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EDUCATION

2005 Ph.D. in Microbiology, Cornell University, Ithaca, NY, USA
1999 M.S. in Microbiology, Fudan University, Shanghai, China
1996 B.S. in Microbiology, Fudan University, Shanghai, China

EMPLOYMENT HISTORY

2012- Assistant Professor of Biology, Northeastern University, Boston, MA
2006-2012 Postdoctoral Fellow, Harvard University, Cambridge, MA
2009-2011 BASF Research Fellow, Harvard University, Cambridge, MA
2006-2009 Jane Coffin Childs Postdoctoral Fellow, Harvard University, Cambridge, MA
2000-2005 Graduate Research Assistant, Cornell University, Ithaca, NY

FELLOWSHIPS AND AWARDS

National Science Foundation CAREER Award (2017-2021)
Badische Anilin-und Soda-Fabrik (BASF) Research Fellowship (2009–2011)
Jane Coffin Childs Medical Foundation (JCC) Postdoctoral Fellowship (2006–2009)

PUBLICATIONS

PEER-REVIEWED ARTICLES

1. Chen Y, Wang J, Yang N, Wen Z, Sun X, **Chai Y**, and Ma Z. (2017). Epigenetic regulation mediated by a member of the wheat head microbiome reduces virulence and growth of a major wheat fungal pathogen. (under review).
2. Qin Y*, Shang Q, Zhang Y, Li P, and **Chai Y**. (2017). *Bacillus amyloliquefaciens* L-S60 reforms the rhizosphere bacterial community and improves growth conditions in cucumber plug seedling. (in revision).
3. Chen X, Gao T*, Peng Q, Zhang J, **Chai Y**, and Song F. (2017). Characterization and regulation of CwlC, a novel cell wall hydrolase from *Bacillus thuringiensis*, and its essential role in mother cell lysis. (in revision).
4. Wang Q, Peng Q, Li X, Huang M, **Chai Y**, and Wu Y. (2017). pH affects the growth and drug resistance of *Staphylococcus aureus* biofilm in artificial urine. (under review)

5. Habib C*, Yu Y*, Gozzi K**, Ching C, Shemesh M, and **Chai Y.** (2017) Characterization of the regulation of a plant polysaccharide utilization operon and its role in biofilm formation in *Bacillus subtilis*. **PLoS One.** 12:e0179761.
6. Xu S, Yang N, Zheng S, Yan F*, Jiang C, Yu Y*, Guo J, **Chai Y[#]**, and Chen Y[#]. (2017) The *spo0A-sinI-sinR* regulatory circuit plays an essential role in biofilm formation, nematicidal activities, and plant protection in *Bacillus cereus* AR156. **Molecular Plant-Microbe Interactions.** 30:603-619. (#co-corresponding authors).
7. Yan F*, Yu Y*, Gozzi K**, Chen Y, Guo JH, and **Chai Y.** (2017) A genome-wide investigation on biofilm formation and biological control in *Bacillus cereus*. **Applied and Environmental Microbiology.** 83(13):e00561-17.
8. Gao T*, Li Y, Ding M, **Chai Y[#]** and Wang Q[#]. (2017) The Phosphotransferase System Gene *ptsI* in *Bacillus cereus* Regulates Expression of *sodA2* and Contributes to Colonization of Wheat Roots. **Research In Microbiology.** 168(6):524-535. (#co-corresponding authors).
9. Gozzi K**, Ching C, Paruthiyil A**, Zhao Y*, Godoy-Carter C, and **Chai Y.** (2017) *Bacillus subtilis* utilizes the DNA damage response to manage multicellular development. **npj Biofilms and Microbiomes.** 3:8.
10. Ching C, Gozzi K**, Heinemann B, **Chai Y,** and Godoy V. (2017) RNA-mediated cis-regulation in *Acinetobacter baumannii* modulates stress-induced phenotypic variation. **Journal of Bacteriology** 199(11): e00799-16.
11. Yu Y*, Yan F*, Chen Y, Jin C**, Guo JH, and **Chai Y.** (2016) Poly- γ -glutamic acids contribute to biofilm formation and plant root colonization in selected environmental isolates of *Bacillus subtilis*. **Frontiers In Microbiology.** 7:1811.
12. Barlow J**, Gozzi K**, Kelley CP, Geilich B, Webster T, **Chai Y,** Sridhar S, van de Ven AL. (2016) High throughput microencapsulation of *Bacillus subtilis* in semi-permeable biodegradable polymersomes for selenium remediation. **Applied Microbiology and Biotechnology.** 101:455–464.
13. Yan F*, Yu Y*, Wang L, Luo Y, Guo JH, and **Chai Y.** (2016) The *comER* gene plays an important role in biofilm formation and sporulation in both *Bacillus subtilis* and *Bacillus cereus*. **Frontiers In Microbiology.** 7:1025.
14. Duanis-Assaf D, Steinberg D, **Chai Y,** and M Shemesh. (2016) The LuxS based quorum sensing governs lactose induced biofilm formation by *Bacillus subtilis*. **Frontiers In Microbiology.** 6:1517.
15. DeLoughey A, Vanina D, **Chai Y,** and Losick R. (2016) Biofilm formation by *Bacillus subtilis* requires an endoribonuclease-containing multisubunit complex that controls mRNA levels for the matrix gene repressor SinR. **Molecular Microbiology.** 99:425-437.

