SYSU CCIC

SUN YAT-SEN UNIVERSITY
Central China iGEM Consortium

2016.9.2 - 9.4

目录

1 CCiC简介

撰稿：倪春阳

CCiC（Central China iGEM Consortium）是由国内高校举办的全国性iGEM交流会，其主旨为**促进国内iGEM参赛队伍间的交流与合作**，并借此机会向国内各高校进一步推广合成生物学。

历届交流会整体模拟iGEM Giant Jamboree赛程，以队伍项目展示及队间交流为主要形式，就**合成生物学**相关主题进行学术及经验分享的同时，也为各参赛队伍提供一个演练的平台。

2 活动日程

因为很重要所以放前面：

1. 请务必**按时入场**！
2. 9.2日晚的开幕式，请每支队伍准备一个**5min的自我介绍**。
3. 每个队伍**展示时间为20min**，请严格控制时间！
4. 请按**队伍展示顺序表**（另附）上的序号上台展示。
5. 三餐均可使用餐券到**学一饭堂**吃饭

日期	时间	内容
9.2	19:00—20:00	开幕式： 张雁院长，黄军就老师致辞
	20:00—21:30	**队伍自我介绍**
	21:30—22:00	经验分享—张浩千（北京大学）
9.3	8:00—8:50	观众入场
	8:50—10:30	**队伍1、2、3展示**
	10:30—10:45	海报交流
	10:45—11:50	**队伍4、5展示**
	11:50—13:30	午休
	13:30—15:10	**队伍6、7、8展示**
	15:10—15:25	海报交流
	15:25—17:05	**队伍9、10、11展示**
	17:05—18:35	晚餐时间
	18:35—20:15	**队伍12、13、14展示**
9.4	7:50—9:00	观众入场
	9:00—10:40	**队伍15、16、17展示**
	10:40—10:55	海报交流
	10:55—12:00	**队伍18、19展示**
	12:00—13:30	午休
	13:30—15:45	**队伍20、21、22、23展示**
	15:45—16:00	海报交流
	16:00—17:05	**队伍24、25展示**
	17:05—19:30	合影留念，晚餐时间
	19:30—20:30	闭幕式： 嘉宾致辞，活动总结

3 队伍项目简介

索引

南开大学 NKU_China

AI-2 Controller: Collective Behavior Regulator

Autoinducer-2 (AI-2) is a signaling molecule that plays a crucial role in Quorum Sensing (QS), a process that mediates inter- and intra-species bacterial communication resulting in coordinated multicellular behavior. Diverse cell processes such as bioluminescence, biofilm formation, virulence, antibiotic production and competence are in part, QS regulated. Drawing inspiration from the effect of AI-2 QS system on collective behavior and cellular decision-making, our team aims to engineer bacteria via synthetic biology approaches to control AI-2 level in natural and artificial environment. We have mainly designed two cell machines: 'AI-2 Supplier' is a cell machine which can directly supply high level of AI-2 molecules in the bacteria community while 'AI-2 Consumer' is a cell machine which can sense, absorb and degrade the AI-2 molecules in the environment. By taking advantage of the special characteristics of AI-2 controllers (i.e. the AI-2 Supplier along with the AI-2 Consumer), we hope to directly control the collective behaviors of bacteria in group level.

第三军医大学 TMMU—China

Establishment and application of a novel blue-white markerless integration selection system for Lactococcus lactis

Probiotics are widely applied in food industry, agriculture and biotechnology. Lactococcus lactis is a food grade probiotic and generally regarded as safe. It is widely used in synthetic biology. Genes introduced by plasmids usually accompanied by antibiotic resistance genes and are unstable when selection pressure is absent. Genes can also be integrated into the genome but this process is extrmely time-consuming. The blue-white screening system is widely used in molecular cloning. We apply this system to select marker free gene integrated strains. DNA of interest replaced the chromosome integrated lacZ gene, which yield white colonies in the presence of X-gal. To demonstrate the utility of this system, we will integrate some ORFs and devices in different length, including salmon calcitonin for the treatment of osteoporosis, Lux operon from Vibrio harveyi for L. lactis in vivo detection , and Vi antigen of Salmonella typhi to make typhoid vaccine.

北京理工大学 BIT

Alarm of Breast Cancer Based on Detection of MicroRNA-21 and MicroRNA-155

In recent years, breast cancer has become one of the highest incidental cancer. If we can get early diagnosis and effective treatment measures,it will largely reduce the mortality of breast cancer. Studies have shown that when have breast cancer, the expression degree of microRNA-21 and microRNA-155 in the serum will be significantly higher than the normal one. Based on it,this project applies the artificial designed biological system to realize the detection of expression levels of microRNA in the serum environment and produce green fluorescent protein,then detect fluorescence by miniaturized signal hardware,through the mathematical modeling of the model to calculate microRNA expression level. Finally the data presented to the user directly by the hardware device or to their phones. This project is a real-time inspection system for breast cancer detection,convenient and quickly.It can provide patients with reference significance testing data, reduce the testing costs drastically,alleviate the contradiction of medical treatment system.

