



Associate Prof Yeong Wai Yee

Singapore 100 Women in Tech List 2021

Winner of TCT Woman in 3D Printing Innovator Award 2019

Associate Professor, Associate Chair (Students), School of Mechanical and Aerospace Engineering, Nanyang Technological University

Program Director (3DP), HP-NTU Digital Manufacturing Corp Lab

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Research website: www.yeongresearch.com

(Updated APR 2022)

RESEARCH AREA

3D Printing, Bioprinting, Tissue Engineering, Metal printing, Electronics printing, Machine learning in 3D Printing.

H-index: 48, Citation: >8000, with **15 highly cited papers** as of Sep 2021. They are in the fields of Engineering, Materials Science, Physics and Clinical Medicine.

AWARDS

- **NRF Investigatorship Class of 2022.** The NRF Investigatorship provides opportunities for established, innovative and active scientists and researchers, in their mid-career, to pursue ground-breaking, high-risk research. It is designed to support a small number of excellent Principal Investigators who have a track record of research achievements that identify them as leaders in their respective field(s) of research. [https://www.nrf.gov.sg/docs/default-source/nrf-investigators/nrf-website-\(nrf-investigators-portfolio\)_updated-dec-2021.pdf](https://www.nrf.gov.sg/docs/default-source/nrf-investigators/nrf-website-(nrf-investigators-portfolio)_updated-dec-2021.pdf)
- Honoured as one of the women in the **Singapore 100 Women in Tech** (SG100WIT) 2021 List. SG100WIT list aims to honour 100 inspiring who have contributed significantly to Singapore's emerging tech landscape. <https://www.sgwomenintech.sg/100-sg-women-in-tech-2021/>
- International award- Inaugural **TCT Woman in 3D Printing Award 2019**, for her significant achievement in 3D printing.
- Finalist for **Lush Award 2018 (Science category)** for developing tissue models for animal-free testing.
- PhD student Eric Guntur - Winner of **Outstanding Award** in the Nanxun Innovation & Entrepreneurship Challenge 2019
- PhD student Huang Sheng - Winner of the **Best Oral Presentation Award** at 2019 4th ICCMME
- **Springer Theses Award** 2017 won by student (Sing Swee Leong) under my supervision.

ACADEMIC RECOGNITION & SERVICES

- **Associate Editor** for international journal **Virtual and Physical Prototyping (VPP)**, Q1 in SCI with impact factor 8.0.
- **Associate Editor** for international journal **International Journal of Bioprinting (IJB)**, Q1 in SCI with impact factor 6.6
- **Member of Council - Treasurer** of Tissue Engineering and Regenerative Medicine International Society Asia Pacific Chapter (**TERMIS-AP**)
- Member of the Steering Committee for **National STEM Championship (NSC) 2022**, a A*STAR – Science Centre Singapore collaboration

- Research featured on **media and news**, including Reuters Science News, Straits Times Channel News Asia and Channel 8.
- Served as Panel Member for **European Research Council ERC- Advanced Grant 2019**. **ERC Advanced Grants** is one more the most prestigious grant for independent research leaders who have been conducting significant and original research for at least 10 years. https://erc.europa.eu/sites/default/files/document/file/Panel_Members_ERC_Advanced_Grant_2019.pdf
- Reviewer for **international grants** such as Mitac's Accelerate (Canada), Rostree's Trust Grant (UK), Swiss National Science Foundation (Switzerland).
- Given more than 20 **invited talks** at various platforms including internationally academic conferences and industrial forum (Singapore, Malaysia, China, Japan, USA, Belgium, Europe).
- **Conference Technical Program Chair** of International Conference on Progress in Additive Manufacturing 2014 and 2016.
- Organizer of Singapore International 3D Printing Competitions 2014-2018.

INVITED KEYNOTE AND TALKS

Keynote Presentations:

2022: 3D-Bioprinting, Biofabrication, Organoids & Organs-on-Chips Asia. May 23-24, 2022, Tokyo, Japan

2022: International Digital Congress on 3D Biofabrication and Bioprinting, Theme: Biofabrication, Bioprinting, Additive Manufacturing applied to health 23- 25 March 2022. Araraquara, SP, Brazil.

2022: Keynote Speaker, Biofabrication & Biomanufacturing, 21 - 22 March 2022. Boston, USA.

2021: Online Keynote Presentation on "Progress in 3D Printing and Additive Manufacturing at NTU Singapore" organized by The Institution of Engineers, Malaysia (Penang Branch) 23 Sep 2021 Penang, Malaysia

2021: 4th International Conference on 3D Printing, 3D Bioprinting, Digital and Additive Manufacturing - I3D21 7 - 8 July 2021 Thessaloniki, Greece

2021: 3D-Bioprinting 2021. March 18-19, 2021, Boston, USA

2021: ONLINE 3D Bioprinting Conference (8th edition) <https://www.3dbioprintingconference.com>

2020: Keynote speech at Disrupting Manufacturing with 3D Printing and Digital Technologies, 03 NOV 2020 Webinar by HP-NTU and SC3DP NTU Singapore.

