Cheemeng Tan

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EDUCATION

2010	Ph.D. Biomedical Engineering (Advisor: Prof. Lingchong You) *Duke University*
2002	M.S. High Performance Computation for Engineered Systems *Singapore-MIT Alliance*
2001	B.Eng. Engineering (First class honors) *National University of Singapore*

APPOINTMENTS

2019-now	Associate Professor, Department of Biomedical Engineering, University of California Davis
2013-2019	Assistant Professor, Department of Biomedical Engineering, University of California Davis
2014-now	Member/Trainer, University of California Davis Chemical Engineering Integrative Genetics and Genomics Biochemistry, Molecular, Cellular and Developmental Biology Designated Emphasis in Biotechnology T32 Training Program in Molecular and Cellular Biology
2010-2013	Lane Postdoctoral Fellow, Lane Center for Computational Biology, Carnegie Mellon University (Advisors: Prof. Philip LeDuc and Prof. Russell Schwartz)
2002-2004	Research Associate, Bioinformatics Institute, Singapore.
2002	Research Intern, Temasek Laboratories, Singapore
2000	Engineer Intern, Sinotech Engineering Consultants Inc., Taiwan.

AWARDS

2018	Cellular and Molecular Bioengineering Young Innovator
2018	Scialog Fellow, Research Corporation and the Gordon and Betty Moore Foundation
2015-2018	Young Investigator Grant, Human Frontier Science Program (10 out of 1011 applications)
2012-2017	Branco Weiss Fellowship, Society in Science, ETH Zurich (10 out of >400 applications)
2011, 2009	q-bio Travel Awards
2010-2013	Lane Postdoctoral Fellowship
2009	Medtronic Fellowship
2008	BioBricks Foundation Synthetic Biology 4.0 Travel Award
2001-2002	Singapore-MIT Alliance Graduate Fellowship
1997-2001	Kuok Foundation Award, Malaysia

PUBLICATIONS (H-INDEX = 18)

2020 1. Holistic engineering of cell-free systems through proteome-reprogramming synthetic circuits. C. Meyer, L. Contreras-Llano, Y. Liu, R. Pasula, S. Lim, M. Longo, C. Tan. ***Nature Communications*.**

2. Orthogonal tuning of gene expression noise using CRISPR-Cas. F. Wu, J. Shim, T. Gong, and C. Tan. ***Nucleic Acids Research*.**
3. Stochastic ordering of complexoform protein assembly by genetic circuits. M. Jensen, E. Morris, H. Tran, M. Nash, C. Tan. ***PLoS Comp. Bio.***

2019 4. Microfluidic cap-to-dispense (μCD): a universal microfluidic–robotic interface for automated pipette-free high-precision liquid handling. J. Wang, K. Deng, C. Zhou, Z. Fang, C. Meyer, K. Deshpande, Z. Li, X. Mi, Q. Luo, B. Hammock, C. Tan*, Y. Chen*, T. Pan*. ***Lab on a Chip***, 2019**.**

5. A biosensing soft robot: Autonomous parsing of chemical signals through integrated organic and inorganic interfaces. K. Justus, T. Hellebrekers, D. Lewis, A. Wood, C. Ingham, C. Majidi, P. LeDuc, and C. Tan. ***Science Robotics,*** *4 (31), eaax0765.*
   Highlighted by Digital Journal, ZDNet, Business Standard, SlashGear, The Peninsular Qatar, New York Post, BGR, Cosmos, hackster.io, Irish Times, New Atlas, TechCrunch
6. Dead bacterial absorption of an antimicrobial peptide underlies collective tolerance. F. Wu and C. Tan. ***Journal of Royal Society Interface***, 16(151), 2019.