东北林业大学 NEFU_China

Magnetosome: a new efficient and handy tool for protein purification

Protein purification is commonly used in Biochemical research, but can become a very tedious and inefficient procedure. We developed a system that can be used to conveniently and efficiently purify recombinant proteins with help of magnetosome.

The system consists of two parts. First, we used Escherichia coli to express an interest protein tagged by a Spytag. Second, we generated a Spycatcher-fused Mms13 protein and expressed it in the magetotactic bacteria AMB-1 (Magnetospirillum magneticum). These bacteria synthesize magnetosomes covered by phospholipid bilayer membrane, in which Mms13 is tightly anchored. Spycatcher binds Spytag with high affinity, and thus Spycatcher-Mms13 anchored in magnetosomes can strongly bind Spytag-conjugated protein and specifically bring it down with help of magnetic field. Our system is applicable to efficiently purifying any interest protein for different research purposes.

四川大学 SCU—China

Look What They've Done To My Shoes!

Foot odor and athlete's foot are close "friends" of human beings and lead to daily problems. This year, we designed an innovative insole called "Comfootable" to prevent them with two strains of engineered E.coli, whose names are "Rihanna" and "Drake" respectively. VHb gene is involved in both strains to enhance their growth ability in tough environment and some genes in two strains are knocked out to keep the strains themselves odorless. In strain "Rihanna", antimicrobial peptide CecropinXJ is supposed to be released and attack pathogens after foot temperature inducement. In strain "Drake", liv operon/polyleucine peptide/aminocyl-tRNA and aarC are expected to remove the malodor in shoes. This insole has specialized structure and proper material to make sure the successful diffusion of substrate, the availability of microorganism growth and the biosafety. Furthermore, we did a lot of modeling works, and we hope our product will be available on the market some day.

华南理工大学A队 SCUT—China_A

Sulfur killer

An Engineering Bacteria Strain for Highly Effective Biodesulfurization

As we know, the consumption of oil——one of the most important fuels in the world, has caused many serious environmental issues including acid rain, which has caused serious damage to the buildings, plants, and animals and so on, mainly due to the sulfur element contained in the oil. To reduce the destruction of sulfur, many traditional desulfurization methods have been studied and applied on industrial desulfurization, such as Oxidative desulfurization and hydrodesulfurization. But these methods have many shortcomings such as the poisonous gas products and high cost at energy. To compensate for weakness in the traditional desulfurization, we decide to adopt the biodesulfurization method, which is far more environmental and energy-saving. In order to meet our expectation, we are devoting to highly effective biodesulfurization through 4s-pathway by using engineering bacteria.

天津大学 Tianjin

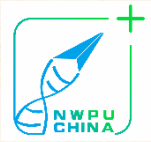
Plasterminator

The accumulation of poly(ethylene terephthalate) (PET) has caused serious environmental problems worldwide. In recent years, biodegradation of PET has gained much popularity among scientists. Two enzymes, PETase and MHETase, were found this March and have much higher activity in degrading PET than any enzyme found before. We aim at improving the yield of these two enzymes by expressing them in fast-growing and well-researched model organisms like Escherichia coli and Saccharomyces cerevisiae, and we hope to obtain enzymes with higher activity by directed evolution. We build a report and self-regulated system to ensure the stability of our organisms and the production efficiency and activity of enzymes. Furthermore, we construct a co-culture system, in which different enzymes are expressed by separate organisms. We also extend the metabolic pathway in order to utilize the degradation product, TPA, to produce new environmental-friendly substances such as PHA.

兰州大学 Lanzhou

Reduce bioaccumulated heavy metals in fish by gut remediation

Nowadays, heavy metals in the water have become a threat to fish and human consumers. Current methods including physical-chemical remediation, phytoremediation and others are limited to deal with heavy metal pollution. We proposed a new approach named gut remediation to reduce bioaccumulated heavy metals in fish by gut microbiota. We designed a polypeptide which can bind to heavy metals including mercury and copper. Then a novel gene Metal Catcher was designed based on the polypeptide with GFP and N-terminal region of INP. Subsequent display of Metal Catcher on the E. coli surface showed highly sensitivity and selectivity of copper, mercury and cadmium, and permitted selective adsorption of copper, mercury. Then, we fed cyprinoid fish with the transformant strains. Result showed that experiment group have lower accumulation of heavy metals compared to the control. Therefore, gut remediation is an ideal approach to control heavy metal contaminations in fish.



