



Department: School of Biotechnology

Professional field: Synthetic Biotechnology

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Profile

Prof. Lixin Zhang is a Director of National Key Laboratory of Bioreactor Engineering at East China University of Science and Technology. He is also a Part-time Professor of Institute of Microbiology, Chinese Academy of Sciences (IMCAS). He is a Chief Scientist of a “973 Program” and an Awardee of the National Science Fund for Distinguished Young Scholars, China. Before joining IMCAS in 2006, Prof. Zhang worked in 3 pharmaceutical companies in USA: SynerZ, Cetek and Microbia, Inc. He received his Ph. D degree in Institute of Applied Ecology, CAS and did his postdoc at Emory University, USA. He has published seven books, more than 200 papers (in Nature, etc) and holds 28 Chinese patents and 16 PCT patents. He co-edited a book with Prof. Arnold Demain, member of American Academy of Sciences on natural products in 2005 by Humana Press. He served as the President of the International Chemical Biology Society (ICBS) during 2016-8. He became the president of SLAS Asia Regional Board, Society for Laboratory Automation and Screening in early 2015. He was recognized as an Honorary lifetime member, Sino-American Pharmaceutical Professional Association (SAPA). He has been appointed as an Editor-in-Chief for "Synthetic and Systems Biotechnology", Associate Editor-in-Chief for Applied Microbiology and Biotechnology, and on the editorial board of 6 other peer-reviewed journals. He also served as an Executive Board Member of International Committee on the Biology of Actinomycetes (ISBA) and the GIM (Genetics of Industrial Microorganisms). His research is focused on: Taxonomy guided diversification of a marine microbial natural product library; screening for synergistic medicines in a high throughput manner; increasing the production of drugable secondary metabolites from microbial producers by synthetic biology. To complement the traditional taxonomic technique, he recently sequenced more than 12,000 actinomycete genomes, which will lead to the discovery of more new taxa. He successfully organized the inaugural conference of BISMIS in Beijing. His Avermectin project won National Award for "Excellence to improve science and technologies".

Research Field

1. Diversifying marine microbial natural product strains and extract libraries, while decreasing genetic and chemical redundancy.
2. Screening for synergistic medicines in a high throughput manner.
3. Increasing the production of drugable secondary metabolites from microbial producers by genetic engineering.

