Progress in 3D Printing and Additive Manufacturing at NTU Singapore

by Ir. Dr Mui Kai Yin

Ir. Dr Mui Kai Yin is currently the Deputy chairman in Electronic Engineering Technical Division (eETD).

Talk Synopsis:

3D Printing has been identified as a key technology for the future of Industry 4.0 and serves as a strategic tool that will disrupt the manufacturing landscape of various industries. In 2014, Singapore Centre for 3D Printing (SC3DP) was set up to drive research and development in 3D printing and additive manufacturing.

SC3DP is one of the leading academic research centers in the world, hosting more than 30 professors and aim to train 100 PhD students. In addition, HP Manufacturing Corporate Lab was commenced on 1 November 2018. Advanced Manufacturing and Engineering is one of four technology domains under the Research, Innovation and Enterprise (RIE) 2020 Plan, which is Singapore's national strategy to develop a knowledge-based innovation-driven economy and society.

In this talk, Prof. Yeong Wai Yee discussed the role of 3D printing and additive manufacturing in sustaining disruption at current situation of global pandemic. She then introduced both SC3DP and HP-NTU Corp lab, and shared on the latest progress in 3D Printing and Additive Manufacturing at NTU Singapore. Specifically, notable achievement in 3D printing of electronics, building and construction, as well as 3D bioprinting of tissue and organs were presented.

Post Talk Write up:

The "IEM eETD Technical Talk" held on 23th September 2021 was organized by the Institution of Engineers, Malaysia (IEM) Electronic Engineering Technical Division (eETD) and IEM Penang Branch. Total 34 pax attended to this evening talk.

IEM eETD Deputy Chairman cum IEM Penang Branch Past Chairman Ir. Dr. Mui Kai Yin delivered the welcoming speech and introduced the agenda of the talk and the biodata of the speaker.

Prof. Yeong then took the stage and shared her research and development projects since last 5 years till recently. Her talk focused on the following key agenda:

- Positioning 3DP technologies at current time.
- 3D printing research lab and center in NTU.
- Focus discussion on:
    - Multi-metal printing
    - Building and construction
    - Electronics printing
    - Bioprinting

Prof. Yeong gave an overview of what 3D printing products that are available in the current market (Figure 1).

Figure 1: 3D printing products available in the current market.

She shared the technology driven manufacturing solutions that lead to smarter supply chains, and cost-efficient production of parts and components, see Figure 2.

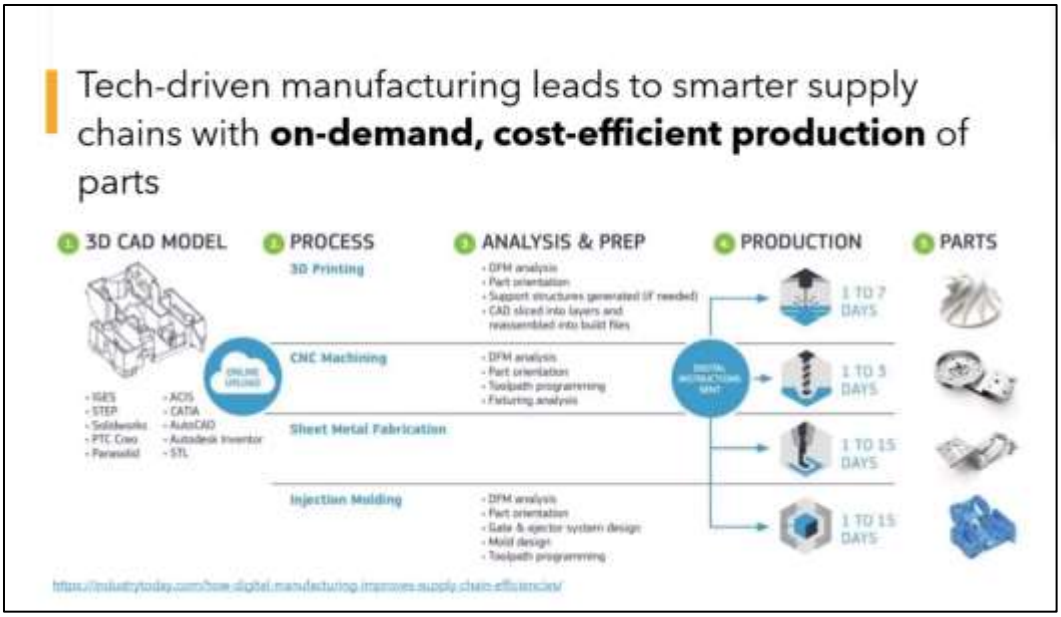

Figure 2: Tech-drive manufacturing with cost-efficient production of parts.

With the on-going Covid-19 pandemic, 3D printing also played a role to provide effective solutions. Refer to Figure 3 for some of latest solutions.