西北工业大学 NWPU

Blue leaf

In many scientific fiction about interstellar travel, the device of carbon recycle is the most essential part. We propose to transform carbon dioxide to formaldehyde via electricity devices, and then engineer microorganisms to utilize formaldehyde to produce carbonhydrates .We expect to obtain a new kind of engineered E. coli that could fix inorganic carbon into carbonhydrates. We call this microbial device “Blue leaf”. The device consists of three parts, first we use electrical energy to convert carbon dioxide to formaldehyde, then use benzoylformate decarboxylase to catalyze formaldehyde into two and three-carbon intermediates, finally use fructose 6-phosphate aldolase to condense two and three-carbon units to form the five-carbon molecule-xylose. To some degree, this device could mimic the function of plant to biosynthesize xylose directly from carbon dioxide. We think the "Blue leaf" will be an indispensable device for astronauts, and human beings to explore new habitats on other planet like Mars.

南京大学 Nanjing—China

HydroMagic

The current world is undergoing a global energy change. Now our energy source depends greatly on the combustion of fossil fuels. However the combustion of fossil fuels leads to great carbon emissions which results in the climate change. Among all possible energy solutions, hydrogen serves as a praising future energy from. This year our team proposed the idea of solar driven whole cell hydrogen production system in air. We will achieve hydrogen production through E.coli [Ni-Fe] hydrogenase Hyd1. We will make solar driven production by semiconductor CdS or TiO2. As for the in air system we proposed a special silicon coat formation wrapping our engineered cells against oxygen.

深圳大学 SZU-iGEM

Light Hygician

Hydrogen energy, is of great potential in the future with its zero-emission and high-efficiency. However, the fact that few efficient and environment-friendly methods for hydrogen production constrains its application. Therefore, our team develope a biological production way, using the green algae - Chlamydomonas reinhardtii. Since the hydrogenase activity will be inhibited in absence of oxygen and the algae can't stop photosynthesis forever, we design a switch altering between 2 states in which light wavelength serves as extraneous inducible factor. In specific alternation, we utilize miRNA targeting the expression of key protein in photosynthesis, so we can select the hydrogen-production switch by regulating miRNA. In our design, we utilize Yeast-Two-Hybrid system and light-mediated fusion protein constructing a gene circuit where microRNA can regulate the specific downstream protein expression, and finally keep algae producing H2. In this way, the blue light switch regulate chlamydomonas producing intemittent hydrogen efficienctly, acting as blue-flame bubbling.

华南农业大学 SCAU-China

aSTARice -- astaxanthin biosynthesis in rice endosperm

Astaxanthin is a naturally-occurring keto-carotenoid found in microalgae, salmon, shrimp, crustaceans, and the feathers of some birds. It provides the red color of salmon meat and cooked shellfish.Because astaxanthin is a powerful antioxidant with great value in medical and health care,it is meaningful to make astaxanthin an accessible health product.Currently, the industrial ways to produce astaxanthin are extract from microalgae Haematococcus pluvialis,Phaffia yeast,shrimp processing waste and chemical product.However these ways aren't safety enough and the purification is difficult. While higher plants are supposed to be an efficient and safe bioreactor to produce astaxanthin,because it has advanced protein processing system to produce complex product.So we think about using higher plant to produce astaxanthin.In our project,we take rice endosperm as the bioreactor of astaxanthin production,and use a technique called multiple-gene metabolic engineering to specifically express astaxanthin in rice endosperm. In this way, rice endosperm can produce and store astaxanthin.

福建农林大学 FAFU-CHINA

Cry For Mosquito

iGEM FAFU-CHINA established in 2015, which participated in this competition and won a bronze medal in 2015. In 2016, FAFU-CHINA will attach the effective protoxin gene, which isolated from Bacillus thuringiensis (Bt.) with the characteristic of high efficient mosquito control, to Chlamydomonas reinhardtii as the biological chassis for cloning. However, there are many problems in the practical application by using Bacillus thuringiensis, such as: the bacterial pollution of waters, the poor timeliness because Bt. strains cannot colonize in the water. Our team use the pertinent literature as the basis for selecting the appropriate biological chassis, combinating the toxic protein, in order to increase the effect of killing mosquito larvae and reduce the Bt. toxin tolerance. Through Chlamydomonas reinhardtii expression system as the basis to optimize gene, enhance expression of results, and reconstruct the engineered bacteria in natural environment, we try to solve these problems mentioned above.

