

EDUCATION

University College London (UCL)

May, 2020

PhD, Biomedical Engineering

- Thesis: *Designing platforms to biophysically regulate T cell activation.*
- **Funding source: UK Biotechnology and Biological Sciences Research Council (BBSRC) via a London Interdisciplinary Biosciences Consortium studentship.**
- Conceptualized the PhD project to study the influence of substrate stiffness on T cell activation in the context of cancer immunotherapy.
- Primary supervisor: Prof. Richard Day (UCL Medicine); Secondary supervisor: Prof. Marc-Olivier Coppens (UCL Chemical Engineering); Tertiary supervisor: Prof. Eileen Gentleman (King's College London).

Imperial College London

November, 2014

MSc & DIC, Biomedical Engineering

- MSc dissertation: *Modulating human PARP-1 activity with allosteric DNA aptamers* (Supervisor: Dr. Sylvain Ladame, Department of Bioengineering).
- Used enzyme activity assays (chemiluminescence- and fluorescence-based) to perform dose-response screening of aptamers.

Imperial College London

August, 2013

BEng & ACGI, Biomedical Engineering

- Final year individual project: *Design of a microfluidic circuit board for the analysis of human microdialysis streams* (Supervisor: Prof. Martyn Boutelle, Department of Bioengineering).
- Group project: *Arrow-positioning haptic feedback system for visually impaired archers* | My role: wrote the code for an Arduino-controlled X-Y table.

RESEARCH EXPERIENCE

University College London

09/01/2020–present

Postdoctoral Research Fellow, Centre for Nature Inspired Engineering | Supervisor: Prof. Marc-Olivier Coppens

- Member of the "NextGen" team – an international collaboration across 8 institutions (US, UK, and France) – **funded by Cancer Research UK, National Cancer Institute and The Mark Foundation for Cancer Research via the \$25M Cancer Grand Challenges partnership.**
- Initiated a new line of research integrating algorithmic design, graph theory, and 3D microprinting to create geometrically complex, biologically inspired cell scaffolds.
- Developed a generative algorithm to create 3D models that emulate the spatial network organization of lymphoid fibroblasts.
- Proposed and currently developing 3D microprinted scaffolds that recapitulate the extracellular matrix of the tumor microenvironment, as part of NextGen's modeling work.
- Led the earlier project "*The immune "mind": bioelectrical and structural networks in decision-making*" (2020-2022), which investigated how immune cells "compute" decisions in 3D printed scaffolds and established computational design framework later adopted by NextGen.

Cupris Ltd. (London, UK) Programming Intern - Cupris is a start-up specializing in remote examination of patients using smartphone connected medical devices. - Created an iOS application for smartphone otoscopy with machine learning-enabled image recognition of eardrum conditions.	08/03/2017–10/27/2017
University College London Research Assistant, Department of Chemistry DNA nanopore characterization (gel electrophoresis, single-channel current recording); Supervisor: Dr. Stefan Howorka.	11/01/2014–08/01/2015
Imperial College London iGEM Team Member, Centre for Synthetic Biology - Project: <i>Plasticity</i> Built a synthetic biology-powered waste recycling platform. - My role: developed a computational model to identify metabolic bottlenecks of biopolymer synthesis in the team's engineered <i>E. coli</i>. - Results from the model led to the design of an award-winning BioBrick, which enhanced biopolymer yield.	07/01/2013–11/04/2013
Imperial College London Undergraduate Research Assistant, Centre for Bio-Inspired Technology Involved in developing a printed circuit board for bioimpedance-based monitoring of internal bleeding in pregnant women, under the supervision of Dr. Nir Grossman.	07/02/2012–08/14/2012

TEACHING EXPERIENCE

University College London Guest Lecturer and Lab Demonstrator, Centre for Nature Inspired Engineering - MEng module: Nature Inspired Chemical Engineering (CENG0029) - MSc module: Nature Inspired Solutions (CENG0080)	09/01/2020–present
University of Greenwich Lecturer (fixed term), School of Engineering - MSc module: Biochemical Engineering (CHEE1011) - Developed the whole syllabus from scratch (incl. exam papers and coursework), taught 2 h/week for 11 weeks, marking.	01/17/2022–08/31/2022
The Bartlett School of Architecture, University College London Invited Guest Critic Provided critique and engaged in discussions for Bio-Integrated Design MArch/MSc Year 1 Final Projects (BARC0125).	03/25/2021