16. Chen Y*, Gozzi K**, and **Chai Y.** (2015) A volatile signal for bacterial biofilm formation. **Microbial Cell.** 2: 406-408 (# mini-review).
17. Gao T*, Greenwich J*, Li Y, Wang Q, and **Chai Y.** (2015) The bacterial tyrosine kinase activator TkmA contributes to biofilm formation largely independent of the cognate kinase PtkA in *Bacillus subtilis*. **Journal of Bacteriology.** 197:3421-3432.
18. Chen Y*, Gozzi K**, Yan F*, and **Chai Y.** (2015) Acetic acid acts as a bacterial volatile signal to trigger biofilm formation. **mBio.** 6:e00392.
19. Gao T*, Foulston L, **Chai Y,** Wang Q, Losick R. (2015) Alternative modes of biofilm formation by plant-associated *Bacillus cereus*. **MicrobiologyOpen.** 4:452-464.
20. Subramaniam AR, DeLoughery A, Bradshaw N, Chen Y, O'Shea E, Losick R, and **Chai Y.** (2013) A serine sensor for multicellularity in a bacterium. **eLife.** 2:e01501
21. Shemesh M and **Chai Y.** (2013) A combination of glycerol and manganese promotes biofilm formation in *Bacillus subtilis* via the histidine kinase KinD signaling. **Journal of Bacteriology** 195:2747-2754.
22. Beauregard P, **Chai Y,** Vlamakis H, Losick R and Kolter R. (2013) *Bacillus subtilis* biofilm induction by plant polysaccharides. **Proceedings of the National Academy of Sciences USA.** 110(17):E1621-1630.
23. Vlamakis H, **Chai Y,** Beauregard P, Losick R and Kolter R. (2013) Sticking together: building a biofilm the *Bacillus subtilis* way. **Nature Review of Microbiology** 11:157-68 (#review article).
24. Chen Y[#], Yan F[#], **Chai Y[#],** Liu H, Kolter R, Losick R and Guo J. (2013) Biocontrol of tomato wilt disease by *Bacillus subtilis* isolates from natural environments depends on conserved genes mediating biofilm formation. **Environmental Microbiology** 15:848-864. (#co-first authors).
25. **Chai Y,** Beauregard P, Vlamakis H, Losick R and Kolter R. (2012) Galactose metabolism plays a crucial role in biofilm formation of *Bacillus subtilis*. **mBio** 3:e00184-12.
26. Chen Y[#], **Chai Y[#],** Guo J and Losick R. (2012) Evidence for cyclic di-GMP signaling in *Bacillus subtilis*. **Journal of Bacteriology** 194:5080-5090 (#co-first authors).
27. Chen Y[#], Cao S[#], **Chai Y[#],** Clardy J, Kolter R, Guo J and Losick R. (2012) A *Bacillus subtilis* sensor kinase recognizes plant signaling molecules that trigger biofilm formation on the roots of tomato plants. **Molecular Microbiology** 85:418-430 (#co-first authors).
28. **Chai Y,** Norman T, Kolter R, and Losick R. (2011) Evidence that metabolism and chromosome copy number control mutually exclusive cell fates in *Bacillus subtilis*. **EMBO Journal** 30:1402-1413.