上海交通大学 SJTU-BioX-Shanghai

Real-time Yeast Biosensor for Early Diagnosis

What to do

We are going to make a yeast-based real-time biosensor for detection of Phaeochromocytomas, a disease in which early diagnoses plays an important role in cure. There are many biosensors made to detect disease biomarkers, while they are either translation-based or mammalian cell based, which means though they are capable of finding that biomarker, they are poor in responding speed and shelf-life. These are devastating aspects when we consider making them commercialized and acceptable for every society member. So we aim to make a real-time yeast based biosensor whose signal can be simply analyzed using iPhone by expressing a set of protein in G-protein coupled receptor pathway and a extremely bright cAMP sensor, Nano-Lantern (cAMP 1.6), in Saccharomyces cerevisiae.

How to achieve: 1. Test of the ‘Nano-Lantern cAMP 1.6’ fusion protein. / 2. Construction of catecholamines sensing GPCR signaling compotents in Saccharomyces cerevisiae. / 3. Characterization of detection capacity. / 4. Digitalization and commercialization"

北京师范大学 BNU—China

Taxolight

It is widely known that taxol plays a significant role in tubulin depolymerized inhibition and therefore stabilizing microtubules. Based on this, our team designed a new way to test the existence of taxol, which may have higher resolution than current chemical approaches.

Firefly luciferase complementation (FLC) and bimolecular fluorescence complementation (BiFC) assay is the core part of our experiments. We expressed one specific tubulin with N-luciferase and C-luciferase respectively. When α-tubulin and β-tubulin tend to form dimers, the normal microtubules are being resembled and are likely to be depolymerized. However, the extremely stable microtubules would be established if taxol is added to the system. By detecting the fluorescent signal, we are able to tell the existence of taxol.

中山大学实验队 SYSU—CHINA

Cyclebow

A lack of techniques to figure out cells undergoing different number of cell-cycle in their lineage has limited our ability to evaluate the efficiency of stem cell therapy and investigate the mechanism behind it. Here we describe Cyclebow, a system for labeling cells undergoing different number of cell-cycles after a specific state in the lineage based on cyclic promoters combined with recombinases and fluorescent proteins. We intend to demonstrate imaging of up to three cell-cycles in a specific lineage, which can help tracking the proliferation, differentiation and migration of stem cells in vivo.

南方科技大学 SUSTech_Shenzhen

Cearll's Secret

Audiogenetics is a useful tool for high-efficiency cell regulation. Compared to chemical genetics, it stimulates cells with better precision and less toxicity. Furthermore, signals are conveyed to target cells with little delay, leading to a shorter response time. To achieve our goal, membrane mechanosensitive channels (TRPC5 and Piezo) are chosen as receptors. Fluorescent calcium indicator (R-GECO) is employed to indicate cytoplasmic calcium level. Nuclear factor of activated T cells (NFAT) and YFP are used as downstream indicators to quantify the regulatory abilities. Microfluidic channels are also utilized in the pre-study in which shear stress, similar to sound waves, is applied on the cell surface as signal input to explore the basic parameters. A sound generator is constructed to test whether sound can trigger the channels as expected. Additionally, we use directed evolution to improve channels' selectivity for specific sound frequency and their sensitivity to sound of lower intensity.

中山大学医学队 SYSU-MEDICINE

MSCavalry: MSCs of Next Generation

With great power to suppress adaptive immune system as well as innate immune system, mesenchymal stem cells (MSCs) are promising candidates for cell-based therapy to treat inflammatory diseases, such as IBD, encephalitis, etc. However, clinical trials of MSCs have demonstrated that only a few MSCs can indeed arrive at the inflamed tissue after systematic administration and exert their immunomodulatory function due to the inefficient homing ability of MSCs.

This year, MSCs of next generation are coming. In our project, we will: 1) Empower MSCs with a series of chemokine receptors in order to ensure its effective homing. / 2) Introduce several kinds of positioning system, such as luciferase to locate in vivo MSC and assure their arrival at the inflamed tissue. / 3) Design a switch to kill MSCs when they differentiate into other types of cells.

Finally, we will confirm our engineered MSCs in animal models, such as IBD and DTH.

江苏师范大学 JSNU—China

Little strokes fell great oaks

Citrus fruits and vegetables contain much anthocyan which is a naturally flavonoid with powerful anticancer function. Although applying anthocyan to cancer therapy, there are a great deal of people still suffering from the cancer. We want to find a key thread to increase anthocyan efficience to destroy cancer castle. KLF4（Kruppel-like-factor 4）is a ES plouripotency factor which is able to bi-directionally regulate genes and playing an essential role in "somatic reprogramming" within the process of tumorigenesis. We'll construct KLF4 motor to promote anthocyan anticaner in gastric cancer.