HONORS AND AWARDS

Competition:

1. 3rd in the World (out of 215 university teams); iGEM World Championship, Massachusetts Institute of Technology, USA (2013).
2. Best Manufacturing Project; iGEM World Championship, Massachusetts Institute of Technology, USA (2013).
3. 2nd Runner-Up; iGEM European Final, INSA Lyon, France (2013).
4. Best New BioBrick Part (Registry #: BBa_K1149051); iGEM European Final, INSA Lyon, France (2013).
5. Gold medal; iGEM European Final, INSA Lyon, France (2013).
6. Best Year 2 Engineering Design Project; Imperial College London - Department of Bioengineering (2012).

Conference/Workshop Awards:

1. Best Poster Presentation; UCL CNIE Workshop (2020).
2. Best Poster Presentation; UCL Soft Materials Network Workshop (2018).
3. Best Poster Presentation; UCL CNIE Workshop (2018).
4. 1st Prize, Research Poster Presentation ("Biological Engineering" category); ChemEngDayUK (2017).

PhD Studentship:

1. BBSRC studentship from the London Interdisciplinary Biosciences Consortium doctoral training partnership (2015-2019).

PERSONAL DEVELOPMENT AND COMPETENCES

1. Learn ARKit with Swift (Augmented Reality) Nanodegree, Udacity (2017).
2. Artificial Intelligence Nanodegree, Udacity (2017).
3. Advanced Quantitative Skills for Bioscience, SysMIC (2016).
4. Maths and Computational Skills for Bioscience, SysMIC (2016) | Project completed with distinction.

PUBLICATIONS

Peer-reviewed journal articles:

1. Todd, L., **Chin, M. H. W.** & Coppens, M.-O. Two conjectures on 3D Voronoi structures: a toolkit with biomedical case studies. *Molecular Systems Design & Engineering* 9, 912-919. <http://dx.doi.org/10.1039/D4ME00036F> (2024).
2. **Chin, M. H. W.**, Reid, B., Lachina, V., Acton, S. E. & Coppens, M.-O. Bioinspired 3D microprinted cell scaffolds: Integration of graph theory to recapitulate complex network wiring in lymph nodes. *Biotechnology Journal* 19, 2300359. <https://doi.org/10.1002/biot.202300359> (2023). | **Recognized as Biotechnology Journal's "Top Viewed Article", which ranked within the top 10% of most-viewed papers published by the journal in 2023.**
3. **Chin, M. H. W.**, Linke, J. & Coppens, M.-O. Nature-inspired sustainable medical materials. *Current Opinion in Biomedical Engineering* 28, 100499. issn: 2468-4511. <https://doi.org/10.1016/j.cobme.2023.100499> (2023).
4. **Chin, M. H. W.**, Norman, M. D. A., Gentleman, E., Coppens, M.-O. & Day, R. M. A Hydrogel-Integrated Culture Device to Interrogate T Cell Activation with Physicochemical Cues. *ACS Applied Materials & Interfaces* 12, 47355–47367. <https://doi.org/10.1021/acsami.0c16478> (2020).
5. **Chin, M. H. W.***, Gentleman, E., Coppens, M.-O. & Day, R. M. Rethinking Cancer Immunotherapy by Embracing and Engineering Complexity. *Trends in Biotechnology* 38. Special Issue: Therapeutic Biomanufacturing, 1054–1065. issn: 0167-7799. <https://doi.org/10.1016/j.tibtech.2020.05.003> (2020). | ***Corresponding author.**
6. Kelwick, R., Kopniczky, M., Bower, I., Chi, W., **Chin, M. H. W.**, Fan, S., Pilcher, J., Strutt, J., Webb, A. J., Jensen, K., Stan, G.-B., Kitney, R. & Freemont, P. A Forward-Design Approach to Increase the Production of Poly-3-Hydroxybutyrate in Genetically Engineered *Escherichia coli*. *PLOS ONE* 10, 1–11. <https://doi.org/10.1371/journal.pone.0117202> (2015).

