killing *Legionella pneumophila Softly*

Presentation room: Hall 4 (Lespinasse Buiding)
Presentation time: 12:00 PM
Poster: 15

Legionella pneumophila is the cause of the Legionnaires' disease, which is a type of pneumonia. The bacterium is found in warm water environments, particularly in artificial water supply systems such as air conditioning systems and cooling towers. The infection occurs by inhalation by small droplets of contaminated water. Our aim, as the team "Baskent_Meds", is developing bacteria, which can recognize *Legionella pneumophila* specifically at species level by *Legionella* quorum sensing, and respond by producing anti-Legionella peptide, which is produced by some *Staphylococcus* strains. Quorum means "minimum". *Legionella pneumophila* should sense the minimum amount of cells around to colonize in the environment and express its virulence. So our modified *E. coli* may sense the presence of *Legionella pneumophila* in any contaminated surface and kill it.

Evry
Iron coli Project

Presentation room: Hall 5 (Claude Chappe Building)
Presentation time: 4:00 PM
Poster: 27

This year, our project focuses on diseases that are subsequent to an iron overload such as hemochromatosis and thalassemia. Nowadays, iron overload is mainly treated by bloodlettings for hemochromatosic patients but this treatment cannot be extended to thalassemic patients who suffer from anaemia. The aim of our project is to prevent the intestinal absorption of iron by engineering *Escherichia coli* to produce siderophores, chelators of iron. This strategy acts directly at the source. We engineer *Escherichia coli* using the Ferric Uptake Regulation (FUR) couple to an inverter system, in order to produce these siderophores in presence of iron. To reduce the patient's iron absorption, our bacteria are encapsulated in a pill. Once it arrives in the duodenum, our bacteria will produce the siderophore at their full potential and chelate the iron.

Goettingen
The beast and its Achilles heel: A novel target to fight multi-resistant bacteria

Presentation room: Hall 3 (Seguin Building)
Presentation time: 10:15 AM
Poster: 24

Since the discovery of penicillin by Alexander Fleming in 1928, antibiotics have marked a major victory of mankind in the battle against infectious diseases. However, after 90 years, the antibiotics are now losing their old time glory: Bacteria acquire resistance against antibiotics and become unbridled. We must control the use of antibiotics, meanwhile, we need new antibiotics, which can sufficiently eliminate the invaders without hurting the 'good' bacteria. Therefore, c-di-AMP, an important, recently discovered signaling molecule in gram-positive bacteria, has come to our sight. Our project is to build a screening system targeting c-di-AMP, which could be applied in novel-drug screening. With this system, the level of c-di-AMP in the cell can be visualized and measured.

Groningen

Engineering *Bacillus subtilis* to self-assemble into a biofilm that coats medical implants with spider silk

Presentation room: Hall 4 (Lespinasse Buiding)
Presentation time: 12:30 PM
Poster: 17

Approximately half of all implanted medical devices result in one or more medical complication, which have been found to increase mortality rates by 25%, and to cost the American society an additional 30 billion dollars every year. A possible solution for these complications is to form a protective biocompatible layer between the implant and the body by means of a spider silk coating. This is achieved through mathematical modelling, techniques from the synthetic biology, and the Gram-positive bacteria *Bacillus subtilis*, which is redesigned to secrete silk and to self-assemble into a biofilm surrounding the implant. It uses a modified chemotaxis system coupled to the DesK heat sensing system to do so. *B. subtilis* is furthermore often used in the industry for the commercial production of extracellular proteins, and is generally regarded as safe.