2018 7. Engineered stochastic adhesion between microbes as a protection mechanism against environmental stress. D. Lewis, R. Vanella, M. Nash, and C. Tan. ***Cellular and Molecular Bioengineering***, 10.1007/s12195-018-0
8. Minimizing context-dependency of gene networks using artificial cells. Y. Ding, L. Contreras-Llano, E. Morris, M. Mao, and C. Tan. ***ACS Applied Materials and Interfaces***, 10.1021/acsami.8b100
9. High-throughput screening of biomolecules using cell-free gene expression systems. L. Contreras-Llano and C. Tan. ***Oxford University Press - Synthetic Biology***, 3 (1), ysy012
10. DD Lewis, C Tan. Aroma-triggered pain relief. ***Nature Biomedical Engineering*** 2 (2), 58, 2018.
    Invited News and Views
11. F. Villarreal, M. Chavez, Y. Ding, J. Fan, T. Pan, and C. Tan. Synthetic microbial consortia enable rapid assembly of multi-protein complexes. ***Nature Chemical Biology***, 14(1), 29, 2018.
12. Dotette: Programmable, high-precision, plug-and-play droplet pipetting. J. Fan, Y. Men, K. Tseng, Y. Ding, Y. Ding, F. Villarreal, C. Tan, B. Li, and T. Pan ***AIP Biomicrofluidics***, 12, 034107, 2018.
13. Engineering approaches of smart, bio-inspired vesicles for biomedical applications. T. Abraham, M. Mao, and C. Tan. ***Physical Biology***, 15 (6), 2018.

2017 14. S. McCutcheon, K. Chiu, D. Lewis, and C. Tan. CRISPR-Cas expands dynamic range of gene expression from T7RNAP promoters, ***Biotechnology Journal***, published online, 2017.
    Selected as inside cover.
15. D. Lewis, M. Chavez, K. Chiu, and C. Tan. Reconfigurable analog signal processing in living cells. ***ACS Synthetic Biology***, *published online, 2017.*
    Highlighted by Cell Systems.
16. C. Tan. What Is the Role of Circuit Design in the Advancement of Synthetic Biology? Part 3, ***Cell Systems***, 4 (6), 579–580, 2017.
    Invited opinion piece
17. J. Fan, F. Villarreal, B. Weyers, Y. Ding, K. Tseng, J. Li, B. Li*, C. Tan*, and T. Pan*. Multi-dimensional studies of synthetic genetic promoters enabled by microfluidic impact printing. ***Lab-on-a-chip***, 17, 2198-2207, 2017. (*Co-corresponding)

18. C. Tan. Special collection of synthetic biology, aiming for quantitative control of cellular systems. ***Quantitative Biology***, 1-2, 2017.

    Served as the guest editor of the special issue

2016 19. F. Villarreal and C. Tan. Cell-free systems in the new age of synthetic biology. ***Frontier Chem. Sci. Eng.***, DOI 10.1007/s11705-017-1610-x, 2016.

20. M. Chavez, J. Ho, and C. Tan. Reproducibility of high-throughput plate-reader experiments in synthetic biology. ***ACS Synthetic Biology***, DOI: 10.1021/acssynbio.6b00198, 2016.

21. F. Wu, C. Ma, and C. Tan. Network motifs modulate druggability of cellular targets. ***Scientific Reports***, 6: 36626, 2016.

22. E. Morris, M. Chavez, and C. Tan. Dynamic Biomaterials: Toward Engineering Autonomous Feedback. ***Current Opinion in Biotechnology***, 39, 97-104, 2016.

2015 23. R. Steward, C. Tan, C-M Cheng, and P. LeDuc. Cellular force signal integration through vector logic gates. ***Journal of Biomechanics***, 48 (4), 613-620, 2015.

2014 24. D. Lewis, F. Villareal, F. Wu, and C. Tan. Synthetic biology outside the cell: linking computational tools to cell-free systems. ***Frontiers in Bioengineering and Biotechnology***, 2, 2014.

25. Y. Ding, F. Wu, and C. Tan. Synthetic biology: the bridge between artificial and natural cells. ***Life***, 4 (4), 1092-1116, 2014.

26. C. Tan, R. Smith, M-C. Tsai, R. Schwartz, and L. You. Phenotypic signatures arising from unbalanced bacterial growth. ***PLoS Comp. Bio.***, 10 (8), e1003751, 2014.