华南理工大学B队 SCUT—China_B

Lung Cancer Targeted Killer： inducing appotosis of lung cancer cells via tumor specific CRISPRi/a system

Many studies indicated that the apoptosis of cancer cells could be induced by increasing the outer mitochondrial membrane permeability（OMMP）. Meanwhile, the activities of bax and bcl-2 can change OMMP，releasing cytc from mitochondria to cytoplasm. Cyt c leakage supports the formation of apoptosome, in turn leading to cell apoptosis. Therefore our project proposes to induce targeted apoptosis of lung cancer cells through regulating bax and bcl2 expression by tumor specific CRISPRi/a system.

国防科学技术大学 NUDT_CHINA

Development of a novel tube-based rapid blood-microRNA detection system with CRISPR-Cas9

MicroRNAs, serve as critical gene expression regulators at the transcriptional and post-transcriptional levels, have also been found as important blood-based biomarkers for early detection of cancers. However, their current in vitro detection methods are relatively complex, costly and low sensitive. Our project attempts to establish a novel in vitro microRNA detection system which is rapid, efficient, sensitive and specific. In this system, CRISPR-Cas9 technique is modified to integrate with split-luciferase or split-HRP reporting systems. The advanced rolling circle amplification technology and cell-free expression system are also involved and optimized. This system may ideally be compatible for the detection of various series of small non-coding RNAs. To our knowledge, we are the first to use the CRISPR-Cas9 system as a small non-coding RNA monitor in vitro. Its establishment and further development might provide a new approach for rapid and low-cost cancer screening, virus detection and curative efficacy assessment.

PEKING 北京大学 PEKING

Uranium Reaper

Uranium, a well-known radioactive metal, exhibits both chemical toxicity and radioactive hazards to environment and humans. Nowadays, several common methods are adopted to cope with uranium pollution, such as solidification of poluted soil and phytoremediation. Nevertheless, these methods are flawed owing to high cost, lengthy procedures as well as potential secondary contamination. To overcome the drawbacks of traditional methods, Peking iGEM team focus on constructing a novel multi-functional biological material which is able to absorb uranyl ion fleetly with high specificity and affinity. This uranyl-absorbing material can be synthesized and secreted continuously by bacteria, self-assembled in extracellular environment, and harvested in a cost-effective manner. It also has a great potential to be modified and expanded due to its modular design. With this material, we demonstrate how the increasingly serious uranium pollution can be treated in a more efficient and sustainable way in the near future.

南京大学 NJU—China

Say goodbye to Mr. Tumor: targeted therapy for cancer based on siRNA-exosome drug system

Cancers, as the most frightening death threats, are aggressive and malignant. However, a perfect treatment of cancer has not appeared so far. The goal of our project is to develop a strategy to treat cancers, with building a transplantable drug system targeting a specific molecule that functions in cancer. We packed siRNA into exosomes (nano-sized vesicles secreted by human cells) to deliver our drug into certain part of a patient's body. Then we modified our exosome with iRGD to act as integrin-specific targeting tool. Our validation experiments will be carried out at the level of cells and animals to prove both the targeting and silencing function of this drug. Eventually, we expect to see a specific accumulation of the siRNA in the mice' s tumor tissues and the decreased expression of the oncogenes at the transcription level. This project may provide new insights into future treatment of cancer.

Cistrons Concerto 中国海洋大学 OUC—China

Cistrons Concerto

As is known, once forming stem-loops, the oligonucleotides will be more stable than the single-stranded ones. And mRNA with stem-loop at its 3' or 5' end often get a longer lifetime than the linear one owe to the stem-loop' s resistance to exonuclease.

Our team tend to design a series of stem-loops each followed by the same endonuclease site and are transcribed as one polycistron. Once digested by endonuclease and seperate into several independent fragments, cistrons with different ΔG stem-loops will get different stability, thus influence the amount of expressed proteins.

In this way, we can decouple the expression level of upstream and downstream genes of the same operon by simply designing different stem-loops. Futhermore, with quantitative ΔG of stem-loops, we even can achieve the ratio expression of target proteins. It is a creative regulating method and we attempt to provide a series of standard regulation parts for others.