ITU MOBGAM Turkey
Intrinsic Factor-y

Presentation room: Hall 2 (AE2 - Gustave Ferrié Building)
Presentation time: 5:45 PM
Poster: 24

Pernicious anemia is described first by James S. Combe in 1822. Pernicious anemia is a type of anemia occurs due to malabsorption of vitamin B12 in the small intestine due to problems with the production of Intrinsic Factor, which is responsible for the absorption of vitamin B12. Pernicious anemia shows its sticking effects on blood, gastro-intestinal tract and nervous system and pernicious anemia usually develops together with an autoimmune disease. Our aim as ITU MOBGAM IGEM Team is to design a bacterium that is capable of surviving in small intestine and secreting Intrinsic Factor dependent on pH. Also, we design a genetic circuit for controlling the overgrowth and containment of bacteria.

Leeds

The Micro-beagle - A living biosensor

Presentation room: Hall 1 (AE1 - Gustave Ferrié Building)
Presentation time: 5:45 PM
Poster: 44

Micro-Beagle is a novel reporter system for *E. coli* that, as an iGEM first, has been designed to dynamically detect arbitrary target solids (including other cells) through a mechanism activated by cell surface binding. Micro-Beagle is a modular system, utilizing Ice Nucleation Protein to express and position target-binding peptides on the cell surface. Target binding induces membrane stress that activates the Cpx signaling pathway, and Micro-Beagle thus utilizes a promoter from this pathway (pCpxR) to initiate expression of a reporter protein, such as GFP. As a proof of concept, we have used silica beads as a model diagnostic target (a pathogen surrogate) and the silica-binding "Si4" sequence as the target-binding peptide. We foresee Micro-Beagle being adapted for both the detection of waterborne pathogens and a variety of other diagnostic applications, and we envision future multisensor Micro-Beagles in which diverse pathogens can be simultaneously and quantitatively measured from a single water sample.

Linkoping Sweden
A novel immunochemical detection system for food allergens

Presentation room: Hall 1 (AE1 - Gustave Ferrié Building)
Presentation time: 5:15 PM
Poster: 26

Antibodies are useful for recognition of antigens in food. Antibodies have, however, a very complex structure that is not suitable for expression in *E. coli.* The Camelid antibody IgG (cIgG), however, has lower complexity than the Human IgG. We present a new approach for recognition of food allergens with a synthetized cIgG for expression in E. coli. The epitope of cIgG is designed for Hen Egg White Lysosyme (HEWL). The cIgG is designed with a linker that connects to the bioluminescent enzyme Luciferase. We also synthetized an HEWL antigen carrying the protein RFP, A-HRFP, that reacts to the luminescence of luciferase as the A-HRFP attaches to the cIgG. The recognition of HEWL in a sample leads to the release of luminescent green light as a result of HEWL binding to the cIgG. If, however, no HEWL antigen is present in the sample, A-HRFP binds to cIgG resulting in a luminescent red shift.

Marburg
Phaectory

Presentation room: Hall 2 (AE2 - Gustave Ferrié Building)
Presentation time: 6:15 PM
Poster: 35

The diatom *Phaeodactylum tricornutum* is a widely spread organism in marine waters. It belongs to the group of diatoms. As a group of great ecological relevance diatoms are responsible for up to 20% of the global CO_2 fixation and generate about 40 % of the marine biomass of primary producers. In addition, diatoms represent an important source of lipids and silicate making them interesting for various biotechnological applications e.g. in biofuel industry, food industry and nanofabrication. Furthermore, a relatively easy biolistic method for transfection is established. A simple cultivation eases a putative industrial use of the diatom. Former researches not only proved a possible expression of antibodies, bioplastic and other recombinant proteins, but also demonstrated a direct secretion of the expressed proteins in the outer medium, making it easier to filter the wanted proteins. These characteristics make *P. tricornutum* an interesting organism for putative industrial use.

