1. Would any of your project ideas raise safety issues in terms of: researcher safety, public safety, or environmental safety?

First of all, the safety of the researchers is guaranteed. In the molecular laboratory, many chemicals such as EB pose a threat to human beings, so we use chemicals with higher safety coefficients instead. For example, EB can be replaced by Gel Green and Gel Red. At the same time, we place and deal with the toxic chemicals in an isolated area in case we pollute other chemicals or laboratory items. Besides, we assign one person to do safety-checks every morning (before 8:00a.m.), every afternoon (12:00a.m.~1:30p.m.) and every night(after10:00p.m.) to reduce the possibility of safety problems.

Secondly, we insure public safety when we do experiments. Because many chemicals are toxic and many bacteria are resistant to antibiotics, chemicals and bacteria are taken in and out of the laboratory carefully. Apart from garbage or necessary things, everything taken into laboratory can't be taken out in order to prevent toxic substances and transgenic bacteria from coming out of the laboratory.

Lastly, environmental safety is also considered. Before being discarded, all transgenic bacteria grown on the culture mediums is sterilized by autoclave so that transgenic bacteria won't spread. Toxic garbage is dealt with carefully. All garbage is placed individually and recycled by a special department. There is someone who is responsible for storing and using antibiotics when they are needed and making sure that antibiotics aren't taken out of the laboratory.

2. Do any of the new BioBrick parts (or devices) that you made this year raise any safety issues?

All the frameworks of plasmids we use in iGEM are from MIT parts registry. Because there are antibiotic resistance genes on the plasmids, bacteria carrying the plasmids may recombine genes with other bacteria. This can result in bacteria with resistance to many antibiotics, so we pay special attention to transgenic bacteria. The transgenic bacteria to be eliminated need to be sterilized by autoclave, and the garbage is dealt with alone.

The strains we use in this project are *Planktothrix rubescens* and *Escherichia coli*. In the studies about Synthetic Biology, *Cyanobacteria* and *E. coli* have been widely used. Some commercial strains, such as Top 10 strain, have been proved harmless to the human body. Although many species of *Cyanobacteria* and *E. coli* are toxic to human beings, the strains we chose are nontoxic. All the experiments are done in the laboratory, and the bacteria can't be taken out of the laboratory. Our work will be able to decrease the possibility of biosafety problems of the public and the environment.

3. Is there a local biosafety group, committee, or review board at your institution?

As for biosafety and laboratorial safety, our college has been formulated according to laboratory safety management regulations-laboratory safety system, which is aimed at our iGEM laboratory, iGEM team member experiment rules and laboratory management rules. In order to promote safety education in college, under the promotion of the students, the school has set up the compulsory course "experiment equipment use procedures and laboratory safety" for all freshmen. At the same time, our laboratory has established a complete safety management system, designed to ensure safety during the project progress in the laboratory,

and to eliminate hidden dangers of the lab. As for waste in the experiment, our college has a special waste recycling mechanism to avoid the outflow of hazardous waste. Besides, the People's Republic of China issued a document "Laboratories—General requirements for biosafety" (GB19489-2004) on April the 5th 2004. It can be viewed at http://www.iphy.ac.cn/aqzt/aqzt_xzzx/201105/P020110503609211780348.pdf

To further strengthen our laboratory safety management, we had been dedicated to Qingdao institution of Bioenergy and Bioprocess Technology Chinese Academic of Sciences professors The professors provided advice about the safety management of laboratory system, hoping to make improvements on our own safety management mechanism based on their advice and practice system. Also, we hope that the experts of the institution will make an assessment on the safety of the experimental project and make suggestions to ensure the safety of the biolab.

In order to let more members be aware of the importance of biological safety and lab safety, we are going to set up our own community about promoting biological safety and laboratory safety. We hope to arouse attention to biological safety and laboratory safety in every laboratory in our college.

4. Do you have any other ideas how to deal with safety issues that could be useful for future iGEM competitions? How could parts, devices and systems be made even safer through biosafety engineering?

Before our team took part in iGEM , our teachers educated us on the safety aspects of experiments, and all the members have learned about the safe use of instruments in order to proceed the experiment safely. We recommend that each laboratory write its own laboratory safety management manual. Our members do a safety check daily as special duty laboratory technicians. The laboratory also arranges a security officer to check the instruments and to manage the security of the laboratory.

In order to ensure that genetically modified bacteria from the lab cannot survive in places where it shouldn't, we suggest that the bacteria used in the experiment be nutritionally deficient and be developed in nutrition supplemented culture medium. As a result, leaked bacteria would die of nutrition deficiency. For instance, 2011 OUC-China iGEM team used auxotroph bacteria to achieve a multiple symbiotic system. The effect is that one colony is not able to live independently in the in the system of symbiosis. http://2011.igem.org/Team:OUC-China

As for the selection of strains, we suggest that each iGEM team replace pathogenic strains with non-pathogenic strains. Bacteria implanted with toxins genes can be added with LVA tags to speed up toxin protein degradation.

In addition, we also suggest that some kind of characteristic sequence be added to standard plasmids, to make standard plasmid DNA easy to identify through DNA barcode technology. In this way we can determine whether or not a certain kind of bacteria has gone under standard plasmid reconstruction.