27. F. Wu and C. Tan. The engineering of artificial cellular nanosystems using synthetic biology approaches. ***Wiley Interdisciplinary Reviews: Nanomedicine and Nanobiotechnology***, 6 (4), 369-383, 2014.

28. R. Smith, C. Tan, K. Riccione, A. Pai, H. Song, and L. You. Programmed Allee effect in bacteria causes a tradeoff between population spread and survival. ***PNAS***, 111 (5), 1969-1974, 2014.

    Selected for Faculty Prime 1000.

2013 29. C. Tan, S. Saurabh, M. Bruchez, R. Schwartz, and P. LeDuc. Shaping gene expression in artificial cellular systems by cell-inspired molecular crowding. ***Nature Nanotechnology***, 8 (8), 602-608, 2013.

    Highlighted in cover article and "News and Views": Gene in a crowd, Nature Nanotechnology, 2013.

2004 to 2012 30. C. Tan*, R. Smith*, J. Srimani, K. Riccione, S. Prasada, M. Kuehn, and L. You. The inoculum effect and band-pass bacterial response to periodic antibiotic treatment. ***Molecular Systems Biology***, 8:617, 2012. (*Equal contribution)

    Highlighted in "Editors' Choice": Microbiology - Hit 'Em Quick, Hit 'Em Strong, Science, 338, 6104, 2012.

31. C. Tan, S. Lo, P. LeDuc, and CM. Cheng. Frontiers of optofluidics in synthetic biology. ***Lab on a Chip,*** 12(19), 3654-65, 2012.

    Highlighted in "Editorial": Themed issue: Optofluidics, Lab on a Chip, 12, 3539–3539, 2012.

32. G. H. Zan, C. Tan, M. Deserno, F. Lanni, and M. Lösche. Fusion of giant unilamellar vesicles with planar hydrophobic surfaces: A fluorescence microscopy study. ***Soft Matter***, 8 (42), 10877-10886, 2012.

33. M. Hallen, B. Li, Y. Tanouchi, C. Tan, M. West, and L. You. Computation of Steady-State Probability Distributions in Stochastic Models of Cellular Networks. ***PLoS Comp. Bio.***, 7 (10), 2011.

34. G. Yao, C. Tan, M. West, J. R. Nevins, and L. You. Origin of bistability underlying mammalian cell cycle entry. ***Molecular Systems Biology***, 7:485, 2011.

35. H. Song, S. Payne, C. Tan, and L. You. Programming microbial population dynamics by engineered cell–cell communication. ***Biotechnology Journal***, 6 (7), 837-849, 2011**.**
36. C. Tan, P. Marguet, and L. You. Emergent bistability by a growth-modulating positive feedback circuit. ***Nature Chemical Biology***, 5, 842-848, 2009.
    Highlighted in "News and Views": Slow growth leads to a switch, Nature Chemical Biology, 5, 784-785, 2009.
37. Q. Wang, J. Niemi, C. Tan, L. You and M. West. Image segmentation and dynamic lineage analysis in single-cell fluorescent microscopy. ***Cytometry A***, 77(1), 101-10, 2009.
38. C. Tan, F. Reza, and L. You. Noise-limited frequency signal transmission in gene circuits. ***Biophysical Journal***, 93, 3753-3761, 2007.
39. C. Tan, H. Song, J. Niemi, and L. You. A synthetic biology challenge: making cells compute. ***Molecular BioSystem***, 3, 343-353, 2007.
    Highlighted in "Perspective": Living computers. Chemical Biology, 2007.
40. P. Marguet, F. Balagadde, C. Tan, and L. You. Biology by design: reduction and synthesis of cellular components and behaviour. ***J. Royal Society Interface***, 4(15), 607-623, 2007.
41. K.-H. Chiam*, C. Tan*, V. Bhargava, and G. Rajagopal. Hybrid simulations of stochastic reaction-diffusion processes for modeling intracellular signaling pathways. ***Phys. Rev. E***, 74, 051910, 2006 (*Equal contribution).
42. P. Dhar, C. Tan, S. Somani, Y. Li, K. Sakharkar, A. Krishnan, A. Ridwan, M. Chitre, and H. Zhu. Grid Cellware: The first Grid-enabled tool for modeling and simulating cellular processes. ***Bioinformatics***, 21(7), 1284-1287, 2005.
43. C. Tan, S. Somani, and P. Dhar. Modeling and simulation of biological systems with stochasticity. ***In-Silico Biology***, 4, 0024, 2004.
44. P. Dhar, C. Tan, S. Somani, Y. Li, A. Sairam, M. Chitre , H. Zhu, and K. Sakharkar. Cellware: a multi-algorithmic software for computational systems biology. ***Bioinformatics***, 20(8), 1319-1321, 2004.