29. **Chai Y**, Norman T, Kolter R, and Losick R. (2010) An epigenetic switch governing daughter cell separation in *Bacillus subtilis*. **Genes & Development** 24:754-765.
30. **Chai Y**, Kolter R, and Losick R. (2010) Reversal of an epigenetic switch governing cell chaining in *Bacillus subtilis* by protein instability. **Molecular Microbiology** 78:218-229.
31. **Chai Y**, Kolter R, and Losick R. (2009) Paralogous antirepressors acting on the master regulator for biofilm formation in *Bacillus subtilis*. **Molecular Microbiology** 74:876-887.
32. **Chai Y**, Kolter R, and Losick R. (2009) A widely conserved gene cluster required for lactate utilization in *Bacillus subtilis* and its involvement in biofilm formation. **Journal of Bacteriology** 191: 2423-2430.
33. Chu F, Kearns DB, Mcloon A, **Chai Y**, Kolter R, and Losick R. (2008) A novel regulatory protein governing biofilm formation in *Bacillus subtilis*. **Molecular Microbiology** 68:1117-1127.
34. **Chai Y**, Chu F, Kolter R, and Losick R. (2008) Bistability and biofilm formation in *Bacillus subtilis*. **Molecular Microbiology** 67:254-263.
35. Esther DC, **Chai Y**, and Winans SC. (2012) The quorum-sensing protein TraR of *Agrobacterium tumefaciens* is susceptible to intrinsic and TraM-mediated proteolytic instability. **Molecular Microbiology** 84: 807-815.
36. **Chai Y** and Winans SC. (2009) The chaperone GroESL enhances the accumulation of soluble, active TraR protein, a quorum-sensing transcription factor from *Agrobacterium tumefaciens*. **Journal of Bacteriology** 191: 3706-3711.
37. **Chai Y**, Tsai CS, Cho H, and Winans SC. (2007) *In vitro* reconstitution of the biochemical activities of the AttK, AttL, and AttM catabolic enzymes and the AttJ repressor of *Agrobacterium tumefaciens*. **Journal of Bacteriology** 189: 3674-3679.
38. **Chai Y** and Winans SC. (2005) RepB protein of an *Agrobacterium tumefaciens* Ti plasmid binds to a pair of sites between *repA* and *repB* for plasmid partitioning and autorepression. **Molecular Microbiology** 58: 1114-1129.
39. **Chai Y** and Winans SC. (2005) A small antisense RNA attenuates expression of an essential replicase gene of an *Agrobacterium tumefaciens* Ti plasmid. **Molecular Microbiology** 56: 1574-1585.
40. **Chai Y** and Winans SC. (2005) Amino-terminal protein fusions to the TraR quorum sensing transcription factor enhance protein stability and autoinducer-independent activity. **Journal of Bacteriology** 187:1219-1226.