NRP-UEA-Norwich
Developing Biosensors to Identify Antimycin-Producing Actinomycetes

Presentation room: Hall 5 (Claude Chappe Building)
Presentation time: 3:30 PM
Poster: 42

Antimycins, anti-fungal compounds primarily produced by *Streptomyces* (a sub-set of actinomycetes), function by inhibiting the final stage of the electron transport chain. Our aim is to develop Biosensors to aid identification of novel antimycin-producing actinomycetes. Homologues of the AntA sigma factor, the key regulatory protein in antimycin biosynthesis, are present in all 14 known biosynthetic gene clusters. Due to this property, Biosensors have been designed with the AntA-regulated promoter (antGp) controlling the expression of three reporters: neomycin resistance gene, RFP (red fluorescent protein) and GUS (providing β-glucoronidase activity). The Biosensors will be produced, trialled and optimised where possible after sub-cloning into two actinomycete-specific integrative plasmids, pMS82 (Φ BT1 integrase) and pAU3-45 (Φ C31 integrase). Worldwide soil and sediment samples have been collected to produce a library of actinomycete strains, which will be screened using our Biosensors, the ultimate goal being to screen bacterial strains for antimycin production .

Abstracts \ **Health & Medicine**

NTNU-Trondheim

VesiColi

Presentation room: Hall 4 (Lespinasse Buiding)
Presentation time: 1:00 PM
Poster: 37

Gram-negative bacteria produce outer membrane vesicles (OMV) in the size range of 20-200nm. Whereas their function and contents has been studied for decades, their potential as drug carriers has not been investigated before. We want to introduce protein G from *Streptococcus dysgalactiae* subsp. equisimilis into *Escherichia coli* OMV's. Protein G is known to bind to human serum albumin (HSA), which helps *S. dysgalactiae* subsp. equisimilis hide from the immune system. The second part of our project is to introduce fluorescent proteins (FP's) linked together into the vesicles. Introducing protein G and linked FP's into the vesicles will demonstrate that it is indeed possible to manipulate the content, and therefore the properties, of OMV's

Paris Bettencourt
Fight Tuberculosis with Modern Weapons!

Presentation room: Hall 3 (Seguin Building)
Presentation time: 9:45 AM
Poster: 30

AWe are testing new weapons for the global war against *Mycobacterium tuberculosis* (MTb), a pathogen that infects nearly 2 billion people. Our 4 synergistic projects aim to help in the prevention, diagnosis, and treatment of tuberculosis. 1) We are reproducing an essential MTb metabolic pathway in *E. coli*, where it can be easily and safely targeted in a drug screen. 2) We are building a phage-based biosensor to allow the rapid diagnosis specifically drug-resistant MTb strains. 3) We are constructing a mycobacteriophage to detect and counterselect drug-resistant Mtb in the environment. 4) We are programming *E. coli* to follow MTb into human macrophages and saturate it with bacteriolytic enzymes. We want to vanquish tuberculosis and build a TB-free world.

TU-Delft

Peptidor: Detection and killing of resistant *S. aureus* using antimicrobial peptides

Presentation room: Hall 3 (Seguin Building)
Presentation time: 10:45 AM
Poster: 25

Methicillin-Resistant *Staphylococcus aureus* causes major problems, especially in hospitals, leading to over half a million infections annually in the US alone. Of the alternative treatments currently under investigation one of the more promising is through antimicrobial peptides (AMPs). These small, highly specific peptides attack the membrane of target organisms. Thousands of AMPs are known to exist and little resistance against them has been developed. The Peptidor project consists of an *E. coli* that can detect *S. aureus*, using *S. aureus*' native quorum sensing system, in order to locally produce and deliver AMPs. Upon detection, peptides inactivated by a SUMO-tag fusion, are overexpressed. After a delay period, introduced through a negative transcriptional cascade, a SUMO protease is expressed cleaving off the inactivating tag. Using this mechanism, high concentrations of peptide are delivered at the infection to efficiently kill *S. aureus.* As a safety mechanism, the timer also activates an *E. coli* kill-switch.