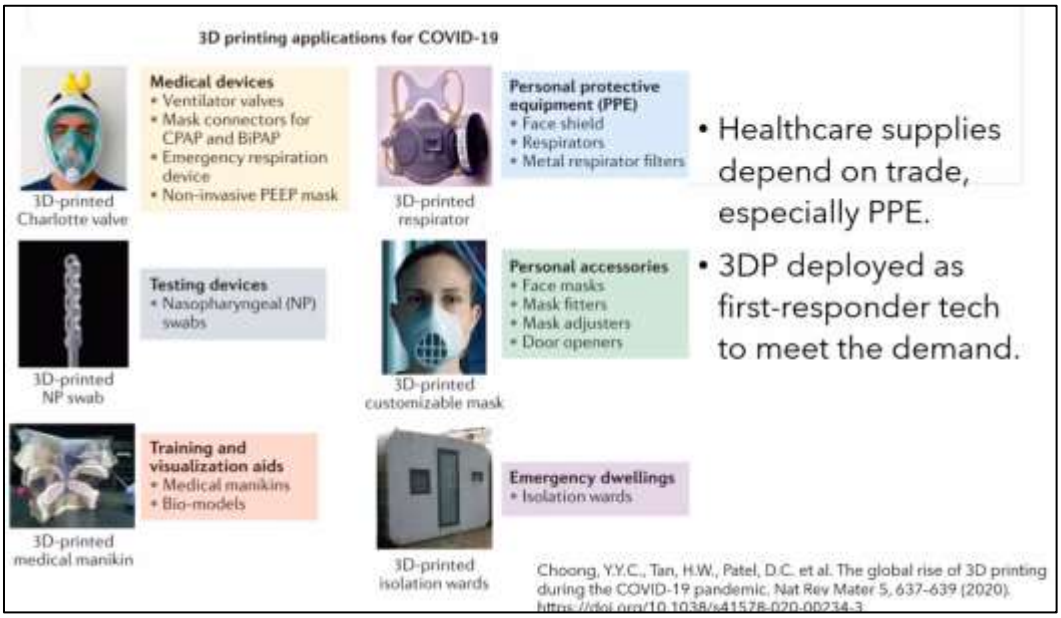

Figure 3: 3D printing solutions for COVID-19 pandemic.

Prof. Yeong shared the current 3D printing machines used for four focus areas: polymer, metal, electronics, bio and food. See Figure 4.

Figure 4: 3D printing machines for polymer, metal, electronics and bio & food.

She also shared the latest 3D printing technologies that are used for the construction industry, wearables and monitoring sensors, and biomedical products. Refer to Figure 5, 6 & 7.

Figure 5: 3D printing for construction industry.

Figure 6: 3D printing for wearables and monitoring sensors.

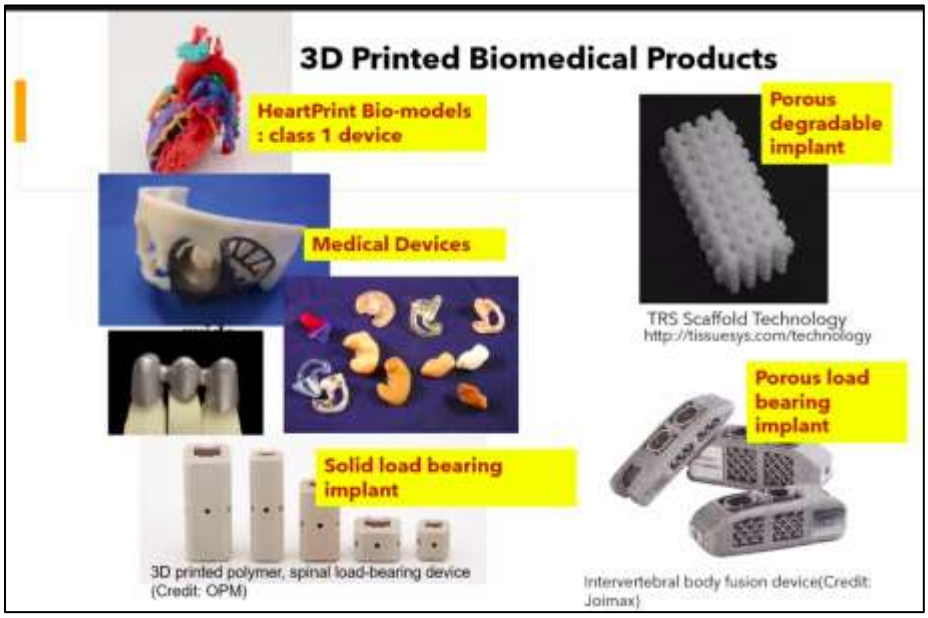

Figure 7: 3D printing for biomedical products.

There were many questions raised by the participants, including the future direction of 3D printing development. Most questions were answered by Prof. Yeong subsequently. These are great inputs to allow the organizer (IEM eETD) to think of solutions to attract students to go for the science career path.

Prof. Yeong concluded her Techtalk with the following key points:

1. 3D printing – essential element in the future of manufacturing.
2. Innovative mindset to reinvent sustainable operations using advanced technology.
3. Paradigm shift in manufacturing strategy and new business models to implement 3D printing.
4. Collaborative platform to bring 3DP to mainstream manufacturing (explore, educate and co-create).

It was a wonderful technical talk presented by Prof. Yeong and there were many positive comments and feedback from the attendees.

At the closing remarks, Ir. Dr. Mui thanked Prof. Yeong for delivering such an eye-opening and inspiring sharing. He also thanked IEM Secretariat staff (Ms Wendy & Ms Julie), IEM Penang YES, for their outstanding support toward the event.

The IEM technical talk ended with a group photo. Refer to Figure 8.

Figure 8: Group photo of tech talk.