IFFTI Faculty Exchange Initiative (Cycle Four) Project Report

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Introduction

This report presents the outcomes of my faculty exchange trip to China, which was granted by the IFFTI Faculty Exchange Initiative (Cycle Four). The IFFTI grant not only provided financial support for the trip, but also connected me to faculty and students in the Fashion Design and Engineering (FDE) Department at Donghua University, the IFFTI member institution located in Shanghai, China. DHU's FDE department's faculty and students provided me with such great support to fulfill all four purposes of the trip: (a) to learn about innovations of a new educational model, curriculum, and pedagogy in an interdisciplinary approach incorporating fashion technology and sustainability, (b) to compare industry-oriented technology educational curriculum between the U.S. and China, (c) to observe technological research facilities and equipment available on campus, and (d) to conduct research on the use of three-dimensional (3D) technologies for sustainable fashion practices. During my visit, the activities performed were as follows: 1) tours to on-campus research facilities and departments and introduction to faculty and staff, 2) sitting in the computerized fashion design class to observe the course structures and learning spaces, 3) group discussions with faculty and students who had prior 3D software teaching/learning experiences, 4) attendance at the international fashion exhibitions off-campus, and 5) meeting with DHU's 3D software company partners. Dr. Xiaokun Yu, associate professor in FDE Department at Donghua, organized the schedule for my visit. Please see the table below for the detailed schedule of my trip.

* All activities occurred in Shanghai, China. According to the fashion technology partners' requests, the names of companies were not revealed to protect their intellectual property.

Date	Activities	Location
Sat. Dec. 14, 2019	- Market visit – free-standing fashion stores	Shanghai Time Square
Sun. Dec. 15, 2019	- Market visit – fashion stores in the shopping mall complex	IFC mall
Mon. Dec. 16, 2019	- Meeting with Dr. Xiaokun Yu: • Review on FDE dept. curriculum • Review on FDE's fashion technology courses' structure and software - Tour to DHU campus facilities and museum	DHU campus
Tue. Dec. 17, 2019	- Meeting with FDE's senior students who had taken or were taking 3D software courses. - Visit the fashion technology research facilities (e.g., 3D body scanning lab, Shima-Seiki 3D knitting lab)	DHU campus
Wed. Dec. 18, 2019	- Meeting with 3D software company partner I - Visit the *"Shanghai International Design Week 2019."*	Shanghai Shanghai New Intl' expo center

	- Market visit - fashion stores in the shopping mall complex	Grand Gateway Shanghai
Thur. Dec. 19, 2019	- Meeting with 3D software company partner II - Meeting with Dr. Xiaokun Yu • Q&A on FDE's 3D technology courses • Review on FDE senior students' digitized fashion design and virtual fashion show projects to exhibit at FIT campus in October, 2020. - Sit in Dr. Xiao Ping's Computerized Fashion Design class	Shanghai DHU campus DHU campus
Fri. Dec. 20, 2019	- Meeting with 3D software company partner I - Market visit – fashion stores in the shopping mall complex	Shanghai
Sat. Dec. 21, 2019	- Market visit – Neiwai (Intimate Apparel brand) store with 3D body scanning technology - Meeting with fashion industry partners (e.g., fashion designers and merchandisers working in Shanghai)	Ming contemporary art museum Raffles City Shanghai
Sun. Dec. 22, 2019	- Market visit – fashion stores in the shopping mall complex	Bund 18
Mon. Dec. 23, 2019	- Meeting with fashion industry partners (e.g., fashion designers and merchandisers working in Shanghai)	Shanghai

Details about the activities

1. DHU's Fashion Design & Engineering (FDE) department and fashion technology research labs

FDE department's undergraduate course curriculum is unique because of the interdisciplinary concepts reflected in the program's curated course work. Almost all projects developed through the FDE classes presented the use of the latest fashion technologies (e.g., later cutter, digital fabric printing, digitized pattern making), incorporating innovative fashion business ideas.

