Associate Professor Christabel Tan

Microfluidics, Microengineering and Instrumentation
Principal Lecturer
CEng, MBA, PhD, MPhil, BEng (Hons)
FHEA, MIET, MISTR, TechIOSH

Research Profile

- Over 17 years of commercial and public-funded project experience in the area of multidisciplinary biological engineering instrumentation and microengineering.
- Microengineering expert with over 21 years of developing unique microfabrication solutions for various engineering and biological applications.
- Primary research area is in microengineered systems and devices mainly for, but not limited to, bio-detection applications.
- PI/Co-PI for over 16 commercially funded research projects worth over £1.5M working with commercial organisations, UK and European funding agencies.
- Authored/Co-authored 25 peer-reviewed publications and conference articles, one of which cited over 900 times
- Authored/Co-authored 15 commissioned reports and artefacts for commercially funded research
- Reviewer for several multidisciplinary, high-impact, peer-reviewed journals in spanning chemistry, microbiology and engineering
- Reviewer of the year for Journal of Micromechanics and Microengineering in 2020
- EPSRC Review College member since 2020
- Technical Committee Member in Chemical Measurements, International Measurement Confederation IMEKO

Academic Background

- MBA (Distinction), University of Hertfordshire (2014-2016)
- PhD, University of Hertfordshire (2001-2005)
- MPhil, University of Manchester Institute of Science and Technology (2000-2001)
- BEng (Hons), Electronics, University of Manchester Institute of Science and Technology (1998-2000)

Professional Qualifications

- Chartered Engineer – Registration Number: 669242 (2019)
- National Certificate in Occupational Health and Safety (Credit), NEBOSH (2017)
- Registered Biosafety Practitioner Level 1, Institute of Safety in Technology and Research (2015)
- PG Certificate in Higher Education, University of Hertfordshire (2012)

Professional Engagement and Outreach

- Reviewer for EPSRC/BBSRC Microsystems Theme across all funding calls
- Peer Reviewer for several international multidisciplinary and specialist engineering journals (Lab on a Chip, Journal of Micromechanics and Microengineering, Sensors and Actuators and Journal of Physics D: Applied Physics etc)
- Associate Editor for Measurements: Sensors journal
- Guest Editor Micromachines, MDPI – "Microfluidics for Biodetection and Sensing"
- Technical and Organising Committee - ECS 2020: 2nd Engineering and Computer Science Research Conference 8th April 2020, University of Hertfordshire, Hatfield, UK
- Technical and Organising Committee - ECS 2019: Inaugural Engineering and Computer Science Research Conference 17th April 2019, University of Hertfordshire, Hatfield, UK

- Panel Reviewer for Athena Swan Awards and Race Equality Charter Awards, Advance HE

Awards

- The Engineer: Collaborate to Innovate Awards 2019, Finalist of the Aerospace, Defence & Security category, London, UK, 6th November 2019
- Excellence in Research (Highly Commended), University of Hertfordshire Vice Chancellor's Awards, 2014

Reviewer and Editorial Roles

- Journal of Micromechanics and Microengineering (Impact Factor in 2020: 1.739), Institute of Physics
- Lab on a Chip (Impact Factor in 2020: 6.774), The Royal Society of Chemistry
- Analyst (Impact Factor in 2020: 3.978), The Royal Society of Chemistry
- Journal of Physics D: Applied Physics (Impact Factor in 2020: 3.169), Institute of Physics
- Journal of Microelectromechanical Systems (Impact Factor in 2020: 2.534) Institute of Electrical and Electronics Engineers
- Associate editor for Measurements: Sensors, Elsevier
- Special Edition Editor for Micromachines (Impact Factor: 2.523), MDPI

Post-Doctoral Employment

- School of Engineering and Computer Science, University of Hertfordshire
    - Associate Professor (2021 → present)
    - Principal Lecturer in Microengineering (2020 → present)
    - Senior Research Fellow/Senior Lecturer (2010 – 2020)
    - Health and Safety Academic Lead and Chair of the School Safety Committee (2017 → present)
    - Interim Technical Manager (Jan 2019 – May 201)
- School of Engineering and Technology, University of Hertfordshire
    - Research Fellow (2007 – 2010)
    - Post-Doctoral Research Fellow (2005 – 2007)

Academic Teaching and Supervision

- One completed PhD supervision graduated in 2020.
- Currently supervising 2 EngD students, completing in 2024.
- Programme and Admissions Tutor MSc Programmes in Engineering
- Teaching
    - Applied Design (CDIO) – Level 4 Mechanical & Automotive Engineering
    - Health and Safety Professional Modules – Level 4, 5 and 6 Engineering
    - Delivering research-informed lectures in Microfabrication and MEMS Sensors as part of the Microengineering & Microtechnology module for level 6
    - Delivery specialist topics in Digital Systems, H&S, Compliance and Ethics as part of Engineering Professionalism for level 4
- UG and PGT project supervision

