

Curriculum Vitae

XIAOXIA XIA

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Shanghai Jiao Tong University
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EDUCATION

- 03/2005–01/2009 PhD, Department of Chemical & Biomolecular Engineering, KAIST, Daejeon, Korea
- 09/2001–03/2004 MSc, School of Bioengineering, East China University of Science and Technology, Shanghai, China
- 09/1997–07/2001 BSc, Department of Fermentation Engineering, Nanchang University, Nanchang, China

PROFESSIONAL EXPERIENCE

- 01/2019–Present Professor, School of Life Sciences and Biotechnology, Shanghai Jiao Tong University
- 08/2018–Present Tenured Associate Professor, School of Life Sciences and Biotechnology, Shanghai Jiao Tong University
- 09/2012–08/2018 Tenure-track Assistant Professor, School of Life Sciences and Biotechnology, Shanghai Jiao Tong University
- 07/2010–08/2012 Postdoctoral Fellow, Department of Biomedical Engineering, Tufts University, MA, USA
- 02/2009–06/2010 Postdoctoral Research Fellow, Center of Bioprocess Engineering, Metabolic & Biomolecular Engineering National Research Laboratory, KAIST, Korea
- 03/2004–02/2005 Research Scientist, Fosun Clone High-tech Biotechnology Ltd. Corp., Shanghai, China

HONORS & AWARDS

1. Eastern Scholar Professor renewed by Education Commission of Shanghai in 2017 for the 2nd term from 2018 to 2020
2. Pujiang Talent Awarded by Science and Technology Committee of Shanghai in 2013
3. Eastern Scholar Professor awarded by Education Commission of Shanghai in 2012 for the 1st term from 2013 to 2015

ACADEMIC SERVICES

ACS Biomaterials Science & Engineering, Editorial Advisory Board

Biotechnology Journal (Wiley), Editorial Board

Journal of Microbiology (Chinese Society for Microbiology), Editorial Board

Metabolic Engineering Communications, Editorial Board

Reviewer for *ACS Biomaterials Science & Engineering, ACS Macro Letters, ACS Omega, ACS Synthetic Biology, Acta Biomaterialia, Advanced Healthcare Materials, Applied and Environmental Microbiology, Applied Biochemistry and Biotechnology, Biomacromolecules, BioMed Research International, Bioresources and Bioprocessing, Biotechnology and Applied Biochemistry, Biotechnology & Bioengineering, Biotechnology and Bioprocess Engineering, Biotechnology Journal, International Journal of Biological Macromolecules, Journal of Materials Chemistry B, Langmuir, Letters in Applied Microbiology, Macromolecular Bioscience, Macromolecular Materials and Engineering, Metabolic Engineering, Microbial Cell Factories, Nature Communications, Process Biochemistry, Scientific Reports, Small*

Reviewer for *Strategic Synthetic Biology Project of China, National Natural Science Foundation of China (NSFC)-Sweden VR Collaboration Research Programme, National Research Foundation of Singapore, Sailing Program sponsored by Science and Technology Committee, Shanghai (STCSM), Technological Innovation Action Plan sponsored by STCSM*

PEER-REVIEW PUBLICATIONS

Note that † and * indicate co-first authors and co-corresponding authors, respectively.

1. Hu X[†], **Xia XX**[†], Huang SC, Qian ZG*. Development of adhesive and conductive resilin-based hydrogels for wearable sensors. *Biomacromolecules*, 2019, 20(9): 3283-3293.
2. Liu CG, Xiao Y, **Xia XX**, Peng S, Zhao XQ, Peng L, Bai FW*. Cellulosic ethanol production: Progress, challenges and strategies for solutions. *Biotechnol Adv*, 2019, 37(3): 491-504.
3. Zhang Y[†], Zhou Z[†], Sun L, Liu Z, **Xia XX**, Tao TH*. “Genetically engineered” biofunctional triboelectric nanogenerators using recombinant spider silk. *Adv Mater*, 2018, 30(50):1805722. (**Selected as back cover**).
4. Xia J[†], Liu CG[†], Zhao XQ*, Xiao Y, **Xia XX**, Bai FW*. Contribution of cellulose synthesis, formation of fibrils and their entanglement to the self-flocculation of *Zymomonas mobilis*. *Biotechnol Bioeng*, 2018, 115(11):2714–2725. (**Selected as cover**).
5. Luo F[†], Qian ZG[†], **Xia XX***. Responsive protein hydrogels assembled from spider silk carboxyl-terminal domain and resilin copolymers. *Polymers*, 2018, 10(8):915. (**Feature Article**)
6. Zhou Z[†], Zhang S[†], Marelli B*, **Xia XX***, Tao TH*. Engineering the future of silk