上海交通大学 SJTU—Software

iMAP—iGEMers' Management and Alliance Platform

iGEM encourages communication and cooperation among teams, but the existed communities can't satisfy all the demands. So we create iMAP(iGEMers' Management and Alliance Platform). Python is used to construct the framework. CSS and JS are used to developed it with complement of HTML. iMAP supports chatting, Cloud hosting, activity releasing, assignment distributing, experiments managing and database searching. This platform enables the official to release information, PIs and group leaders to allocate assignments and check the progress, team members to deliver HP messages, share relevant literature on Cloud, and find teams nearby or work on the same research direction and communicate with other teams through instant chatting feature, which can make it more efficient to manage the progress and easier to contact others. With improvements of this platform, the intelligent map and the accumulation of the cloud, iMAP will be a practical platform to assist iGEM for all iGEMers

中山大学软件队 SYSU—Software

CRAFT – Community Retro-synthetic Analysis Functional plaTform

Genetic circuit design based on targets and chassis choosing are two obstacles concerned in complex synthetic system design, which are time-consuming and convoluted with repetitive experiment and trial to determine the appropriate circuit. To address these problems, we developed Community-based Retro-synthetic Analysis Functional Platform (CRAFT), an open and self-acting software for user to customize their own circuit from base sequence level. CRAFT mainly consist of two closely interconnected modules, the automatic selection system, excogitating and choosing the most appropriate circuits and chassis species conform to user's demand based on flux balance analysis (FBA), and the experimental scheme auto-generation system, providing standard protocol and unique data frame for previously selected pathways and chassis species, modifying FBA model with experiment data. In conclusion, our software have developed a more precise and self-revise system, integrating software design and experiment realization more closely, making complex synthetic system design accessible and practical.

浙江大学 ZJU—China

Enigma：Cipher Machine

Synthetic genetic oscillators have long been of interest to the scientific community.

Our team has constructed a special oscillator gene circuit manipulating two quorum sensing autoinducers to change periodically, and reach their peak value alternately. Inspired by Enigma machine, we intend to use our oscillator circuit to make a biological cipher machine, which is able to encrypt and decipher information consisting of two basic elements. In our design, blue and red fluorescence stand for two basic elements of input and output. When one protein reaches its threshold value, a corresponding gene circuit will be triggered, either to retain the original element, or to change it to the other one. Using this method, we could realize the periodic conversion of a code book, which is hard to be deciphered. We hope this design can be an innovative attempt to apply synthetic biology to information safety from the aspect of interdiscipline.

华中农业大学 HZAU—Igem

BioPaFiAR: Bio-Pattern Formation in Augmented Reality

Bio-pattern formation is the establishment of spatial patterns in morphogenesis. When guided by computer, the spatial pattern of a group of cells can be altered in an augmented reality space created by superposing a computer simulated virtual space on a real culture apparatus. In our project, light-switchable synthetic gene circuits are adopted to control the mobility of E. coli cells by light-mediated real-time communication between the real bio-pattern in culture media and its virtual counterpart in computer simulation to implement a synchronized growth. Eventually, the shape of the colony matches the preset pattern we want and thus a “what you see is what you get” platform for the study of bio-pattern formation is obtained. Our system can also be extended to eukaryotic cell community to modulate cell fates in the future which will be particularly useful in aiding the development of biological tissues and the regeneration of organs.

S1 你好~ 这里是中山大学

撰稿：牟泽鲲

中山大学（Sun Yat－sen University，SYSU），由孙中山先生于1912年在广州创办。历经风雨九十载，中山大学已经成为一所国内一流、国际知名的现代综合性大学，同时正在向世界一流大学迈进，努力成为全球学术重镇。

学在南校 - 广州南校区

中山大学的“大本营”，学霸云集之地，也是周末市民散心游玩，拍婚纱照的好地方。

南校区坐落在广州市中心，珠江南岸，曾为岭南大学旧址。校园内古木参天，碧瓦红砖，古朴静谧，被誉为“最美大学校园之一”。

走出校园，却尽是繁华。南校园周边600米内有603个公交站，成为**全国出行最便利的大学校园**。若是在北门远眺，珠江新城和广州塔尽收眼底。

2016 SYSU－CCiC就将在南校区举办。

吃在东校 - 广州大学城东校区

东校区位于广州大学城，总占地面积98.9万平方米。相比南校区，东校区更富有现代感。东校区一直因为相对较好的生活条件备受中大人青睐，也有了“吃在东校”的美称。

东校区在学术上也毫不逊色。**国家超级计算广州中心**落户东校区，同时还有光电材料与技术国家重点实验室、**有害生物控制与资源利用国家重点实验室**以及一批实力强劲的人文社会科学学科。

图中工学院大楼为东校区地标性建筑，中山大学90周年校庆时登上Bing首页。

住在珠海 - 珠海校区

面朝大海，春暖花开。

珠海校区**面积最大**，三面环山、一面向海，是不可多得的求知治学胜境。 校区交通便利，乘车到拱北海关去澳门仅30分钟，乘船去香港仅2个小时。校园住宿条件优越，因此，中大人常说“住在珠海”。