Research results and selected published papers

1. Weishan Wang*, Shanshan Li#, Zilong Li#, Jingyu Zhang#, Keqiang Fan, Gaoyi Tan, Guomin Ai, Sin Man Lam, Guanghou Shui, Zhiheng Yang, Hongzhong Lu, Pinjiao Jin, Yihong Li, Xiangyin Chen, Xuekui Xia, Xueting Liu, H. Kathleen Dannelly, Chen Yang, Yi Yang, Siliang Zhang, Gil Alterovitz, Wensheng Xiang*, Zhang Lixin*. 2020. Harnessing cellular triacylglycerol pool for titer improvement of polyketides in Streptomyces. Nature Biotech. 38, 76–83 (doi: 10.1038/s41587-019-0335-4).
2. Mindong Liang#, Zilong Li#, Weishan Wang#, Jiakun Liu#, Leshi Liu, Loganathan Karthik, Guoliang Zhu, Kefeng Wang, Yuting Shuai, Jiaming Yu, Lu Zhang, Chuan Li, Qian Zhang, Tong Shi, Liming Zhou, Man Wang, Zhong Wang, Jing Yu, Feng Xie, Huanqin Dai, Xueting Liu, Jingyu Zhang, Guang Liu, Buchang Zhang, Chenli Liu, Shanshan Li, Xuekui Xia, Yaojun Tong, Yanwen Liu, Gil Alterovitz, Gao-Yi Tan*, Zhang Lixin*. 2019. A CRISPR/Cas12a-derived biosensing platform for the highly sensitive detection of diverse small molecules. Nature Communications. 10 (1):3672-6
3. Cao Jiaqian, Yao Yongpeng, Fan Keqiang, Tan Gaoyi, Xiang Wensheng, Xia Xuekui, Li Shanshan*, Wang Weishan*, Zhang Lixin*. 2018, Harnessing a previously unidentified capability of bacterial allosteric transcription factors for sensing diverse small molecules in vitro. Sci Adv. 4(11), eaau4602.
4. Gao Qiang, Tan Gaoyi, Xia Xuekui, Zhang Lixin*. Learn from microbial intelligence for avermectins overproduction, 2017, Curr Opin Biotechnol, 48: 251–257.
5. Yan Wupeng, Song Heng, Song Fuhang, Guo Yisong, Wu Cheng-Hsuan, Her Ampon Sae, Pu Yi, Wang Shu, Naowarojna Nathchar, Weitz Andrew, Hendrich Michael P., Costello Catherine E., Zhang Lixin*, Liu Pinghua*, Zhang Yan Jessie *. 2015, Endoperoxide Formation Catalyzed by FtmOx1, an α -Ketoglutarate-dependent Mononuclear Non-heme Iron Enzyme. Nature. 527: 539–543.
6. Bai Chaoxian, Zhang Yang, Zhao Xuejin, Hu Yiling, Xiang Sihai, Miao Jin, Lou Chunbo*, Zhang Lixin*. 2015, Exploiting a precise design of universal synthetic modular regulatory elements to unlock the microbial natural products in Streptomyces. Proc Natl Acad Sci U S A. 112 (39): 12181–12186.
7. Wang Qian, Song Fuhang, Xiao Xue, Huang Pei, Li Li, Aaron Monte, Wael M. Abdel-Mageed, Wang Jian, Guo Hui, He Wenni, Xie Feng, Dai Huanqin, Liu Miaomiao, Chen Caixia, Xu Hao, Liu Mei, Andrew M. Piggott, Liu Xueting*, Robert J. Capon*, Zhang Lixin*. 2013, Abyssomicins from the South China Sea deep-sea sediment Verrucospora sp.: Natural thioether Michael addition adducts as antitubercular prodrugs. Angew Chem-Int Edit. 52: 1231–1234.
8. Zhuo Ying, Zhang Wenquan, Chen Difei, Gao Hong, Tao Jun, Liu Mei, Gou Zhongxuan, Zhou Xianlong, Ye Bangce, Zhang Qing, Zhang Siliang, Zhang Lixin*. 2010, Reversebiological engineering of hrdB to enhance the production of avermectins in an industrial strain of Streptomyces avermitilis, Proc Natl Acad Sci U S A. 107(25): 11250–11254.
9. Ashforth Elizabeth Jane, Fu Chengzhang, Liu Xiangyang, Dai Huanqin, Song Fuhang, Guo Hui, Zhang Lixin*. 2010, Bioprospecting for antituberculosis leads from microbial metabolites. Nat Prod Rep. 27: 1709–1719.
10. Zhang Lixin*, Yan Kezhi, Zhang Yu, Huang Ren, Bian Jiang, Zheng Chuansen, Sun Haixiang, Chen Zhihui, Sun Nuo, An Rong, Min Fangui, Zhao Weibo, Zhuo Ying, You Jianlan, Song Yongjie, Yu Zhenyan, Liu Zhiheng, Yang Keqian, Gao Hong, Dai Huanqin, Zhang Xiaoli, Wang Jian, Fu Chengzhang, Pei Gang, Liu Jintao, Zhang Si, Goodfellow Michael, Jiang Yuanying, Kuai Jun, Zhou Guochun and Chen Xiaoping. 2007, Highthroughput synergy screening identifies microbial metabolites as combination agents for the treatment of fungal infections. Proc Natl Acad Sci U S A. 104(11): 4606–4611.
11. Zhang Lixin*, and A. Demain. Natural Products: Drug Discovery, Therapeutic Medicine, ISBN:1-58829-383-1, Humana Press, 2005, USA