Figure 1: DHU's FDE students' graduation project exhibition in the department windows

During my visit to DHU, I had opportunities to see the various fashion technology research labs available on campus. It was impressive that each lab showcases the latest 3D fashion technologies such as a 3D body and foot scanner, Shima-Seiki 3D seamless knitting machine, and body metapolic rate tester. After I saw these technologies, I conducted research and found that there are many existing research publications on the use of 3D technologies for computerized fashion design published by FDE department faculty at DHU. Learning about these studies has broadened my insight for the future fashion technology research.

Figure 2: DHU's technology research labs and equipment

2. Group discussions with FDE's students on 3D fashion technologies and Computerized Fashion Design class

Fifteen students participated in group discussions on different 3D virtual garment prototyping technologies as well as digitized pattern making software. These students had previously taken or were taking classes using 3D prototyping software. My takeaways from the discussions with students include: (a) from the previous internship experiences in the fashion companies, especially, global firms, such as Nike, Zara, and Gap, potential fashion industry employers take into greater consideration for unique design thinking skills reflected in a fashion technology design project over the use of specific software; (b) there are four major 3D software programs frequently used by global fashion companies including DC Suite, Optitex, CLO, and Browzware. Each software has both advantages and disadvantages; (c) currently, the use of 3D prototyping technology is expanded to product development, retail presentation, product planning, and store spatial design in addition to fashion design; and (d) students feel a strong necessity to learn the usage skills of more than one 3D prototyping software to better understand fashion employers' demands.

FDE uses ModaSoft digitized pattern making software for the Computerized Fashion Design class. The students I met in the class explained that digitized pattern making software is becoming more and more user-friendly and compatible with different 3D prototyping software programs. This course is a pre-requisite for taking 3D prototyping course. It was inspirational that the lecturer (Dr. Xiao Ping) used a classroom management software program enabling live streaming of the instructor's software demo onto the students' screens. Students in the class recorded the demo using their mobile phone apps, then replayed the recording when they practiced using the software in their own time. The class size was approximately 25, similar to classes sizes at FIT.

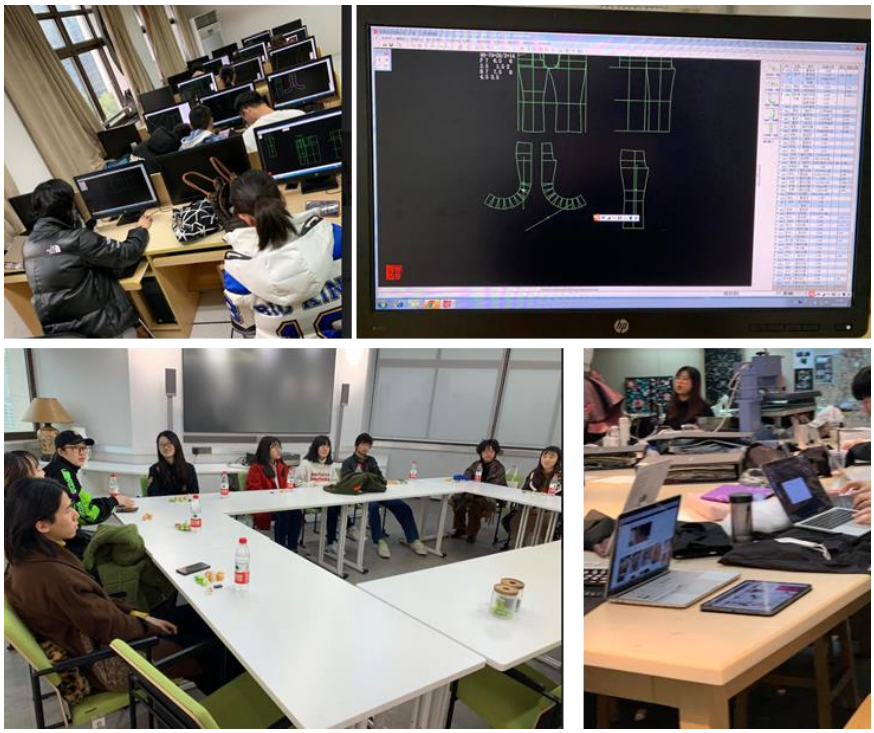

Figure 3: FDE's computerized fashion design class students and group discussions with 3D virtual prototyping class students

3. Tour of DHU's different academic departments and museum

I was fortunate enough to visit DHU's different academic departments' facilities and learn about their undergraduate programs. It was impressive to see that each department has a full industry-scale design studio available for student projects. For example, the Fashion Product Design lab includes a laser cutter and CNC cutter to develop different fashion products including footwear. There were many footwear samples developed by students in the classes.