UCL
Spotless Mind

Presentation room: Hall 2 (AE2 - Gustave Ferrié Building)
Presentation time: 5:15 PM
Poster: 51

This year, the UCL iGEM team is taking a radical new step with synthetic biology. We intend to explore the potential application genetic engineering techniques on the brain, by tackling Alzheimer's disease, which is linked to the presence of amyloid plaques in the brain. Targets for the project include: establishing microglia cells as a new Synthetic Biology chassis and constructing new BioBricks to enable engineered Microglia to detect and destroy disease-associated amyloid plaques.

ETH Zurich

Colisweeper: The world's first biological Minesweeper game

Presentation room: Hall 5 (Claude Chappe Building)
Presentation time: 5:15 PM
Poster: 2

Colisweeper is an interactive, biological version of the Minesweeper computer game, based on LuxI/LuxR quorum sensing and chromogenic enzymatic reactions. The goal is to clear an agar "minefield" without detonating mines. Genetically engineered *Escherichia coli* colonies are used as sender-cells (mines) and receiver-cells (non-mines). Mines secrete the signaling molecule N-(3-oxohexanoyl)-l-homoserine lactone (OHHL) whereas non-mines process the signal. To distinguish between OHHL-levels, a library of PluxR promoters with various sensitivities was created through site-saturation mutagenesis. High-pass filters were constructed to control the expression of different orthogonal hydrolases in non-mines, depending on the number of surrounding mines. Additionally, the mines express their own hydrolase. A spatiotemporal reaction-diffusion model was established to evaluate and improve the system. To play Colisweeper, a colorless substrate solution is pipetted onto a colony of choice. The result is a defined color change within minutes, allowing identification of the played colony and the number of mines surrounding it.

Poznan-BioInf

SR-MUX: a biological multiplexer with 3-bit editable transcriptional memory.

Presentation room: Hall 5 (Claude Chappe Building)
Presentation time: 5:45 PM
Poster: 46

Our goal is to engineer a device allowing to save up to three binary input signals in living *E. coli* cells, resulting in expression of red, blue and green fluorescent proteins as reporters. Converting inducer signals into expression of serine recombinases, enzymes capable of specific DNA editing, we are able to create three transcriptional analogues of transistors - transcriptors - and to use them as elemental memory units called SR-latches under control of a fourth, strobe signal, providing a mean to reset the system to its original state. This complex biological memory unit opens the way to cheap, reversible gene induction, useful both to the industry and researchers, not only lowering inducing cost but also being less stressful for the studied organisms, e.g. plants. It is also another step towards Von Neumann-inspired biocomputers.

Imperial College

Plasticity: Engineering microbes to make environmentally friendly plastics from non-recyclable waste

Presentation room: Hall 1 (AE1 - Gustave Ferrié Building)
Presentation time: 3:30 PM
Poster: 19

Accumulation of waste represents a considerable problem to humanity. Over the next 50 years, the global community will produce approximately 2 trillion tones of waste, or 2.5 times the weight of Mount Everest. Traditionally, mixed non-recyclable waste is sent to landfill or for incineration, both of which result in environmental damage. The detrimental effects are perpetrated by the plastic degradation into toxic byproducts and the production of greenhouse gases by these processes. As an alternative we propose to upcycle this mixed waste into the bioplastic poly-3-hydroxybutyrate (P3HB) to create a closed loop recycling system. Our engineered *E. coli* will operate within sealed bioreactors. In the future we picture the use of our system in a variety of contexts as part of our M.A.P.L.E. (Modular And Plastic Looping *E.coli*) system.

SDU-Denmark
Bacteriorganic Rubber

Presentation room: Hall 1 (AE1 - Gustave Ferrié Building)
Presentation time: 3:00 PM
Poster: 48

The growing demand for natural rubber causes deforestation of the rainforest or occupation of arable lands, all due to the founding of new plantations. If producing rubber by bacteria succeeds, production of natural rubber will not be limited to the regions where the rubber tree can grow. Our project aims to make an *E. coli* strain able to produce natural rubber while grown under controlled conditions. Natural rubber is composed of polymerized IPP (isopentenyl pyrophoshate) units. *E. coli* already possesses the ability to produce IPP, but it lacks the polymerization enzyme, prenyltransferase, from the rubber tree. In this project we introduce prenyltransferase into *E. coli* and simultaneously manipulate the bacteria to produce more of the IPP links, consequently leading to the production of natural rubber in the bacterial setting.

