**Human Practice**

（文档中的中文内容之后会替换为英文，当前只显示HP wiki的基本布局框架）

**一、Overview**

During our project "S-Din", we brainstormed many aspects concerning our project, and took them into practices to confirm or to overturn our hypothesis. Then, we tried to integrate them into our final project in order to improve the project functions and user experience.

Through discussions, interviews with professionals or scholars in different fields, and search related policies, we had a better awareness of our project in the context of scientific inspiration, societal attention, safety and security, and legal considerations. Click “**Silver**” for more details.

when designing the project we integrated many fine details into the software. We tried hard to make more positive contributions to scientific and societal practices, and reduce and even eliminate the potential negative impacts. Click “**Gold**” for more details.

Combined with user needs investigation and social promotion, our project is a new product in fact. We wrote a user statement for our product. Click “**Integrated Human Practices**” for more details.

Click “**Public Engagement**” to see how we communicated with public in our special activity and what we learned from them.

We also acknowledge all the help and **collaborations** with other iGEM teams and express our sincere gratitude to them.

**二、Silver**

**Overview**

During the project, we brainstormed many aspects concerning our project. These aspects can be roughly divided into **two basic problems**:

(1) What advantages will our project have to **raise scientists’ ideas**, which may lead to a wonderful genetic design? Or what to **raise ordinary bio-lovers’ interest**, which may attract them to learn more about synthetic biology?

(2) What impacts will our project have in different fields of **society**?

Through discussions, interviews with professionals or scholars in different fields, and search related policies, we had a better awareness of our project in the context of scientific inspiration, societal attention, safety and security, and legal considerations. These “inspirations” help us improve our S-Din a lot.

**1. Interview of other iGEM teams and ordinary bio-lovers**

（大致内容是：我们了解了他们对S-Din构想的评价、他们目前的困惑、需求、兴趣点，他们提出的问题或建议、我们针对于此的思考）（每一部分都会配0~2张图左右）

**[Motivation: ]**

Every production (including a software) is designed for users’ needs. We hope to learn about what problems other iGEM teams meet, and to analysis what they need to solve their problems. What’s more, the intention of ordinary amateurs is also taken into account.

**[Practices: ]**

This summer, we were very glad to have a chance to collaborate with an iGEM team NJU-China. They got in trouble when they urgently needed to collect some data online---- what happened to be our strong point as we are a software team. We provided a script to them and solved their problems.

And then we communicated with NJU-China team members and summarize the reason behind their problem. We found that their problem was originally based on ----**fragmented data, and lack of means of integrating the data.**

We discussed among our team members about fragmented data. Nowadays data belonging to every subject was scattered around the Internet. Many people spend much time on integrate them by themselves---- In fact, they should spend more time on their ideas.

（配图，表示过于分散的数据不利于项目的想法挖掘与完成）

At the same time, we chatted with some students who are interested in biology work. They told us, “We’ll like the software if it shows details of each bio-project, in a way easy to understand.”

**[Inspirations on our project: ]**

An Integrated database is very important for an iGEM team, also for research group. Our software is supposed to have such a database in a standard format, which is easy to understand by users and easy to maintain.

**2. Studying the needs of biology labs**

**[Motivation: ]**

Apart from iGEM teams, biology labs and other biotechnology institutes have more rights to speak from a genetic circuit design in papers to a practical protocol in labs. It is also very interesting and exciting to meet them who will be most likely to be affected by our project.

**[Practices:]**

During the summer, we visited several biology laboratories of Sun Yat-sen University. Researchers warmly greeted us. Thanks to Prof. Lu Yongjun’s help, we finished our interlab task and wet-lab validation in his laboratory.

（配在实验室做实验的图or与实验室研究员共同入镜的交谈照）

By talking with researchers working in the lab, we were surprised that lack of ideas is one of the common problems when they work on a synthetic biology project.

“A good beginning is half done. That is to say, a good idea of genetic circuit design is half done of the whole project.” A researcher told us.

Since ideas are so significant to a project, where do researchers’ ideas usually come from? How much time do researchers usually spend on an idea? We did a small survey of researchers in several labs.

（配上两份饼图，显示idea来源比例&花费时间的比例，数据我打算自己调……）

From the figures above, we learned that the majority of researchers’ idea source is professional research articles and journals. However, different articles on synthetic biology or biotechnology, bio-engineering usually describe its design in the author’s own style and standard. which is sometimes hard to understand and absorb its design ideas for our own creative work.

“We all hope to stand on the shoulders of the giant, but it’s hard at this stage to combine or transfer the senior’s ideas in order to form my own ideas.”