41. Weihgart C, White C, Liu S, **Chai Y**, Cho H, Tsai C, Wei Y, Delay NR, Eberhard A and Winans SC. (2005) Direct binding of the quorum-sensing regulator CepR of *Burkholderia cenocepacia* to two target promoters *in vitro*. **Molecular Microbiology** 57: 452-467.
42. **Chai Y** and Winans SC. (2004) Site-directed mutagenesis of a LuxR-type quorum sensing transcription factor: alteration of autoinducer specificity. **Molecular Microbiology** 51:765-776
43. Zhu J[#], **Chai Y**[#], Zhong Z, Li S and Winans SC. (2003) *Agrobacterium* bioassay strain for ultrasensitive detection of *N*-acylhomoserine lactone-type quorum-sensing molecules: detection of autoinducers in *Mesorhizobium huakuii*. **Applied and Environmental Microbiology** 69:6949-6953(#co-first authors).
44. **Chai Y**, Zhu J and Winans SC. (2001) TrlR, a defective TraR-like protein of *Agrobacterium tumefaciens*, blocks TraR function *in vitro* by forming inactive TrlR:TraR dimers. **Molecular Microbiology** 40:414-421.

BOOK CHAPTER

Gozzi K** and **Chai Y**. (2017) Acetic acid is an important modulator for intracellular function and interspecies communication in bacteria. Mariusz Szymczak and Osman Topuz, eds., Acetic Acids: Advances in Research and Applications. NOVA Science Publishers, Hauppauge, NY, USA (In press).

CONFERENCE PROCEEDINGS

Di Cecco G**, Greenwich J*, and **Chai Y**. (2017) Differential tRNA^{ser} expression regulates translation rate of a biofilm master regulator during *Bacillus subtilis* biofilm development. **FASEB J.** 31:759.5.

CONFERENCE PRESENTATIONS (2012-present)

A. Oral presentations

Greenwich J*, Di Cecco G**, and Chai Y. The Interplay Between Serine Metabolism and Biofilm Formation in *Bacillus subtilis*. 23rd Annual Boston Bacterial Meeting (BBM), Cambridge, MA, June 2017.

Gozzi K**, Ching C, Paruthiyil A**, Zhao Y*, Godoy-Carter C, and Chai Y. DNA damage response regulates multicellular development in *Bacillus subtilis*. 22nd Annual Boston Bacterial Meeting, Cambridge, MA, June 2016.

B. Poster presentations

Hunter E* and Chai Y. Investigation of cell fate determination in *Bacillus subtilis* biofilms. 23rd Annual Boston Bacterial Meeting (BBM), Cambridge, MA, June 2017.

Reverdy A*, DeLoughery A, Losick R, and Chai Y. A chaperone-like protein complex plays an important role in growth transition in *Bacillus subtilis*. 23rd Annual Boston Bacterial Meeting, Cambridge, MA, June 2017.

Greenwich J*, Di Cecco G**, and Chai Y. The interplay between serine metabolism and biofilm formation in *Bacillus subtilis*. American Society of Microbiology General Meeting, New Orleans, LA. June 2017 (poster and mini-talk).

Di Cecco G**, Greenwich J*, and Chai Y. Differential tRNA^{ser} expression regulates SinR translation rate during biofilm formation in *Bacillus subtilis*. 2017 Northeastern University RISE: Research, Innovation, and Scholarship EXPO. Boston, MA, April 2017.

Di Cecco G**, Greenwich J*, and Chai Y. Differential tRNA^{ser} expression regulates SinR translation rate during biofilm formation in *Bacillus subtilis*. 2017 ASBMB Annual Meeting, Chicago, IL. April 2017.

Greenwich J*, Di Cecco G**, and Chai Y. Serine levels regulate biofilm formation in *Bacillus subtilis* by affecting translational efficiency. 2016 American Society of Microbiology General Meeting, Boston, MA. June 2016.

Gozzi K**, Ching C, Paruthiyil S**, Godoy-Carter V and Chai Y. The DNA damage response plays a key regulatory role in bacterial multicellularity and cell-fate determination. 2016 American Society of Microbiology General Meeting, Boston, MA. June 2016.