Wageningen UR

Aspergillus niGEM: A lov story

Presentation room: Hall 1 (AE1 - Gustave Ferrié Building)
Presentation time: 4:00 PM
Poster: 38

The fact that secondary metabolites are often synthesized as polymer backbones that are subsequently diversified greatly via the actions of tailoring enzymes sets the stage for combinatorial biochemistry because their biosynthesis is modular. One of the goals is to establish a modular system of domain shuffling to generate a plethora of novel enzymes with new and improved functionalities. The production of lovastatin, a drug used in lowering LDL cholesterol for patients suffering from cardiovascular disease, has been chosen as a proof of principle. The aim is to transfer the entire lovastatin metabolic pathway from *A. terreus* into a GRAS organism like *Aspergillus niger*. To expand our scope we will also be working on host engineering, trying to create a single cell phenotype of *Aspergillus niger*. To increase the accessibility of our host we also deliver a set of tools, which include ATP and pH biosensors, cytoskeletal gfp-fusions and chromoproteins.

Braunschweig

Engineering synthetic microbial consortia

Presentation room: Hall 3 (Seguin Building)
Presentation time: 1:00 PM
Poster: 43

Bacterial consortia offer a great benefit for synthetic biology due to the ability to perform complex tasks by splitting the whole reaction into smaller reactions and share the task among different specialized strains. Also, a self-regulating bacterial culture with intra consortial dependencies offers great advances in biosafety. To shut down the whole bacterial consortium, only on strain has to be eliminated. We engineer three different *E. coli* strains to grow in a consortium exploiting different Quorum Sensing systems. Each strain maintains a constitutive expression of an inactive transcription activator (LuxR, LasR or RhlR). Inducers are synthesized by different synthases (LuxI, LasI or RhlI) that are each expressed in one strain and subsequently secreted into the medium. Once taken up by a cell, the inducers bind to the corresponding, inactive transcription factors to render them functional. As a result, an antibiotic resistance under the control of an inducible promoter is expressed.

Abstracts \ **New Application**

EPF Lausanne

Taxi.Coli: smart drug delivery

Presentation room: Hall 4 (Lespinasse Buiding)
Presentation time: 9:45 AM
Poster: 12

EPF_Lausanne's team is proud to participate to iGEM 2013 and excited to present their project: Taxi.Coli: smart drug delivery. The team's vision is to build a biosynthetic drug delivery concept. The key word of this project is "adaptability". Our goal is to explore a way of using *E. coli* as a highly modular carrier, opening the gate to several applications and alternatives in disease treatments. Using the principles of synthetic biology, we engineered a gelatinase secreting *E. coli* able to bind gelatin nanoparticles using a biotin-streptavidin interaction and release them in a corresponding location. The drug delivery system is built in three parts: 1) the nanoparticle binding and 2) the environment sensing that 3) triggers the gelatinase release of the engineered *E. coli*, liberating the content of the nanoparticle. The nanoparticles made of gelatin are able to carry any type of organic compound leading to a wide range of applications.

Grenoble-EMSE-LSU
Light Automated Cell Control by Talk'E. coli

Presentation room: Hall 4 (Lespinasse Buiding)
Presentation time: 10:45 AM
Poster: 18

Maintaining cell growth state during culturing is generally difficult due to metabolic adaptation and changing cell division rates. Using light-induced promoters and a phototoxic fluorescent protein, we've designed Talk'E. coli. It uses light signals to communicate with bacteria allowing the researcher to remotely control the cultures using a computer. Cell density is monitored through fluorescence recordings and, thanks to a predictive model, Talk'E. coli responds by illuminating the culture with one or more wavelengths to obtain different effects: killing off cells beyond a threshold density, or producing or degrading protein. The tool is portable and mountable in an incubator making it a handy device for research.