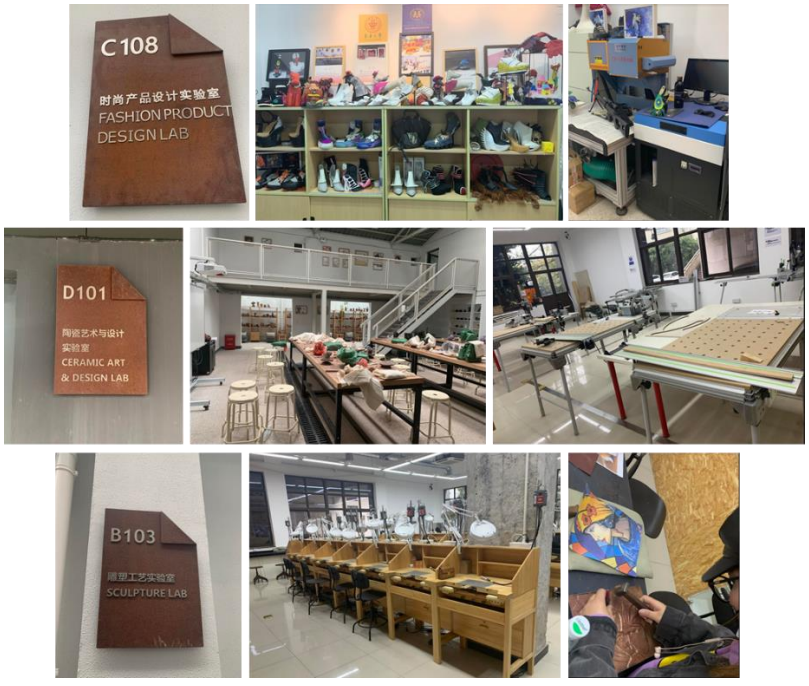

Figure 4: DHU's art related majors' design and crafting studios

I also visited the College of Fashion Design Students' Graduation Project Exhibition on campus. The exhibition showcased the use of mobile app technologies developed for various fashion market segments, such as a virtual reality (V/R) make-up app, and user interface design presenting the concept of sustainability. In addition, I noticed that there are many student projects presented on campus in collaboration with global fashion industry partners such as Swarovski and Lee.