珠海校区凭借“中大—珠海模式”，成为中国高等院校异地办学的成功范例。结合校区优势，已建立珠江口西岸区域经济发展研究基地、旅游研究院旅游影响研究基地、海洋生物技术研究中心以及**与丁肇中博士合作的热控实验室**等。

死在北校 - 广州北校区

中山医学院所在地，医学相关专业在此集中，行走的学神们在这里闪耀。

地方虽小，实力却很强。中山大学医科最早可追溯至创办于1866年的博济医学堂，它是我国最早的西医学府。经过一百四十多年的薪火相传，科研、教学与临床实力均居国内前列。现拥有**8家直属附属医院**及多个院区。

因为医科生实在是太辛苦太辛苦了，所以就有了“死在北校”的说法。

S2 SYSU-CHINA

历史战绩

2011年	bronze medal
2012年	silver medal
2013年	gold medal
	Best model
	Best New BioBrick Part, Natural, Asia, Overgrad
	Best Wiki, Overgrad
	Finalist, Overgrad
2014年	bronze medal
	Best New Composite Part, Undergrad
2015年	gold medal

队伍简介

16年的队伍有10人，分别来自生科、数计、传设等专业，我们本着“认真做科研，快乐每一天”的态度参加iGEM比赛。

今年项目简介

Our project enables cells to present different colors when they experience different numbers of cell-cycles. By lining up different recombinase UNITs (e.g. VIKA UNIT, VCRE UNIT)in circuit 2 activated by cell-cycle dependent promoters, and different florescence UNITs (e.g. mCHERRY UNIT, GFP UNIT) in circuit 3 activated by constructive promoters, and an inducible tet-on circuit 1, our design enables cells to change one color once a cell-cycle. Therefore, by referring to the color chart, we can determine how many cell-cycles the cells have undergone.This can help confirm whether stem-cells used in Stem Cell Therapy have successfully renewed and differentiated, and how many cell cycles they experienced. In fundamental stem-cell researches, our project can help distinguish actively self-renewing cells from quiescent cells which hardly proliferate. Apart from these, our project has many other potential applications in both fundamental and applied science.

S3 SYSU-Software

SYSU-Software自成立以来，一直致力于通过开发软件，解决合成生物学问题。我们之前开发的CORE、FLAME等软件，基于简化通路设计、预测实验结果、提供实验方案等方式，让合成生物学研究人员可以更好地进行科学研究。

队伍组成

由于iGEM比赛的跨学科性质，完整的项目包含了生物理论、数学建模、编程实现和美术设计等模块。为了建设一个科学全面的团队，SYSU-Software分成生物组、模型组、程序组以及设计组这四个模块。整支队伍由来自生命科学学院、数学学院、数据科学与计算机学院、传播与设计学院和逸仙学院的成员组成。

交流与合作

SYSU-Software积极参加国内外的交流活动。曾参加过iGEM亚洲研讨会等交流会，并与南京大学等国内一流高校有过项目上的合作。这次作为CCiC的主办方之一，团队也将做好东道主的角色，积极主动地对外交流。同时，我们也十分期待各队伍与我们的合作。

S4 广州小浪

撰稿：马立真

小北门：广州市海珠区下渡西街(中山大学东门进入向北直走)

小北门：循着飘香的气息，穿过热闹的窄巷，来到小北。无论你来自何方，阳春白雪抑或下里巴人，美食的旋律日夜不息。

广州塔：广州市海珠区阅江西路222号(中山大学北门沿江向东直走)