Conference Papers (Refereed)

45. T. Ray, H. Tsai, and C. Tan. Effects of Solver Fidelity on a Parallel Search Algorithm's Performance for Airfoil Shape Optimization Problems. 9th AIAA/ISSMO Symposium on Multidisciplinary Analysis and Optimization Conference, Atlanta, Georgia, 2002.
46. C. Tan, T. Ray, and H. Tsai. Effects of Adaptive Search Space Operator on Performance of SWARM Algorithm for Airfoil Design Optimization. 41st Aerospace Sciences Meeting and Exhibit, Reno, Nevada, 2003
47. C. Tan, T. Ray, and H. Tsai. A Comparative Analysis of Evolutionary Algorithm and Swarm Algorithm for Airfoil Design Problems. 41st Aerospace Sciences Meeting and Exhibit, Reno, Nevada, 2003

Book Chapters

48. T. Lee, C. Tan, D. Tu, and L. You. Systems Bioinformatics: An Engineering Case-Based Approach. G. Alterovitz (Editor), M. F. Ramoni. Artech House Publishers, 2007.

Patents and Patent Applications

49. International patent filed**.** International application number: PCT/US18/17102. Use of microbial consortia in the production of multi-protein complexes.

INVITED TALKS

02/2020	Seminar Speaker, Academia Sinica, Taipei, Taiwan
09/2019	10th year Anniversary Event Speaker, Carnegie Mellon University, Department of Computational Biology
09/2019	Seminar Speaker, Carnegie Mellon University, Department of Biology
06/2019	Speaker, UCSF, Symposium on gene-expression noise

05/2019	Speaker, UC Davis – Nanyang Technological University Summit
11/2018	Symposium Speaker, Branco-Weiss Fellowship Annual Meeting
01/2018	Seminar Speaker, Wyss Institute at Harvard University
01/2018	Seminar Speaker, MIT
09/2017	Seminar Speaker, University of Minnesota Twin Cities
03/2017	International Biological Engineering Meeting, New Delhi, India
12/2016	Cold Spring Harbor Asia Synthetic Biology meeting, Shanghai, China
08/2016	Seminar Speaker, Lawrence Livermore National Lab
07/2016	Summer Course in Synthetic Biology, National Chung-Hsing University, Taiwan
07/2016	Seminar Speaker, Academia Sinica, Taiwan
06/2016	Late-breaking Talk, 2016 Biointerface Science - Gordon Research Conference, Switzerland
02/2016	Keynote Presentation, NanoEngineering for Medicine and Biology Conference (ASME), Houston
02/2015	Workshop Proposer and Speaker, Annual Biophysical Society Meeting, Baltimore
01/2015	Conference Speaker, PepTalk 2015, San Diego
07/2014	Workshop Speaker, EITA Conference, MIT
06/2014	Conference Speaker, Peking University, China
06/2014	Seminar Speaker, Ludwig-Maximilians Universitat Munchen, Germany
05/2014	Seminar Speaker, Medical Microbiology and Immunology, UC Davis
03/2014	Seminar Speaker, BME and CHMS recruitment events, UC Davis
02/2014	Seminar Speaker, Chemical Engineering and Materials Science, UC Davis
10/2013	Seminar Speaker, Biomedical Engineering, UC Davis
05/2013	Seminar Speaker, Purdue University
05/2013	Seminar Speaker, University of Warwick, UK
05/2013	Seminar Speaker, North Carolina State University
03/2013	Seminar Speaker, University of California Davis
03/2013	Seminar Speaker, University of California Berkeley
02/2013	Seminar Speaker, University of California Irvine
02/2013	Seminar Speaker, Arizona State University
01/2013	Seminar Speaker, Stony Brook University
01/2013	Seminar Speaker, Texas A&M University College Station