Peer-reviewed conference proceeding:

1. Todd, L., **Chin, M.** & Coppens, M.-O. A Computational Pipeline to Optimize 3D Scaffolds for Cancer Immunotherapy in Computer Aided Chemical Engineering (eds Kokossis, A. C., Georgiadis, M. C. & Pistikopoulos, E.) 52 (Elsevier, 2023), 2705–2710. <https://doi.org/10.1016/B978-0-443-15274-0.50430-3>.

Other conference proceedings:

1. **Chin, M. H. W.**, Reid, B., Lachina, V., Acton, S. E. & Coppens, M.-O. Algorithmic Design of Lymph Node-Inspired 3D Microprinted Cell Scaffolds. AIChE Annual Meeting (2023).
2. **Chin, M. H. W.**, Gentleman, E., Coppens, M.-O. & Day, R. M. Biophysical fine-tuning of immune cell behaviour by using a biomaterial-based culture platform. European Biophysics Journal With Biophysics Letters 46, S244-S244 (2017).

Book chapter:

1. Sofokleous, P., **Chin, M. H. W.** & Day, R. M. Phase-separation technologies for 3D scaffold engineering in Functional 3D Tissue Engineering Scaffolds (eds Deng, Y. & Kuiper, J.) (Woodhead Publishing, 2018), 101–126. isbn: 978-0-08-100979-6. <https://doi.org/10.1016/B978-0-08-100979-6.00005-7>.

Software/codes:

1. 3D Cell Scaffold Generator (3D CSG). Open source license: GPL-3.0. Available at GitHub: <https://github.com/mattychin/3D-cell-scaffold-generator>. A Grasshopper algorithm for generating 3D printable scaffolds with small-world network properties.

PRESENTATIONS

1. **Chin, M. H. W.**, Vimeux, L., Guilbert, T., Benhammou, I., Lachina, V., Yadav, S., Reid, B., Straathof, K., Acton, S., Donnadieu, E. & Coppens, M.-O. Extracellular Matrix-Inspired 3D Microprinted Tumor Microenvironment Models. AIChE Annual Meeting, 2024, San Diego, US; Oral presentation.
2. **Chin, M. H. W.**, Vimeux, L., Guilbert, T., Donnadieu, E. & Coppens, M.-O. Bioinspired 3D Microprinted Tumour Microenvironment Models. BioMedEng24, 2024, London, UK; Oral presentation.
3. **Chin, M. H. W.**, Reid, B., Lachina, V., Acton, S. E. & Coppens, M.-O. Algorithmic Design of Lymph Node-Inspired 3D Microprinted Cell Scaffolds. AIChE Annual Meeting, 2023, Orlando, FL, USA; Oral presentation.
4. **Chin, M. H. W.**, Reid, B., Lachina, V., Acton, S. E. & Coppens, M.-O. An Algorithmic Design Approach to Generate Lymph Node-Inspired 3D Microprinted Cell Scaffolds. TERMIS-AP, 2023, Hong Kong; Poster presentation.
5. **Chin, M. H. W.**, Reid, B., Lachina, V., Acton, S. E. & Coppens, M.-O. Designing nature-inspired scaffolds to model 3D biophysical T cell dynamics for cancer immunotherapy. Cancer Grand Challenges: Future Leaders Conference, 2022, Barcelona, Spain; Poster presentation.
6. **Chin, M. H. W.**, Gentleman, E., Coppens, M.-O. & Day, R. M. Transforming Immunotherapy with Nature-Inspired Engineering. AIChE Annual Meeting, 2018, Pittsburgh, PA, USA; Oral presentation.
7. TERMIS World Congress, 2018, Kyoto, Japan; Poster presentation.
8. **Chin, M. H. W.**, Gentleman, E., Coppens, M.-O. & Day, R. M. Biophysical fine-tuning of immune cell behaviour by using a biomaterial-based culture platform. 19th IUPAB and 11th EBSA Congress, 2017, Edinburgh, UK; Poster presentation.
9. **Chin, M. H. W.**, Gentleman, E., Coppens, M.-O. & Day, R. M. A hydrogel-based platform for the *ex vivo* activation and expansion of T cells. TERMIS-EU, 2017, Davos, Switzerland; Poster presentation.
10. A biomaterial-based platform for the optimisation of therapeutic immune cell culture. ChemEngDayUK, 2017, Birmingham, UK; Oral + poster presentations.
11. Bower, I., Chi, W., **Chin, M. H. W.**, Fan, S., Kopniczky, M., Pilcher, J. & Strutt, J. Project Plasticity. iGEM World Championship, 2013, Massachusetts Institute of Technology, Cambridge, MA, USA; Oral + poster presentations.
12. Bower, I., Chi, W., **Chin, M. H. W.**, Fan, S., Kopniczky, M., Pilcher, J. & Strutt, J. Project Plasticity. iGEM European Final, 2013, INSA Lyon, Lyon, France; Poster presentation.