Yu Y*, Yan F*, Chai Y, and JH Guo. Synergistic activity in biofilm formation and biocontrol between *Bacillus subtilis* and *Bacillus cereus*. 2016 American Society of Microbiology General Meeting, Boston, MA. June 2016.

Habib C* and Chai Y. UDP-Galactose: Signal and Toxin in *Bacillus subtilis*. 2016 American Society of Microbiology General Meeting, Boston, MA. June 2016.

Hunter E* and Chai Y. A novel function for ComK in regulating *Bacillus subtilis* biofilm development. 22nd Annual Boston Bacterial Meeting, Cambridge, MA. June 2016.

Greenwich J*, Di Cecco G**, and Chai Y. Intracellular Serine levels Affect Biofilm Formation in *Bacillus subtilis*. 22nd Annual Boston Bacterial Meeting, Cambridge, MA. June 2016.

Habib C* and Chai Y. Molecular analysis of an operon involved in utilization of plant polysaccharide in *Bacillus subtilis*. 22nd Annual Boston Bacterial Meeting, Cambridge, MA. June 2016.

Greenwich J*, Di Cecco G**, and Chai Y. The role of serine metabolism in biofilm formation in *Bacillus subtilis*. 7th American Society of Microbiology Conference on Biofilms, Chicago, IL. October 2015.

Gozzi K**, Ching C, Godoy-Carter V, and Chai Y. Regulation of biofilm formation by DNA damage in *Bacillus subtilis*. 7th American Society of Microbiology Conference on Biofilms, Chicago, IL. October 2015.

Barlow J, Gozzi K**, Kelley C, Chai Y, Van De Ven-Moloney A, and Sridhar S. Development of Stable Polymersomes Encapsulating Bacteria for Release of Metabolites. 2015 Annual Meeting of the Controlled Release Society. Edinburgh, Scotland. July 2015.

Gozzi K**, Ching C, Godoy-Carter V, and Chai Y. Investigating the link between DNA damage and biofilm formation in *Bacillus subtilis*. 21st Boston Bacterial Meeting, Cambridge, MA. June 2015.

Greenwich J*, Di Cecco G**, and Chai Y. Investigating the role of serine metabolism in biofilm formation in *Bacillus subtilis*. 21st Boston Bacterial Meeting, Cambridge, MA. June 2015.

Barlow J**, Gozzi K**, Kelley C, Van De Ven-Moloney A, Chai Y, and Sridhar S. Microencapsulation of bacteria for controlled release of bioactives. Northeastern University RISE 2015. Boston MA. April 2015.

Yan F*, Chen Y, Gozzi K**, Guo J, and Chai Y. A comprehensive genetic study on *Bacillus cereus* multicellularity. Microbial Stress Response Meeting, Madison, WI. August 2014.

Yan F*, Chen Y, Wang L, Guo J, and Chai Y. Genetic analysis of *Bacillus cereus* multicellularity. 20st Boston Bacterial Meeting, Cambridge, MA. June 2014.

Gozzi K**, Antar H**, and Chai Y. Acetic acid may function as a volatile signal for biofilm formation in *Bacillus subtilis*. 20th Boston Bacterial Meeting, Cambridge, MA. June 2014.

Godoy-Carter, V Chai Y, Goluch E, Zhao Y*, Lin I, Tashjian T. Linking DNA damage response and biofilm disassembly. 108th American Society of Microbiology General Meeting, Boston, MA. May 2014.

Gao T*, Elsholz A, Losick R and Chai Y. Studying the role of the bacterial tyrosine kinase YwqD in biofilm formation in *Bacillus subtilis*. 19th Boston Bacterial Meeting, Cambridge, MA. June 2013.

Beauregard P, Chai Y, Vlamakis H, Losick R and Kolter R. Plant polysaccharides as inducers and carbon source for *Bacillus subtilis* biofilm formation. 2013 Gordon Conference on Microbial Adhesion & Signal Transduction. Newport, RI. August 2013.

