

Symposium on Engaging Undergraduates in Research And Inquiry:

A scholarly Dialogue, May 20, 2011, HKUST

1. Project/Course title

The International Genetically Engineered Machine Competition (iGEM)

2. Project/Course team

| Name | Institute | Post | Department/ Division | E-mail |
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| <i>Course Instructor/Project leader:</i> Prof King Chow | HKUST | Professor/Project leader Director | Biology MBMS | bokchow@ust.hk |
| <i>Members (if any):</i> Dr Jessica TANG (instructor) Mr Sun WONG (instructor) Swift CEHN (advisor) Angela LIU (advisor) Kelvin MIU (advisor) Vito NG (advisor) Helen ZHONG (advisor) Joyce ZHANG (team member) Rory LI (team member) Tim WANG (team member) Wendy LU (team member) Audrey SU (team member) Andrea FENG (team member) Hanson JIANG (team member) Yimo WANG (team member) Elizabeth HONG (team member) Julie LIN (team member) Victor XIE (team member)r Karen KE (team member) Jack LIN (team member) Philo FU (team member) | HKUST | Program Assistant Research Assistant Year 2 UG student Year 2 UG student Year 3 UG student Year 3 UG student Year 2 UG student Year 2 UG student Year 2 UG student Year 1 UG student Year 1 UG student Year 1 UG student Year 2 UG student Year 1 UG student Year 1 UG student Year 1 UG student Year 1 UG student Year 1 UG student Year 1 UG student Year 1 UG student Year 1 UG student Year 1 UG student | MBMS Biology Chemistry Biochemistry MBMS MBMS Biochemistry MBMS MBMS Biochemistry Biochemistry Biochemistry CBPE Biology Biology Biology Biochemistry Biology Biochemistry Chemistry | bocemun@ust.hk |

BEFORE

3. Project/Course objectives (Intended Learning Outcomes) (Suggested number of words 30-40 words)

What did you intend students to learn from this project/course?

1. To be proficient in literature searches to find information about the untested ideas of the project.
2. To be able to define clear viable project objectives and execute them accordingly.
3. To be able to manage the project on time and respond to unexpected factors which arise during the project.
4. To acquire the molecular biology laboratory techniques required for making the genetic constructs.
5. To work as a team, collaborate and communicate effectively among the team members.
6. To familiarize with the practice of synthetic biology, the limitation, various ethical issues associated within the field and its impact on applications in different fields.

DURING

4. Inquiry Based Learning Activities (Suggested number of words: 75-85 words)

What did students do (inquiry-based learning activities) during the course/project?

Students had to design a project and its objectives first by searching through literature and discussing it with the project leader. The whole project involved careful planning and students had weekly 2-hour discussions with the group leader. The group leader was only a facilitator providing insight, resources and practical recommendation, but the actual project direction was led by the students. The students had to search for experiment protocols before they could carry out the experiments. They also had to trouble shoot when the experiments did not work.

AFTER (Suggested number of words for items 5 & 6: 50-60 words)

5. How did you assess the effectiveness of students' learning?

Please give an account of the assessment methods and results.

As this was a competition, students were not directly assessed on their learning. The project leader had weekly discussions with the students for approximately two hours, when they had to report their results and also discuss the next step forward for the project. The instructor who was based in the lab also checked if students were performing the laboratory techniques correctly.

6. What were the major outcomes of this project/course? Do they match with your Intended Learning Outcomes (objectives)?

Examples of outcomes include educational software, improvement in student learning or change in student attitude.

Even though not all students could attend the competition at MIT, they all found the project an excellent learning experience and had increased their desire to carry out research work as undergraduates. The students were able to pick up the techniques quickly and were able to read and understand papers and also plan their project carefully. They were able to practice teamwork over an extended period of six months, and put various knowledge acquired in class into real life practice. These outcomes are largely what we have expected. At the Jamboree at MIT, students had to present to the other teams and judges which gave them an opportunity to demonstrate their communication skills. The HKUST team won a gold medal which was a strong encouragement for them.