# PUBLIC ENGAGEMENT

**INTRODUCTION** :

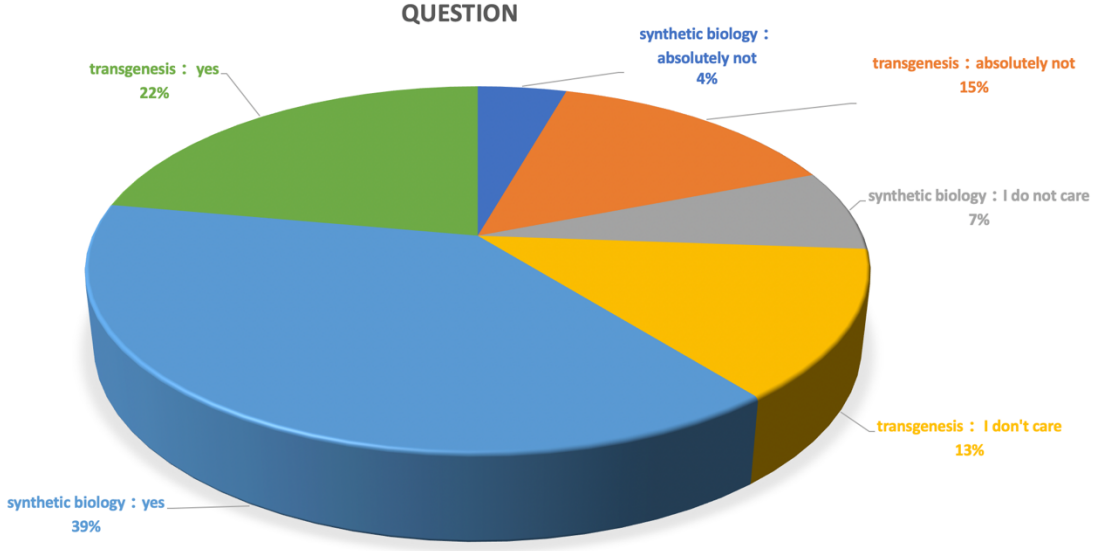
This year, we hosted various workshops and speeches on the applications of synthetic biology, introducing the idea of making wearable clothing completely out of bacteria to the public. Besides that, we compared and contrasted the perspectives on natural pigments from Native American and Chinese artists. By establishing a long-term collaboration with Xiaolei, a traditional natural pigment artist, surprisingly, we were able to change her attitude toward synthetic biology after a few visits. She was inspired by our project and started to design and test with new dyeing methods. We documented her responses by recording interviews to keep track of these changes.

## PUBLIC SURVEY:

Description:

Before we started to advertise our spider silk products, our team published an online survey to investigate local communities' perspectives on the influences and values of GMOs, including the wording biases that people hold against synthetic biology. In the survey, we ask people the exact same question with different descriptive wording (Transgenesis or Synthetic Biology).

FIGURE 1. PEOPLE'S RESPONSE REGARDS TO DIFFERENT WORDING OF THE SAME QUESTION




Reflection and adaptations:

Noting the significant bias in people against synthetic biology, we realized the necessity of carefully choosing our wording as we engaged public education. On the other hand, this illustrates to us the need for more public educations and exposures on the subject of synthetic biology, so that the worries of the public could be eliminated.

## XIAOLEI

After realizing biosynthetic natural dye may challenge the traditional, handmade dye industry, we engaged with some stakeholders to ask for their opinions. Xiaolei, a successor to a natural dye colorist from Guilin, was invited to our lab for three times.

### 1ST VISIT:

**DESCRIPTION:**

From this workshop, we tried to explore the similarities and differences in Chinese and Native American cultural approaches toward natural dying by comparing this with the visit to Almany dye farm.

**“Silk conducts the best coloration with natural dye among all the fabric we use.”**

Xiaolei demonstrated four different traditional dyeing methods that was prevalent in ancient China: shibori, wax dying, textile printing and katazome. The basic principles of all of these dyeing methods are based on the obstruction of the cloth and dye, also known as resis dyeing. Generally, different techniques could be combined in order to ahchieve a more desirable result. We created our first bucket under the instructions from the artist, and applied the techniques to creat our own team flag.


Figure 2: Indigo colorist workshop. We died our own team flag by applying the method we learned from indigo artist

Shibori（扎染）: As one of the most commonly used dyeing techneques, it requires manual compression of certain area on the cloth to create a repetitive pattern on cloth. The compression could be made from thread, stitches or even wrapping of the cloth to a certain angle.

Wax dying（蜡染）: using heated wax as to isolate the dye and the cloth

Textile printing（印染）: (Demonstrated as the picture shown below) Textile printing involves a predesigned model of desired pattern. The cloth will then be pressed from the block from two sides as the dye emerges the cloth.

Katazome: Originated from Japan, this dyeing requires the artist to apply hydrophobic solution (usually made out of wheat or rice ) on the cloth to form the design that will not contact the dye.