INVITED TALKS

- “*Bacillus* species as biological control agents for plant protection”. Invited seminar. Chinese Academy of Agricultural Sciences, Institute of Plant Protection. Beijing, China. August 2017.
- “*Bacillus* species as biological control agents for plant protection”. Invited seminar. Hebei Agricultural University, College of Plant Protection. Baoding, China. August 2017.
- “Bacterial multicellular development in *Bacillus subtilis*”. Invited seminar. Sichuan University, College of Science. Chengdu, China. July 2017.
- “Bacterial multicellular development in *Bacillus subtilis*”. Invited seminar. Southwest University, College of Science. Chongqing, China. July 2017.

- “A *Bacillus subtilis* operon for utilization of plant polysaccharides and biofilm formation”. Invited seminar. Nanjing Agricultural University, Department of Plant Protection. Nanjing, China. July 2016.
- “Investigating the mechanism of biofilm formation and biological control in *Bacillus cereus*”. Invited seminar. China Agricultural University, Department of Plant Pathology, Beijing, China. July 2015.
- “Genetic analysis of *Bacillus cereus* multicellularity and its role in biological control. Invited keynote speaker, 2014 International Congress of Plant Biocontrol, Beijing, China. October 2014
- “Global genetic investigation on *Bacillus cereus* multicellularity”. Invited seminar. Nanjing Agricultural University, Department of Plant Protection. Nanjing, China. August 2014.
- “Global genetic investigation on *Bacillus cereus* multicellularity”. Invited seminar. University of Pennsylvania, Department of Microbiology and Immunology. March 2014.
- “Aminoglycosides inhibit *Bacillus subtilis* biofilm formation through a novel mechanism”. Invited seminar. Zhejiang University, Institute of Biotechnology. Hangzhou, China. July 2013
- “Biological control and environmental protection by *Bacillus* species”. Invited seminar. Zhejiang Ocean University, College of Science. Zhoushan, China. July 2013.
- “Investigation of toxicity by UDP-galactose in bacteria”. Invited seminar. Harvard University, BASF-Harvard Research Center. Cambridge, MA. November 2012.
- “Multicellular development by *Bacillus subtilis*”. Invited seminar. University of Wisconsin at Madison, Department of Bacteriology. Madison, WI. March 2012.
- “Multicellular development by *Bacillus subtilis*”. Invited seminar. University of Georgia at Athens, Department of Microbiology. Athens, GA. March 2012.
- “Multicellular development by *Bacillus subtilis*”. Invited seminar. University of Chicago, Department of Microbiology. Chicago IL. February 2012.
- “Multicellular development by *Bacillus subtilis*”. Invited seminar. University of Illinois at Urbana Champaign, Department of Microbiology. Urbana Champaign, IL. February 2012.
- “Investigation of multicellular communities by *Bacillus subtilis*”. Invited seminar. Duke University, Department of Biochemistry. Durham NC. February 2011.
- “A genetic switch that controls biofilm formation in *Bacillus subtilis*”. Invited talk. Boston Bacterial Meeting. Cambridge, MA. June 2010.
- “Alternative life style by *Bacillus subtilis*”. Invited seminar. International Congress of Plant Protection and Biological Control. Nanjing, China. May 2010.
- “Bistability controls biofilm formation in *Bacillus subtilis*”. Invited seminar. Nanjing Agricultural University, Department of Microbiology. Nanjing, China. July 2007.

SERVICE TO THE PROFESSION

- Associate editor, *Frontiers In Microbiology* (2016 - present)
- Guest editor for the Frontiers Research Topic “Rhizosphere Bacterial Community and Bacteria- Plant Interactions” (<http://journal.frontiersin.org/researchtopic/5169/rhizosphere-bacterial-community-and-bacteria-plant-interactions>)
- Editorial member, *Microbial Cell* (2016 - present)

- Member, American Society of Microbiology
- Panelist, National Science Foundation Graduate Research Fellowship Program (GRFP, 2017-)