FUNDING

Fellowships / Research grants

1. Marie Skłodowska-Curie Actions Global Fellowship (European Commission). Project: *Designing Vascular Geometries in 3D Bioprinted Models for Immuno-oncology (VASPRINT)*. Host institutions: Harvard University (2 years), UCL (1 year). Total award: EUR 430,343.40 (2025).
2. UCL CNIE Inspiration Grant. Project: *The immune "mind": bioelectrical and structural networks in decision-making*. Principal investigator: myself, collaborator: Dr. Sophie Acton (Laboratory of Molecular Cell Biology, UCL). Total award: GBP 20.4k for 9 months (2021).
3. UCL small project grant (Vinson & Cissy Chu Charitable Foundation). Project: *Investigating how 3D printed microenvironments influence immune decision-making*. GBP 25k for 6 months (2020).
4. UCL Grand Challenges Doctoral Students' Small Grants Scheme (category: Transformative Technology). Project: *Transforming Immunotherapy with Nature-Inspired Engineering*. Total award: GBP 2k for 12 months (2017).

Travel grants

1. DMM Conference Travel Grant, The Company of Biologists, GBP 600 (2024).
2. International Travel Award, IET, GBP 1500 (2024).
3. Andrew Carnegie Research Fund, IOM3, GBP 250 (2017).
4. Research Student Conference Fund, IOP, GBP 200 (2017).
5. Young Scientist Travel Award, IUPAB, EUR 300 (2017).
6. Travel Bursary, Wellcome Trust and British Biophysical Society, GBP 500 (2017).
7. School of Life and Medical Sciences Graduate Conference Fund, UCL, GBP 876.74 (2017).

CO-SUPERVISION AND MENTORING

1. Treena Villanueva, MEng dissertation (2025).
2. Nur Qaliesya Afzainizam, MEng dissertation (2025).
3. Lucy Todd, PhD thesis (2021-2024).
4. Yecheng (Max) Zhang, MEng dissertation (2024).
5. Klara Burdova, MEng student assisting with research on a volunteering basis (2024).
6. Julia Linke, PhD thesis (2021).

PUBLIC ENGAGEMENT / OUTREACH

1. Showcased research to alumni, UCL Chemical Engineering Centenary Alumni Event (2024).
2. Presenter – Showcased research to secondary school (Year 12) students (2024).
3. Mentor – In2Research, a placement program aiming to improve access to postgraduate research degrees and careers for people from low socioeconomic backgrounds (2022-2024).
4. Presenter – "Shaping a Sustainable Future: Transformative Technology" public event at UCL (2023).

ACADEMIC SERVICE / OTHER ACTIVITIES

1. Workshop Co-Organizer (2024) – Co-organized a workshop with University of Oxford DPhil students (Engineering Science) to exchange research ideas and explore collaborative opportunities with UCL Centre for Nature Inspired Engineering. News about the event: <https://eng.ox.ac.uk/news/tackling-grand-challenges-with-nature-inspired-chemical-engineering-interdisciplinary-collaboration/>
2. Invited Reviewer (2023) – Advanced Science (Wiley).
3. Ambassador of Automorph Network (06/2023-Present) – a collaboration between scientists and designers, working together on the concept of self-shaping matter (<https://www.automorphnet.com/ambassadors>).
4. Early Career Researcher Board Member, UCL Institute of Healthcare Engineering (09/2018 - 01/2019).
5. Member – Royal Society of Biology; Institute of Materials, Minerals and Mining; Institution of Engineering and Technology; Institute of Physics; Tissue Engineering and Regenerative Medicine International Society; UK Society for Biomaterials; American Institute of Chemical Engineers (PostDoc).