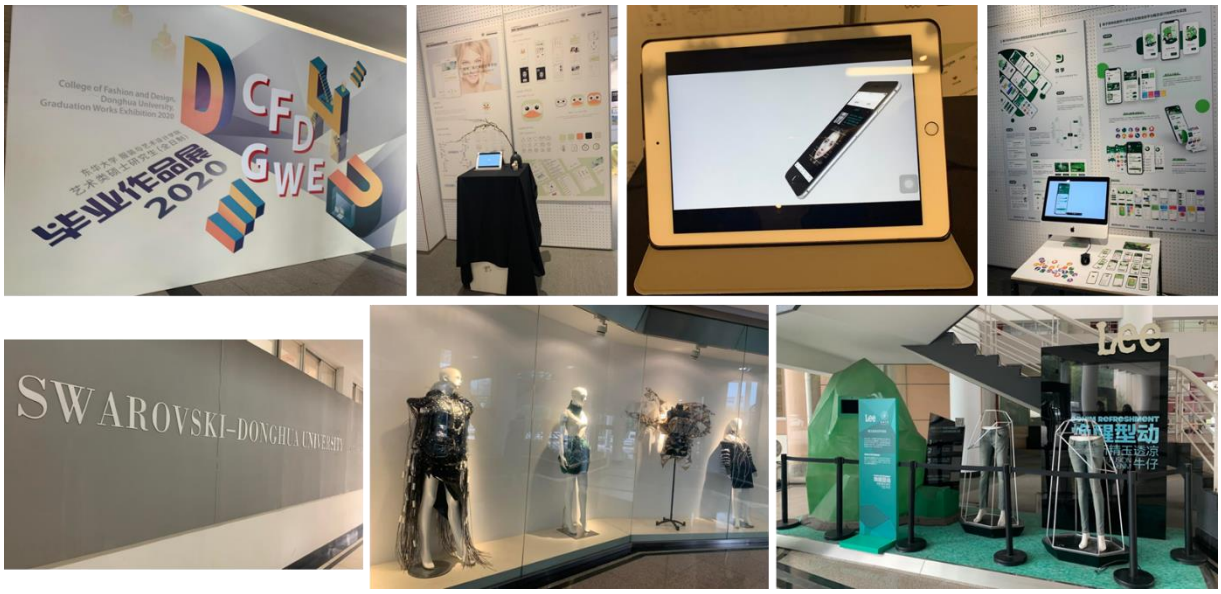

Figure 5: College of Fashion Design Students' Graduation Project Exhibition and industry collaborative projects

Visiting DHU's museum was another unique experience I had during my time on campus. The entire first floor of the museum presented fashion technology projects including two projects in collaboration with the Chinese Government. First, the space-suit development project and fire-fighters' protective clothing project were eye-catching and demonstrated the incorporation of advanced high-tech textile and 3D virtual fitting developed by College of Fashion Design at DHU. Second, the 2010's Shanghai Expo eco-fashion design project using natural fibers showed DHU's advanced level of sustainable design and education.

Figure 6: DHU museum's Chinese government sponsored technology project exhibitions

4. Meeting with 3D Software company partners

I met with several 3D software company partners providing software to academic institutions in Shanghai areas including DHU. The 3D software I observed during the meeting with the company partners demonstrated fabric scanning, body scanning, virtual fitting, and virtual prototyping. Each company described their collaborations with academia and industry clients. I have learned that sports apparel companies most frequently use 3D virtual prototyping software in the Chinese market. Compared to six years ago, when I was working in the fashion industry, I noticed that the photo-realistic quality of 3D prototyping software has dramatically advanced to today.

