Cheemeng Tan

Assistant Professor
Department of Biomedical Engineering
University of California Davis
Tel: +1-530-752-7849 (office)
Email: cmtan@ucdavis.edu
Website: www.bme.ucdavis.edu/tanlab

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

08/2013-now	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 = 16)

2019
a) A Biosensing Soft Robot: Integrating Chemical and Optical Responsive Synthetic Cells with Soft Robotics. K. Justus, T. Hellebrekers, D. Lewis, A. Wood, C. Ingham, C. Majidi, P. LeDuc, and C. Tan. ***1st round review, Science.***
b) Dead bacterial absorption of an antimicrobial peptide underlies collective tolerance. F. Wu and C. Tan. ***Journal of Royal Society Interface***, accepted, 2019.

2018 1. 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

2. 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

3. 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

4. DD Lewis, C Tan. Aroma-triggered pain relief. ***Nature Biomedical Engineering*** 2 (2), 58, 2018.

   Invited News and Views

5. 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.

6. 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.

7. Engineering approaches of smart, bio-inspired vesicles for biomedical applications. T. Abraham, M. Mao, and C. Tan. ***Physical Biology***, 15 (6), 2018.

2017 8. 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.

9. 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.

10. 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

11. 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)

12. 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 13. 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.

14. 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.

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

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

2015 17. 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 18. 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.

19. Y. Ding, F. Wu, and C. Tan. Synthetic biology: the bridge between artificial and natural cells. ***Life***, 4 (4), 1092-1116, 2014.
20. 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.
21. 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.
22. 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 23. 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 24. 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.

25. 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.

26. 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.
27. 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.
28. 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.
29. 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**.**
30. 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.

31. 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.
32. C. Tan, F. Reza, and L. You. Noise-limited frequency signal transmission in gene circuits. ***Biophysical Journal***, 93, 3753-3761, 2007.
33. 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.

34. 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.

35. 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).
36. 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.
37. C. Tan, S. Somani, and P. Dhar. Modeling and simulation of biological systems with stochasticity. ***In-Silico Biology***, 4, 0024, 2004.
38. 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)

39. 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.
40. 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
41. 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

42. 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

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

INVITED TALKS

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

***SELECTED CONTRIBUTED PRESENTATIONS* (*OUT OF >20*)**

2013	Shaping gene expression in artificial cellular systems by cell-inspired molecular crowding. Winter q-bio, Honolulu
	Shaping gene expression in artificial cellular systems by cell-inspired molecular crowding. Biophysical Society Annual Meeting, Philadelphia
2012	Shaping gene expression in artificial cellular systems by cell-inspired molecular crowding. American Institute of Chemical Engineers Annual Meeting, Pittsburgh
2011	The inoculum effect and band-pass bacterial response to periodic antibiotic treatment. Biomedical Engineering Society Meeting, Hartford
	The inoculum effect and band-pass bacterial response to periodic antibiotic treatment. Q-bio 5, Santa Fe
2008	Growth modulation turns a noncooperative positive feedback bistable. Institute of Biological Engineering Annual Meeting, Chapel Hill
2006	Bistability in an integrated protein and gene regulatory network. Biomedical Engineering Society Annual Fall Meeting, Chicago

SERVICES OUTSIDE UC DAVIS

2017 – now	Reviewer, NDSEG Fellowship
2017	Consultant, Hitachi R&D
2017 – now	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

2017	Chair, Faculty Hiring Planning Committee
2017 – now	Member, Academic Merits and Promotion Committee
2014 – now	Member, Undergraduate Affairs Committee
2016	Reviewer, Limited Submission
2016 - 2018	Member, BME Graduate Group Admission Committee
2015, 2016	Session moderator, UC Davis Undergraduate Research Conference

TEACHING

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

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-now
Graduate Students	Fan Wu, Ph.D. Biomedical Engineering, 2013-now
	Daniel Lewis, Ph.D. Integrated Genetics and Genomics, 2013-now
	Luis Contreras-Llano, Ph.D. Biochemistry, Molecular, Cellular and Developmental Biology, 2017-now
	Conary Meyer, Ph.D. Biomedical 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-now
	Jagveer Singh, 2018-now
	Katelyn France, 2018-now
	Hamad Linjawi, 2019-now
Thesis Committee	Kyungjin Song, Ph.D. awarded
	Kyle Justus, Ph.D. awarded

	Andrew Yao, M.S. awarded
Qualifying Exam	Kyungjin Son, Biomedical Engineering, 2013
	Anh Miu, Biomedical Engineering, 2014
	Leif Anderson, Biomedical Engineering, 2015
	Xiao Kang, Biomedical Engineering, 2015
	Prema S. 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

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.* *No cost extension till 2019*
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, Scientific Reports, ACS Synthetic Biology, Nature Biomedical Engineering, Science Translational Medicine, Biophysical Journal, Journal of Visualized Experiments, Annual Meeting of Biomedical Engineering Society.