**[Inspiration on our project: ]**

**3. Learn Biosafety Policy**

**[Motivation:]**

**[Practices:]**

**[Inspirations on our project:]**

**4. Consult to the Biosafety and Ethics Advisor**

**[Motivation:]**

如何引导公众关注生物伦理与生物安全——这是我们在项目开发前所急需了解并重视的问题。我们尤其关心：

（1）在电脑软件上进行虚拟的生物遗传设计，有哪些容易被我们忽视的生物安全隐患？

（2）信息时代，使得公众能即时、迅速了解各种渠道的信息，这是我们向公众普及正确的生物伦理观念的好机会，但也可能相反。我们希望贺教授能提供一些他的建议。

**[Practices:]**

九月份中旬，我们团队拜访了中山大学生物安全委员的顾问贺竹梅教授，他既是进行生物学研究的学者，同时也致力于引导公众关注生物伦理与生物安全。

（picture）

贺教授对我们的造访表示惊讶，“主动来找我们了解生物伦理方面的内容的人还是比较少的。像你们这样的本科生参赛团队，会主动思考生物安全问题，难能可贵。”我们进行了约半个小时的愉快交流，贺教授简单了解了我们项目的初衷，耐心地解答了我们的困惑，同时给出了不少新的思考生物伦理的角度。

对我们提出的第一个问题，贺教授表示，不论是传统的湿实验室内进行的生物研究，还是目前流行的借助软件进行模拟生物设计，要维护生物安全最重要的是树立生物安全意识，并且体现到每一步操作中。而作为生物软件的开发团队，我们有责任在与用户的交互过程中提醒他们遵循安全可靠的设计原则，并对危险操作发出警告。这个建议给我们后期的软件开发注入了新的灵感。请阅读“安全评估”部分了解我们为此做出的努力！

对于我们的第二个关切，出乎我们的意料，教授和我们进行了一场丰富开放的生物伦理讨论，有一些……

**[Inspirations on our project:]**

**5. Consult Microsoft staff about Information security**

**[Motivation:]**

（软件收集用户兴趣数据后，怎样有效保障用户信息的安全与不泄露？软件健壮性如何维护？如何确定软件的目标用户？对方的建议，我们的思考）

**[Practices:]**

**[Inspirations on our project:]**

**6. Consultation on intellectual property issues**

（我们为知识产权的疑问咨询了相关学者，与文献的出版社沟通，出版社的回复，我们的思考）

**[Motivation:]**

**[Practices:]**

**[Inspirations on our project:]**

**三、Gold**

（一段overview）

1. “关键词分级树”探索对灵感的启发

[Inspirations we have learned:]

[Integrated into project:]

2. 软件完善了安全提示的用户交互功能

[Inspirations we have learned:]

[Integrated into project:]

3. 编写了软件的安全声明、用户协议，解决可能存在的法律纠纷

[Inspirations we have learned:]

[Integrated into project:]

4. 与文献出版社的事先沟通，确保无知识产权的“迷雾区”

[Inspirations we have learned:]

[Integrated into project:]

**四、Integrated Human Practices**

（一段overview）

(1) User needs analysis

(2) Needs & Functions integrating

(3) Project Assessment

1. 安全性评估（底盘生物风险组、红旗元件的筛查）

2. 软件的稳定性评估

2.1. 软件的安全提示交互，平易近人

2.2. 搜索与重设计的无缝对接，用户友好（采用SBOLv标准化通路，元件与骨架可在画图设计模块里任意拖动与编辑）

3. 用户体验评估

（面向对合成生物学领域感兴趣的任何个人和团队，尤其欢迎专业人士与iGEM队伍）

(4) Social promotion

推广给各个实验室/iGEM队伍

公众参与部分

(5) Our product statement

（一段Summary）

**五、Public Engagement**

（一段overview）

1. 生物节摆台，推广小游戏与合成生物学的生物设计思想

（公众对合成生物学的奇妙感到惊讶，但了解不够深入，短短的摆台也很难完全解释清楚他们理解上的困惑，公众的疑问，我们对此的思考）

2. “贪食蛇”合成生物学小游戏的推广

（让公众以轻松愉快的方式接近、了解合成生物学，同时寓科普于娱乐中，但很多人停留于游戏本身的目标，并未像预期一样增进对合成生物学的理解，我们的思考：游戏与合成生物学的设定要更紧密些？科普语言的浅显程度？）

3. 对新生/高中生的宣讲会，介绍项目idea及合成生物学科普

（新生/高中生对宣讲内容的反馈，他们的问题，我们的思考）

4. 合成生物学峰会

（邀请社会学、计算机、生命科学领域的学者，共同探讨合成生物学的发展对各自领域的潜在影响，以及他们对软件的一些建议，我们的思考）

5. 华农联合宣讲会

（与xxx学校的iGEM队伍交流，他们给软件的建议，我们的思考）

（一段Summary）

**六、Collaboration**

（一段overview）

1. Collaboration with NJU-China

(How we cooperated with each other…)

2. Meeting up with HKUST

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3. Biology Festival with SCAU-CHINA

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4. Attending Joint Lectures held by SCAU-CHINA

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