SERVICES OUTSIDE UC DAVIS

2020	NSF grant review panel
2019	NASA grant review panel
2017 – now	Reviewer, NDSEG Fellowship
2017	Consultant, Hitachi R&D
2017 – 2019	NIH, Early Career Reviewer
2017	Ad-hoc Reviewer, The Leverhulme Trust (UK)
2017	Guest editor, Special Issue on "Synthetic Biology" in Quantitative Biology
2015, 2016	Ad-hoc Reviewer, NSF
10/2015	Platform Session Chair, BMES Annual Meeting, Tampa
04/2015	Ad-hoc Reviewer for ETH Postdoctoral Fellowship, ETH Zurich, Switzerland
01/2015	Ad-hoc Reviewer for David Philips Fellowship, BBSRC, UK
01/2015	Workshop Chair, Biophysical Society Annual Meeting, Baltimore
2014-2018	Undergraduate Affairs Committee, BME, UC Davis
10/2014	Poster & Platform Session Chair, BMES Annual Meeting, Texas

SERVICES IN UC DAVIS

2019-now	Graduate advisor, BME Graduate Group
2016-2019	Member, BME Graduate Group admission committee
2017	Chair, Faculty Hiring Planning Committee
2017 – now	Member, BME, Academic Merits and Promotion Committee
2014 – now	Member, BME, Undergraduate Affairs Committee
2016, 2019	Reviewer, UC Davis, Limited Submission
2015, 2016	Session moderator, UC Davis Undergraduate Research Conference

TEACHING

University of California Davis (evaluation score – higher is better)

Fall 2019	Lecturer, BIM161 Molecular Biotechnology (eval=4.5/5)
Spring 2019	Lecturer, BIM167 Biofluid Mechanics (eval=4.5/5)
Fall 2018	Lecturer, BIM264 Systems and Synthetic Eng. Of Cells (eval=4.5/5)
Spring 2018	Lecturer, BIM167 Biofluid Mechanics (eval=4.6/5)
Winter 2018	Lecturer, BIM106 Biotransport Phenomenon (eval = 4.0/5)
Fall 2017	Lecturer, BIM161 Molecular Biotechnology (eval = 4.8/5)
Spring 2017	Lecturer, BIM167 Biofluid Mechanics (eval=4.7/5)
Winter 2017	Lecturer, BIM106 Biotransport Phenomenon (eval=4.4/5)
Spring 2016	Lecturer, BIM167 Biofluid Mechanics (eval=4.7/5)
Winter 2016	Lecturer, BIM106 Biotransport Phenomenon (eval=4.5/5)
Fall 2015	Lecturer, BIM161 Molecular Biotechnology (eval=4.3/5)
Spring 2015	Lecturer, BIM167 Biofluid Mechanics (eval=4.5/5)
Winter 2015	Lecturer, BIM289A Systems & Synthetic Eng. of Cells
Spring 2014	Lecturer, BIM167 Biofluid Mechanics (eval=4.89/5)
Spring 2014	Guest lecturer, BIM209 Scientific Ethics and Integrity
Fall 2014	Guest lecturer, BIM01 Introduction to Biomedical Engineering

Carnegie Mellon University

Spring 2013	Guest lecturer, Applied Cell and Molecular Biology
Fall 2012	Guest lecturer, Computing and biology
Fall 2011	Guest lecturer, Biological modeling and simulation

Duke University

Fall 2006	Teaching assistant, Modeling cellular and molecular systems
Fall 2007	Teaching assistant, Bio-transport phenomena