TU-Eindhoven

MRiGEM: Creating a production and delivery system for a CEST MRI contrast agent

Presentation room: Hall 3 (Seguin Building)
Presentation time: 12:00 PM
Poster: 16

Our project presents an alternative solution to the use of heavy metals MRI contrast agents by focusing on CEST MRI. Within CEST imaging, proteins enclosing hydrogen atoms generate high quality images. We use Escherichia coli to create CEST proteins when the bacteria sense a hypoxic environment due to a promoter designed for this purpose, thus working as a production and delivery system for the CEST MRI contrast agent. Hypoxic regions are related to tumors, therefore our eventual goal is to use this device to target and image tumors in humans by injecting the bacteria into the bloodstream. A second application is tracking bacteria in bacterial infections studies. For the iGEM competition however, the proteins are only expressed ex-vivo: in aerobic and anaerobic conditions. We aim to achieve an efficient testing of the CEST properties of the proteins and confirm the promoter's ability to express each protein.

UNIK Copenhagen
Project Magneto

Presentation room: Hall 3 (Seguin Building)
Presentation time: 12:30 PM
Poster: 57

Project Magneto is a biological system that allows us to find better ways to treat cancer, acts as a sustainable energy source or just enables us to visualize our environment in a new way. We created it using magnetosomes. Thanks to these specialized organelles magnetotactic bacteria are able to navigate in the earth's magnetic field. The magnetosome is a nanomagnet, which consists of a magnetic crystal housed inside a lipid membrane. Magnetosomes arrange together in chains and act as a compass needle thereby orienting the cell. They show various properties that give them an advantage over industrially synthesized nanomagnets. We demonstrate their usability by fusing fluorescent proteins to their membrane. Through this we open the way for using magnetosomes in various different applications where the fluorescent protein could be simply replaced by a drug for targeted cancer therapy, an ATP-synthase to create a biological dynamo or dye for magnetic paint.

Valencia Biocampus

Wormboys

Presentation room: Hall 4 (Lespinasse Buiding)
Presentation time: 10:15 AM
Poster: 58

Bacteria are essential in biotechnology, but they can hardly move. Nematodes, such a *C. elegans*, are fast crawling organisms, but they have limited biotechnological applications. By combining the best from both organisms, we present the first artificial synthetic symbiosis with bacteria engineered to ride on worms, which concentrate in hotspots where bacteria perform a desired biotechnological process, such as bioplastic (PHA) production. We have engineered *Pseudomonas putida* with a whole operon that allows the formation of a biofilm on the worm. Biofilm formation is switched on and off depending on the media, and thus bacteria get on and off the worm like travellers on a bus. We have also engineered a third partner, *E. coli,* to express an interference RNA that promotes clumping. Taken together, our artificial symbiosis allows biotechnologically interesting bacteria to travel on nematodes, reach nutrient-rich biomass spots and maximize the efficiency of biotechnological fermentations in heterogeneous substrates.

AMU-Poznan
sh-miR designer - tool for construction of RNA interference reagents: sh-miRs

Presentation room: Hall 3 (Seguin Building)
Presentation time: 4:00 PM
Poster: 20

sh-miR Designer will be a software aimed at fast and efficient design of effective RNA interference (RNAi) reagents - sh-miRs, also known as artificial miRNAs. sh-miRs are RNA particles whose structure is based on miRNA precursor pri-miRNA, but sequence interacting with transcript is changed depending on research purpose. Maintenance of structure of pri-miRNA is very important to enable cellular processing and therefore ensure functionality of artificial particles. sh-miRs delivered to cells on genetic vectors - plasmids or viral vectors - enter natural RNAi pathway and silence target mRNA. They can be used in genetic therapies and basic biomedical research.

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