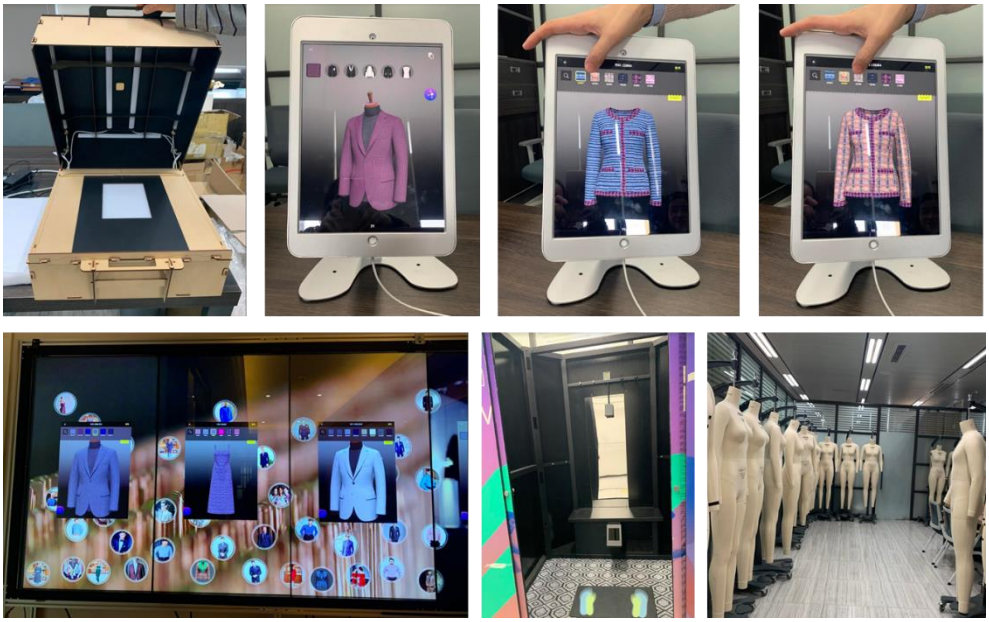

Figure 7: 3D technology partners' virtual fitting and body scanning projects

5. Market visit – Neiwai (3D technology inspired fashion store)

Neiwai is a Chinese native intimate apparel company that has been aggressively investing in the implementation of 3D technologies for product development and in-store consumer experience. The company currently operates the retail chain stores both online and offline. I visited the Neiwai store located in the Raffles City Shanghai Mall close to DHU campus. There is a 3D body scanning station allowing consumers to virtually measure the body specs for selecting appropriately sized products to fit their body. There were user-friendly instructions how to use 3D body scanner available at the cash register area as well as inside of the 3D body scanning station. After a consumer completes a scan of his or her body specs, the screen suggests the best size and product options on the screen. At the end, the screen shows a QR code that the user can download their measurement results onto a mobile phone. The store manager explained that the 3D body scanner available in the store helps to enhance consumer engagement in the brand experience, and the use of emerging fashion technologies, such as a 3D body scanner, positively impacts consumers' attitudes and perceptions toward the company's brand.

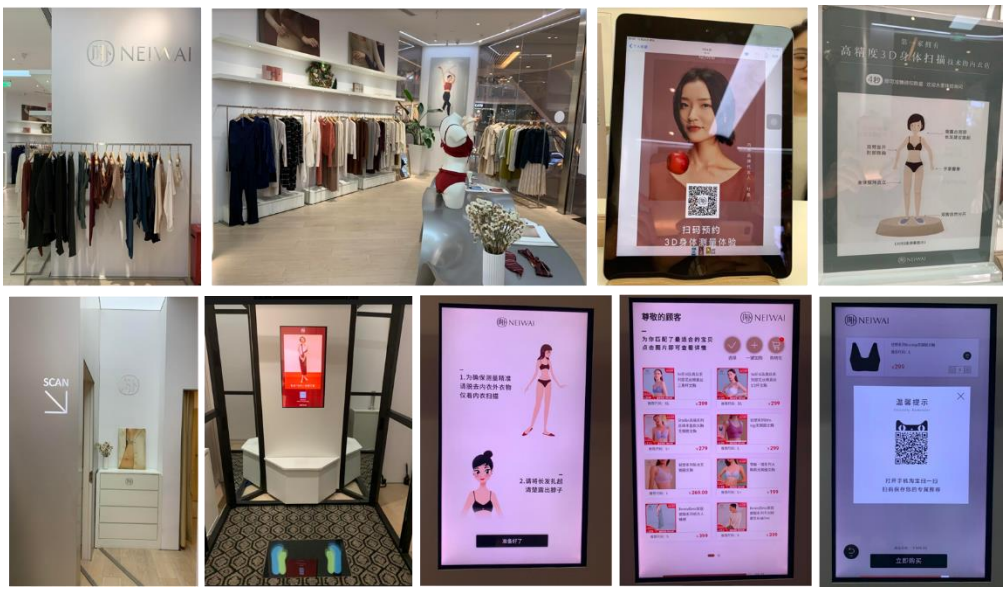

Figure 8: Neiwai store's 3D body scanning technology and consumer experience

6. Market visit – Shopping malls

Rather than free-standing stores, the shopping mall is the most frequently presented retail business format in Shanghai. The malls located close to DHU campus, such as the Raffles City Mall, carry global fashion brands, such as Nike, Zara, Prada, and Tommy Hilfiger, to attract young college consumers. Most of the global brands' store size is large, containing a full range of new merchandise, similar to what I have seen in New York City. I visited different shopping malls both during the week days and weekend. A decent amount of consumers was present at the malls near college campuses during the week days.