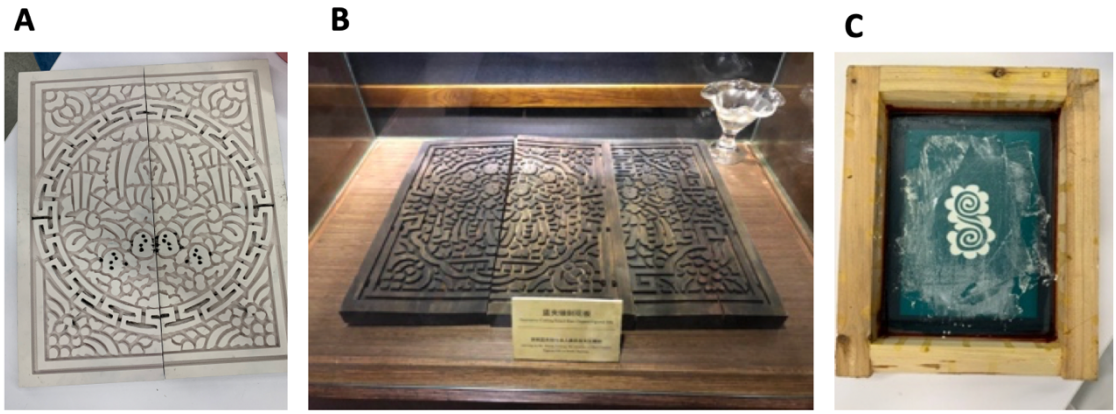



Figure 3: Models used in various traditional dying techniques. A, Plastic block used in textile printing; B, the ancient handmade wood block used in textile printing, photo taken at Silk art Creative Park of China);C, A model for combined usage of Textile printing and katazome.

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### REFLECTIONS AND ADAPTATIONS:

From this visit, we interviewed the perspective toward synthetic pigments from a natural dye colorist. Her initial responses were largely negative and she remained conservative toward the use of synthetic pigments. Interestingly, both Chinese traditional dyers and Native American traditional dyers believe in the use of plant-made dyes on the assumption that synthetic biology may provide a more sufficient quantity at a cheaper price. Xiaolei explained that the pigments might no longer be considered as “natural” if it’s artificially “synthetic”, which contradicts with its original purpose. However, as our own pigments were successfully produced, her perspective was changed as she visits our lab for the second and third time.

### 2ND VISIT :

On the second visit of Xiaolei, we presented her our own produced natural pigments and recorded an interview of her responses under her consensus. We interviewed Xiaolei’s perspective toward synthetic pigments as well as her insights in current developments of natural dyes. Her special perception on hand-dyed products helped us to understand the importance of preserving these traditional handcrafts, which are irreplaceable in the area of mass production. Her responses correspond to the values held by the Native American artists, providing us with an unexpected vision toward hand-dyeing traditions.

See our video at the end of the document (video-1)

Furthermore, when xiaolei came to our lab on her second visit, she brought a friend to the lab. We interviewed her anonymous friend, who also helped evaluate our project from the perspective of a potential customer.

See our interview with our potential customer at the end of document: (video-2)

### 3RD VISIT:

When Xiaolei visited to our lab for the third time, we can see that she has become more interested in our natural pigments' application as well as their functions. She agreed to give us some feedbacks on the quality of our natural pigments by trying several trials. When asked if she can give us some feedbacks on the quality of our natural pigments by using it to dye some sample clothes, her direct responses were as follows:

"The dyed cloth doesn't have any weird order, which most plant dyed clothing has. The color quality of the dye is way better than I expected. The colors on the cloth were easily well-distributed. I would recommend you to test the color fixation under other conditions, like Sun exposures and wash with basic soaps."

As demonstrated above, responses from Xiaolei became more and more positive as she understood more about our project and the basics of synthetic biology. Meanwhile, we were glad to see she is influencing others' perspectives by showing her willingness to try our synthetic natural pigments and introducing synthetic biology to her friend.

Figure 4. Clothing Xiaolei dyed with deoxyviolacein produced from our lab using traditional techniques. All the dying materials strictly follows the “do not released” policy.

## Workshops:

Figure 5. collaboration with a local Kimono club, discussing about potential application of spider silk and natural pigments different type of clothing.


Figure 6. GreatBay_SZ members interacting with local schools /communities

## CONCLUSION:

From our public engagement, we realized that the traditional artists were all trying to protect the traditional heritage from blending into the modern world. The workshops we held with Xiaolei inspired us to communicate to the public, revealing diverse perspectives of evaluations on our project. The responses from Xiaolei and her friend gave us a deeper understanding from the perspective of traditional colorists.

These workshops led us to understand the concerns that people hold upon synthetic biology, and we changed our approach from simply advertising the project to giving real demonstrations, which we found has successfully changed others perspectives.

The development of synthetic biology has infinite possibilities and applications in the times to come, and it takes time and demonstrations of the capabilities of synthetic biology to gradually alter the public's view towards such development, making the public more widely accept synthetic biology and thus allowing it not only to benefit users of clothing created through this process, but also artists and innovators who may utilize this process to express themselves or use the biologically synthesized fabric in new and inventive ways.