Invited Speakers:

2021: Invited speaker in Women in 3D Printing first annual conference, TIPE 3D Printing Jan 27-28 , 2021

2020: Invited speaker for TCT Japan 2020, 09-11 December 2020, Tokyo Big Sight https://www.tctjapan.jp/index_en.html

2020: Invited speaker at The Virtual 2nd European Conference on Controversies in Diabetic Foot Management (DiabeticFoot-Europe), 09-10 December 2020. <https://diabeticfoot-europe.com/congress-agenda/>

2020: Invited speaker at Materials Research Society MRS Virtual Spring/Fall Meeting & Exhibit, November 28 - December 4, 2020. USA.

SUPERVISION OF GRADUATE STUDENTS

Graduated 9 PhD students, currently supervising 2 PhD students. 4 PhD students moved on to academic positions in universities.

FUNDING AND COLLABORATIONS

Secured >US\$10million project funding since 2013, on joint labs, academic research projects and industrial projects. Collaborations partners include academic groups and companies across different disciplines.

PATENTS

- Filed 28 Technology Disclosure, 9 patents applications, 14 know-how
- Selected patent applications as follows:
 - A Hydrogel Composite (US Patent Application 16/490,034)
 - Bio-inks for three-dimensional printing PCT/US21/44261
 - Bio-ink Printing PCT/US21/31671
 - Titanium-Tantalum Alloy and Method of Forming Thereof, 2017 (US Patent Application (Divisional) 17/499,643)
 - In-Situ Alloying Via Laser Powder Bed Fusion PCT/SG2021/050453
 - Voxelating 3D Printed Food For Higher Customization In Personalized Nutrition SG Provisional Patent Application (SGPRV) 10202113511T
 - Anomaly Detection In Fused Filament Fabrication Using Machine Learning SGPRV 10202109692X
 - Copper Wire Deposition Method For 3D Printing Applications SGPRV 10202105811Y

RECENT PAPERS

Papers are grouped by topic, followed by evidence of international recognition and impact.

1. Soetedjo, Andreas Alvin Purnomo, Jia Min Lee, Hwee Hui Lau, Guo Liang Goh, Jia An, Yexin Koh, **Wai Yee Yeong**, and Adrian Kee Keong Teo (2021), Tissue engineering and 3D printing of bioartificial pancreas for regenerative medicine in diabetes. Trends in Endocrinology & Metabolism <https://doi.org/10.1016/j.tem.2021.05.007>
2. Ng WL, Ayi TC, Liu YC, et al., (2021), Fabrication and characterization of 3D bioprinted triple-layered human alveolar lung models. Int J Bioprint. DOI: <https://www.doi.org/10.18063/ijb.v7i2.332>
3. J. M. Lee & **W. Y. Yeong** (2020), Engineering macroscale cell alignment through coordinated toolpath design using support-assisted 3D bioprinting, Journal of the Royal Society Interface 17(168), 20200294
4. Shairah Radzi, Heang Kuan Joel Tan, Gerald Jit Shen Tan, **Wai Yee Yeong**, Michael Alan Ferenczi, Naomi Low-Ber, and Sreenivasulu Reddy Mogali (2020), Development of a three-

dimensional printed heart from computed tomography images of a plastinated specimen for learning anatomy, *Anatomy & Cell Biology*, 53(1). Published. DOI: 10.5115/acb.19.153

5. J. M. Lee, W. L. Ng & **W. Y. Yeong** (2019), Resolution and shape in bioprinting: strategizing towards complex tissue and organ printing, *Applied Physics Reviews* 6(1), 011307
6. W. L. Ng, Y. J. Tan, **W. Y. Yeong** & M. W. Naing (2018), Proof-of-concept: 3D bioprinting of pigmented human skin constructs, *Biofabrication* 10(2), 025005. doi: 10.1088/1758-5090/aa9e1e.

Paper 1-6 demonstrated expertise in Bioprinting and 3D printing of anatomical relevance construct . Different tissues have been demonstrated including lung, skin and cardiac tissue. Paper 4 and 6 are ground-breaking report, which were followed by media reporting in Channel News Asia, and also Straits Times.

7. Sing, S. L., Huang, S., Goh, G. D., Goh, G. L., Tey, C. F., Tan, J. H. K., & Yeong, W. Y. (2021). Emerging Metallic Systems for Additive Manufacturing: In-situ Alloying and Multi-metal Processing in Laser Powder Bed Fusion. *Progress in Materials Science*, 100795
8. Huang S., Sing, S.L., Geoffrey deLooze, Robert Wilson, & **Yeong, W. Y.** (2020). Laser powder bed fusion of titanium-tantalum alloys: Compositions and designs for biomedical applications. *Journal of the Mechanical Behavior of Biomedical Materials*, 103775, doi: <https://doi.org/10.1016/j.jmbbm.2020.103775>.
9. Swee Leong Sing, Sheng Huang, **Wai Yee Yeong** (2020), Effect of solution heat treatment on microstructure and mechanical properties of laser powder bed fusion produced cobalt-28chromium-6molybdenum, *Materials Science and Engineering: A*, Volume 769, 138511, <https://doi.org/10.1016/j.msea.2019.138511>
10. Luis, E., Pan, H. M., Sing, S. L., Bastola, A. K., Goh, G. D., Goh, G. L., ... & **Yeong, W. Y.** (2019). Silicone 3D Printing: Process Optimization, Product Biocompatibility, and Reliability of Silicone Meniscus Implants. *3D Printing and Additive Manufacturing*, 6(6), 319-332. <https://doi.org/10.1089/3dp.2018.0226>.