Figure 9: Raffles City Shopping mall in Shanghai

7. International fashion and design exhibitions in Shanghai

It was interesting to see that many participating artists in the international fashion and design exhibitions in Shanghai presented the integration of traditional textile design technology into modern fashion design. The use of traditional natural dyeing techniques in the modern pattern design and construction was particularly interesting. There were many buyers and audience members at the keynote speeches at the exhibitions.

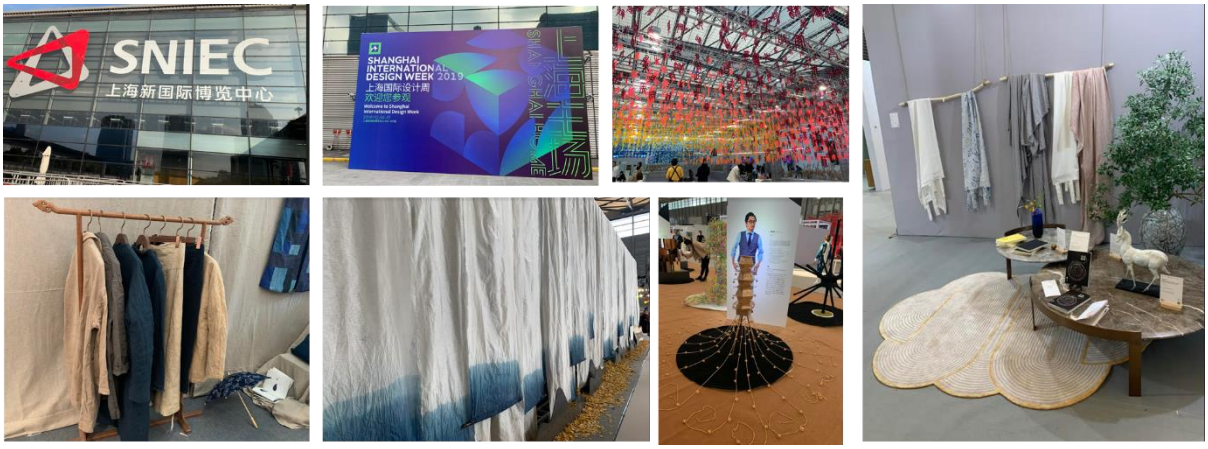

Figure 10: Shanghai International Design Week 2019 Exhibition

Conclusion

After the completion of the initiative, my achieved outcomes include the enhancement of my instructional leadership capacity and pedagogical skills to innovate and teach 3D virtual garment visualization technology for fashion business related course curriculum. After the trip, I have completed writing of a research manuscript entitled "Toward sustainable product commercialization process: Implementation of 3D virtual prototyping technology to fashion business related majors' curriculum" for publication and conference presentations. This research will be beneficial for educators and researchers in the creation of impactful interdisciplinary fashion course curriculum and content integrating 3D technologies, especially for non-design major, business-oriented students. The research project was accepted for an oral presentation by the SUNY Conference on Instructions and Technologies (CIT), one of the largest academic tech conferences in the U.S., to be held in May of 2020. In the accepted conference proceedings, I acknowledged that the research was funded by IFFTI Faculty Exchange Initiative (Cycle Four) grant. After the conference, I plan to publish the research findings in one of academic journals, then share my publications and learning achieved from the IFFTI grant via FIT library's digital repository and OPEN SUNY (online education system of the State University of New York) available for all SUNY faculty and students. My experiences and knowledge gained from the IFFTI grant will be also shared in the IFFTI's web-site. In addition, I plan to write a new special topic course with a tentative title "3D virtual prototyping for fashion business" to be launched in the Fashion Business Management department at FIT. I truly appreciate the IFFTI Education Subcommittee for giving me the grant to visit DHU. I would like to express my special thanks to FIT faculty: Dr. Deirdre Sato, Dean of International Education, Steven Frumkin, Dean of School of Business and Technology, and Robin Sackin, President of Faculty Senate and Chairperson of Fashion Business Management department and Dr. Jun Li, Dean of the College of Fashion and Design at DHU for making this wonderful research trip possible.