ADVISORY AND SUPERVISORY RESPONSIBILITIES

University of California Davis

Postdoc	Fernando Villarreal, 2014-2017
	Yunfeng Ding, 2014-2017
	Eliza Morris, 2015-2016
	Yao Liu, 2017-2019
	Ting Gong, 2019-now
	Jiyoung Shim, 2019-now
Graduate Students	Fan Wu, Ph.D. Biomedical Engineering, 2013-2019
	Daniel Lewis, Ph.D. Integrated Genetics and Genomics, 2013-2019
	Luis Contreras-Llano, Ph.D. Biochemistry, Molecular, Cellular and Developmental Biology, 2017-now
	Conary Meyer, Ph.D. Biomedical Engineering, 2018-now
	Chuqing Zhou, Ph.D. Chemical Engineering, 2018-now
	Yuchen Yao, M.S. Chemical Engineering, 2017-2018

Undergraduate Students	Cong Ma, Summer 2014 Jonathan Ho, 2014-2015 Meidi Wang, Summer 2015 Mi Hwangbo, 2015-2016 Ying Zhang, Summer 2016 Michael Chavez, 2014-2016 Alexander Duveneck, 2015-2017 Kwan-Lun Chiu, 2015-2017 Sean McCutcheon, 2015-2017 Michelle Mao, 2016-2018 Tanishq Abraham, 2016-2018 Christopher Vo, 2017-now Rachel Ibrahim, 2017-2019 Jagveer Singh, 2018-2019 Katelyn France, 2018-2020 Hamad Linjawi, 2019-2020 Matthew Wong, 2019-now Dasha Iserlis, 2019-now
Thesis Committee	Kyungjin Song, Ph.D. awarded Kyle Justus, Ph.D. awarded Andrew Yao, M.S. awarded Daniel Lewis, Ph.D. awarded Fan Wu, Ph.D. awarded
Qualifying Exam	Kyungjin Son, Biomedical Engineering, 2013 Anh Miu, Biomedical Engineering, 2014 Leif Anderson, Biomedical Engineering, 2015 Xiao Kang, Biomedical Engineering, 2015 Prema Karunanithi, Biochemistry, Molecular, Cell, and Developmental Biology, 2015 Fan Wu, Biomedical Engineering, 2015 Kyle Justus, Mechanical Engineering, 2015 Jovana Veselinovic, Chemical Engineering, 2016

COMPLETED AND CURRENT GRANTS

2019-2022	PI, NIH, NIBIB Trailblazer Award *Modeling heterogeneity of a cancer-signaling cascade using biomimetic cells*
2018-2020	PI, Branco Weiss Fellowship, Collaborative Grants Program *Engineering stochastic adhesion between probiotics for prolonged engraftment and function in the treatment of gut dysbiosis*
2018-2021	PI, NSF, Standard Grant *In situ sensing of chemicals inside three dimensional bacterial matrix using artificial cells*
2018-2021	Co-PI (PI: Marjorie Longo), NSF, Standard Grant *Functional Biomembrane Architectures in Mesoporous Gels*
2018-2019	PI, UC Davis Research Core Facilities Program Pilot and Feasibility Program *Screening of genes and proteins that underlie heterogeneous response of bacteria towards antimicrobial peptides*
2015-2019	PI, Young Investigator Grant, Human Frontier Science Program (Co-PI Nash) *Underlying dynamical coupling between gene expression and cellulosome assembly.*

2012-2017 PI, Branco-Weiss Fellowship, Society-in-Science
The engineering of antibacterial artificial cells using a synthetic biology approach

JOURNAL/CONFERENCE ABSTRACT REVIEWER

PLoS Computational Biology, PLoS One, Journal of the Royal Society Interface, Biotechnology Journal, Micro and Nano Letters, Journal of Systems and Synthetic Biology, Journal of Cellular and Molecular Medicine, Nature Protocols, Nature Communications, Science, Scientific Reports, ACS Synthetic Biology, Nature Biomedical Engineering, Science Translational Medicine, Biophysical Journal, Journal of Visualized Experiments, Annual Meeting of Biomedical Engineering Society.