Papers 7-10 reported our work on novel biomaterials in 3D printing for biomedical applications. These include 3D printing of metal alloy such as Titanium, cobalt-chromium and a novel method in 3D printing of silicone meniscus.

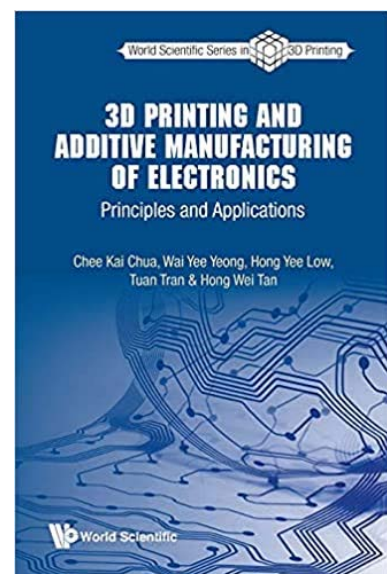
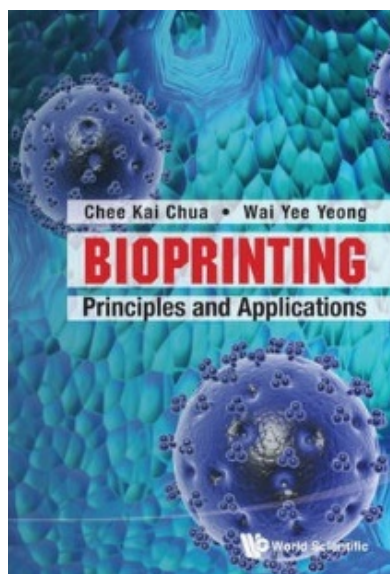
11. G. L. Goh, N. Saengchairat, S. Agarwala, **W. Y. Yeong** & T. Tran (2019), Sessile droplets containing carbon nanotubes: a study of evaporation dynamic and CNTs alignment for printed electronics, *Nanoscale* 11(22), 10603-10614 DOI: 10.1039/c9nr03261d.
12. S. Agarwala, J. M. Lee, W. L. Ng, M. Layani, **W. Y. Yeong** & S. Magdassi (2018), A novel 3D bioprinted flexible and biocompatible hydrogel bioelectronic platform, *Biosensors and Bioelectronics* 102, 365-371.
13. G. L. Goh, S. Agarwala, Y. J. Tan & **W. Y. Yeong** (2018), A low cost and flexible carbon nanotube pH sensor fabricated using aerosol jet technology for live cell applications, *Sensors and Actuators B: Chemical* 260, 227-235

Paper 11-13 demonstrated our research work in printed electronics. We have demonstrated application of printed electronics for life science, created innovative steps to incorporate electronics and electrical circuits into device for smart biomedical applications. We have developed the necessary sintering process and showed the feasibility of a bioelectronics platform.

14. G. D, Goh, S. L. Sing, **W. Y. Yeong** (2020), A review on Machine Learning in 3D printing: Applications, Potential, and Challenges, *Artificial Intelligence Review*, (Impact Factor: 5.747, Q1, Rank: 16/136 Computer sciences, Artificial Intelligence) DOI: <https://doi.org/10.1007/s10462-020-09876-9>
15. Lee, J., Sing, S., & **Yeong, W. Y.** (2020). Bioprinting of Multimaterials with Computer-aided Design/Computer-aided Manufacturing. *International Journal of Bioprinting*, 6(1). doi:<http://dx.doi.org/10.18063/ijb.v6i1.245>

3D printing is a digital technology that is critical for industry 4.0. It is an inevitable trend to see digitization of the life science industry. The challenge is huge, but the gain will be equally remarkable. Paper 14-15 shows my research direction towards incorporating machine learning and computer-aided design thinking to accelerate the research in 3D Bioprinting.

TEXTBOOKS PUBLICATION



CITATION

Prof Yeong has demonstrated global. She has received recognition from the scientific community, presented keynote talks at international conferences, and producing hot paper and highly cited papers in her field of research. Prof Yeong Wai Yee has been named the winner of the inaugural TCT Women in 3D Printing Innovator Award in 2019 and listed as one of the Singapore 100 Women in Tech (SG100WIT) 2021. She excels in innovation and has secured >\$10 million research grants. Her key area of research is Bioprinting and 3D printing. She serves as Program Director in HP-NTU Digital Manufacturing Corp Lab and Singapore Centre for 3D Printing.