Publications and Conferences

L Coudron, T.G.Foat, D.McCluskey, I. Munro, **C Tan**, R. Baxter, D.Despeyroux, I.Johnston, (2021) "DA novel bio-aerosol to droplet sampler for high concentration rate collection" Oral Presentation, WG 3: Aerosol Measurement Techniques European Aerosol Conference - EAC 2021, 30 August - 3 September 2021.

R Kumar, T. H Nguyen, B Rente, **C Tan**, T Sun, KTV Grattan (2021) "*A Portable 'Plug-and-Play' Fibre Optic Sensor for Measurement of pH Values in a Microfluidic Channel*" Analyst (In Review)

C Tan, T Baker and H Goodard (2021) "*CDIO at University of Hertfordshire*" (Invited Speaker), The European / UK and Ireland Annual Meeting of the CDIO initiative, Norwegian University of Science and Technology (NTNU), 6-8th January 2021

L Coudron, C Lemenu, K Lemaine, D McCluskey, **C Tan**, I Munro, AE Holdo, M Tracey, I Johnston (2020) "*Controlled actuation of Self-propelled Droplets*" 24th International Conference on Miniaturized Systems for Chemistry and Life Sciences (MicroTAS 2020), October 4-9

R Kumar, B Rente, S Ghosh, **C Tan**, T Sun, KTV Grattan (2020) "*Real-time strain measurement of piezoelectrically actuated polydimethylsiloxane (PDMS) bar using fibre Bragg grating sensor for biomedical applications*" 24th International Conference on Miniaturized Systems for Chemistry and Life Sciences (MicroTAS 2020), October 4-9

A Kanellopoulos, J Norambuena-Contreras, I Gonzalez-Torre, JL Concha, I Johnston, L Coudron, **C Tan**, A Chaliasou, A Chrysanthou, "*Biopolymeric microparticles for self-healing of construction materials*", (accepted 2019). Resilient Materials 4 Life 2020 (RM4L2020) International Conference, Churchill College, Cambridge: 14-17 September 2020 (Postpone to Sept 2021)

CKL Tan, H Ash, C Goligher (2020) "*Going faster, going greener, going safer – a student-led approach for safety management*" University of Hertfordshire Learning and Teaching Conference 2020, Hatfield, United Kingdom, 10th July 2020

N Dimov, MB McDonnell, I Munro, D McCluskey, ID Johnston, **CKL Tan**, L Coudron (2019) "*Electrowetting-Based Digital Microfluidics Platform for Automated Enzyme-linked Immunosorbent Assay*", Journal of Visualized Experiments, accepted (Impact Factor: 1.050; Citations: 2)

L Coudron, MB McDonnell, I Munro, DK McCluskey; ID Johnston, **CKL Tan**, MC Tracey (2019) "*Fully integrated digital microfluidics platform for automated immunoassay; a versatile tool for rapid, specific detection of a wide range of pathogens*", Biosensors and Bioelectronics, Vol. 128 p 52 (Impact Factor: 10.257; Citations: 18)

CKL Tan, J Morewood, V De-Belis (2019) "*Improving the Engagement of Engineering Students in Laboratory Activities Using QR codes*" University of Hertfordshire Learning and Teaching Conference 2019, Hatfield, United Kingdom, 7th June 2019

L Coudron, T Foat, M McDonnell, D McCluskey, I Munro, I Johnston, **C Tan**, N Dimov, W Sellors, D Despeyroux, M Tracey, "*Recent progress towards a worn bio-detector*", The 11th International Conference on Electrowetting, University of Twente Enschede, the Netherlands, 18th – 20th June 2018

D McCluskey, I Johnson, **CKL Tan**, MC Tracey (2017) "The design of an innovative, immersive, research-led, undergraduate module for effective development of R&D skills and learning" Blended learning in practice, Autumn Edition, pp 70-85

TG Foat, WJ Sellors, MD Walker, PA Rachwal, JW Jones, DD Despeyroux, L Coudron, I Munro, DK McCluskey, **CKL Tan**, MC Tracey (2016) "*A prototype personal aerosol sampler based on electrostatic precipitation and electrowetting-on-dielectric actuation of droplets*", Journal of Aerosol Science, Vol 95, p 43, (Impact Factor: 2.645; Citations: 18)