广州塔：她，是太阳的白衣仙子，端庄婷立，素服无暇；她，是月亮的七彩舞娘，妖娆多姿，华衣灼灼。你，又眷恋哪个她？

珠江夜游：中山大学北门

珠江夜游：霓虹灯收尽白日的燥热，唤起夜晚静谧的色彩，像是宠儿，独留满眼的绚烂。争渡，争渡，踏起千层光路。

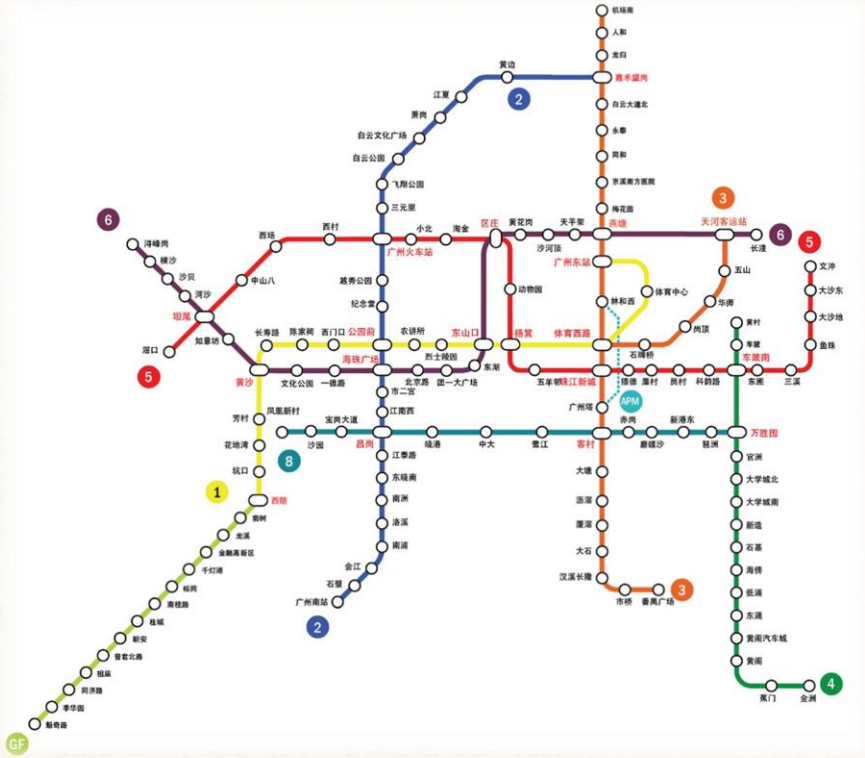
二沙岛：中山大学北门珠江对面，可通过海印大桥或广州大桥过去

二沙岛：肖邦奏响小调夜曲的第一章，马奈执起春天的调色笔，餐厅的清脆银器敲击着梦想，灰色的石板滴滴答答地私语，而你牵着伞。

其他地点：如果你喜欢消遣娱乐，这里有珠江新城、体育西路以及上下九，那里有数不尽的娱乐场所和美食靓妆；如果你喜欢自然气息，这里有华南植物园、白云山以及越秀公园；如果你喜欢历史遗迹，这里有沙面、陈家祠以及黄埔军校。如果你还喜欢……**你喜欢的都在我们的公众号，快翻到封底扫码关注吧~！**

S5 地铁交通指南

撰稿：刘皓傲



线路1：广州白云国际机场→中山大学南校区

机场南（3号线）→ 客村（转8号线）→ 鹭江（B出口，右转前行约300米抵达中山大学东校门）→ 中大（A出口，向左直走抵达中山大学南校门，距离会场最近；B出口，抵达中山大学西校门）。

线路2：广州南站→中山大学南校区

广州南（2号线）→ 昌岗（转8号线）→ 中大（同上）→ 鹭江（同上）。

线路3：广州东站→中山大学南校区

广州东（3号线）→ 客村（转8号线）→ 鹭江（同上）→ 中大（同上）。

线路4：广州火车站→中山大学南校区

广州火车站（2号线）→ 昌岗（转8号线）→ 中大（同上）→鹭江（同上）。

S6 如何找到隐蔽的会场——贺丹青

撰稿：刘的傲

中大站A出口线路

中大站A出口出站，向左沿围墙直行，到达**中山大学南门**；
进门后沿大道直行，在道路左侧第二个路口将看见**测试大楼**；
在此路口左转，至在道路右侧见到**马文辉堂**（生物博物馆）；
在此路口右转上一个小坡，在道路左侧即可看见贺丹青堂。

中大站B出口线路

中大站B出口出站，向右直行至**中山大学西门**；
第一个路口右转，沿大路行走，直至在路左侧看见**马文辉堂**；
转入马文辉堂右侧的小路（上坡），在左侧即可看见贺丹青堂。

马文辉堂

贺丹青堂

致谢


SUN YAT-SEN UNIVERSITY


SCHOOL OF LIFE SCIENCES


iGEM


iGEM


iGEM_BIT


gcu
China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2016
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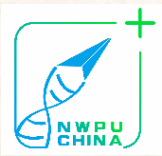
iGEM
Team Tianjin


NWPU
CHINA


ZJU
iGEM


NANJING-CHINA
iGEM 2016


SZU iGEM
深圳大学
SHENZHEN UNIVERSITY


aSTARice
SCAU 2016 iGEM


PEKING


iGEM
FAFU-CHINA


SYSU-CHINA 2016


NUDT iGEM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SJTU Software
Share And Connect


Cistrons Concerto


SJTU
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主办：中山大学生命科学学院

承办：中山大学iGEM实验队 SYSU-CHINA

中山大学iGEM软件队 SYSU-Software