L Coudron, TG Foat, W Sellors, M Walker, P Rachwal, J Jones, D Despeyroux, M McDonnell, DK McCluskey, I Munro, ID Johnston, **CKL Tan**, MC Tracey, "*New strategies towards the next generation of biodetector*", Poster, 10th International Meeting on Electrowetting, Taipei, Taiwan, 19th – 22nd June 2016

DK McCluskey, **CKL Tan**, MC Tracey, ID Johnston, L Coudron, "*The design of an innovative research-led programme for effective development of R&D skills and learning*", Oral presentation, 1st ASEAN innovation Conference (UAIC), Vientiane, Laos, 25th – 26th October 2016

CKL Tan, MJ Davies, DK McCluskey, I Munro, MC Nweke, MC Tracey, N Szita (2015) "*Electromagnetic Stirring in a Microbioreactor with Non-conventional Chamber Morphology and Implementation of Multiplexed Mixing*" Journal of Chemical Technology and Biotechnology, vol. 90, no. 10, pp. 1927-1936 (Impact Factor: 2.75; Citations: 4)

MJ Davies, **CKL Tan**, I Munro, MC Tracey, N Szita (2014) "*Electromagnetic Actuated Stirring in Microbioreactor Enabling Easier Multiplexing and Flexible Device Design*" 4th Micro and Nano Flows Conference, London, United Kingdom, 7/09/14 - 10/09/14

ID Johnston, MB McDonnell, **CKL Tan**, DK McCluskey, MC Tracey (2014) "*Dean flow focusing and separation of small microspheres within a narrow size range*" Microfluidics and Nanofluidics, vol. 17, no. 3, pp. 509-518 (Impact Factor: 2.489; Citations: 34)

ID Johnston, **CKL Tan**, DK McCluskey, MC Tracey (2014) "*Mechanical characterization of bulk Sylgard 184 for microfluidics and microengineering*" Journal of Micromechanics and Microengineering, vol. 24, no. 3, 035017 (Impact Factor: 1.739; Citations: 960)

L Coudron, ID Johnston, **CKL Tan**, MC Tracey (2013) "*Low-cost credit card-based microfluidic devices for magnetic bead immobilisation*", Microfluidics and Nanofluidics, Vol 1-2, p 359 (Impact Factor: 2.489; Citations: 6)

T Fujiwara, ID Johnston, MC Tracey, **CKL Tan** (2010) "*Increasing pumping efficiency in a micro throttle pump by enhancing displacement amplification in an elastomeric substrate*" Journal of Micromechanics and Microengineering, vol. 20, no. 6, 065018 (Impact Factor: 1.739; Citations: 16)

MJ Davies, ID Johnston, **CKL Tan**, MC Tracey (2010) "*Whole blood pumping with a microthrottle pump*" Biomicrofluidics, vol. 4, no. 4, 044112 (Impact Factor: 2.5; Citations: 17)

MC Tracey, ID Johnston, JB Davis, **CKL Tan** (2010) "*Dual independent displacement-amplified micropumps with a single actuator*" Journal of Micromechanics and Microengineering, vol. 16, no. 8, pp. 1444-1452 (Impact Factor: 1.739; Citations: 25)

MC Tracey, ID Johnston, JB Davis, **CKL Tan** (2010) "*Suspension-Compatible Elastomer-Glass Micropumps Employing a Linear Topology*" Procs IET Seminar on MEMS Sensors and Actuators 2006. IEEE, pp. 31-38

CKL Tan, ID Johnston, JB Davis, MC Tracey (2005) "*Continuously variable mixing-ratio micromixer with elastomer valves*" Journal of Micromechanics and Microengineering, vol. 15, no. 10, pp. 1885-1893 (Impact Factor: 1.739; Citations: 22)

MC Tracey, ID Johnston, JB Davis, **CKL Tan** (2005) "*Micro throttle pump employing displacement amplification in an elastomeric substrate*" Journal of Micromechanics and Microengineering, vol. 15, no. 10, pp. 1831-1839 (Impact Factor: 1.739; Citations: 25)

MC Tracey, ID Johnston, JB Davis, **CKL Tan** (2005) "*Microfluidic solid-phase suspension transport with an elastomer-based, single piezo-actuator, micro throttle pump*" Lab on a Chip, vol. 5, no. 3, pp. 318-325 (Impact Factor: 6.774; Citations: 33)

MC Tracey, ID Johnston, JB Davis, **CKL Tan** (2004) "*Micro Fluidics Using Novel Materials*" ASME Emerging Technology in Fluids, Structures, and Fluid-Structure Interactions, 1, pp. 51-57, San Diego, July 2004.