- materials through advanced manufacturing. *Adv Mater*, 2018, 30(30):1706983. (**Selected as back cover**).
7. Jiang J[†], Zhang S[†], Qian Z, Qin N, Song W, Sun L, Zhou Z, Shi Z, Chen L, Li X, Mao Y, Kaplan DL, Gilbert Corder SN, Chen X, Liu M, Omenetto FG, **Xia XX**^{*}, Tao TH^{*}. Protein bricks: 2D and 3D bio-nanostructures with shape and function on demand. *Adv Mater*, 2018, 30(20):1705919 (**Selected as inside back cover**).
 8. Chen XF, **Xia XX**, Lee SY, Qian ZG^{*}. Engineering tunable biosensors for monitoring putrescine in *Escherichia coli*. *Biotechnol Bioeng*, 2018, 115(4): 1014–1027.
 9. Yu JL, **Xia XX**, Zhong JJ^{*}, Qian ZG^{*}. Enhanced production of C5 dicarboxylic acids by aerobic-anaerobic shift in fermentation of engineered *Escherichia coli*. *Process Biochem*, 2017, 62: 53–58.
 10. Jiang H, **Xia XX**, Feng Y, Zhong JJ, Qian ZG^{*}. Development of a robust system for high-throughput colorimetric assay of diverse amino acid decarboxylases. *Process Biochem*, 2017, 60: 27–34.
 11. Yu JL, **Xia XX**, Zhong JJ^{*}, Qian ZG^{*}. A novel synthetic pathway for glutarate production in recombinant *Escherichia coli*. *Process Biochem*, 2017, 59: 167–171.
 12. Huang SC[†], Qian ZG[†], Dan AH, Hu X, Zhou ML, **Xia XX**^{*}. Rational design and hierarchical assembly of a genetically engineered resilin-slik copolymer results in stiff hydrogels. *ACS Biomater Sci Eng*, 2017, 3(8): 1576–1585.
 13. Qiao X, Qian Z, Li J, Sun H, Han Y, **Xia XX**, Zhou J, Wang C, Wang Y^{*}, Wang C^{*}. Synthetic engineering spider silk fiber as implantable optical waveguides for low-loss light guiding. *ACS Appl Mater Interfaces*, 2017, 9(17): 14665–14676.
 14. Chen L, Zhou ML, Qian ZG, Kaplan DL, **Xia XX**^{*}. Fabrication of protein films from genetically engineered silk-elastin-like proteins by controlled cross-linking. *ACS Biomater Sci Eng*, 2017, 3(3): 335–341.
 15. Zhou ML, Qian ZG, Chen L, Kaplan DL, **Xia XX**^{*}. Rationally designed redox-sensitive protein hydrogels with tunable mechanical properties. *Biomacromolecules*, 2016, 17(11): 3508–3515.
 16. Peng Q[†], Zhang Y^{†*}, Lu L, Shao H, Qin K, Hu X, **Xia XX**^{*}. Recombinant spider silk from aqueous solutions via a bio-inspired microfluidic chip. *Sci Rep*, 2016, 6: 36473.
 17. Qin N[†], Zhang S[†], Jiang J, Corder SG, Qian Z, Zhou Z, Lee W, Liu K, Wang X, Li X, Shi Z, Mao Y, Bechtel HA, Martin MC, **Xia XX**, Marelli B, Kaplan DL, Omenetto FG^{*}, Liu M^{*}, Tao TH^{*}. Nanoscale probing of electron-regulated structural transitions in silk proteins by near-field IR imaging and nano-spectroscopy. *Nat Commun*, 2016, 7: 13079.
 18. Huang W, Tarakanova A, Dinjaski N, Wang Q, **Xia XX**, Chen Y, Wong JY, Buehler MJ, Kaplan DL^{*}. Design of multistimuli responsive hydrogels using integrated modeling and genetically engineered silk-elastin-like-proteins. *Adv Funct Mater*, 2016, 26(23): 4113–4123.
 19. Yang YX[†], Qian ZG[†], Zhong JJ^{*}, **Xia XX**^{*}. Hyper-production of large proteins of spider dragline silk MaSp2 by *Escherichia coli* via synthetic biology approach. *Process*

- Biochem*, 2016, 51(4): 484–490. (**Editors' Choice paper**)
20. Qian ZG[†], Zhou ML[†], Song WW, **Xia XX***. Dual thermosensitive hydrogels assembled from the conserved C-terminal domain of spider dragline silk. *Biomacromolecules*, 2015, 16(11): 3704–3711.
 21. Qi K, **Xia XX**, Zhong JJ*. Enhanced anti-oxidative activity and lignocellulosic ethanol production by biotin addition to medium in *Pichia guilliermondii* fermentation. *Bioresource Technol*, 2015, 189: 36–43.
 22. Yu JL, **Xia XX**, Zhong JJ*, Qian ZG*. Direct biosynthesis of adipic acid from a synthetic pathway in recombinant *Escherichia coli*. *Biotechnol Bioeng*, 2014, 111(12): 2580–2586.
 23. Xu YN, **Xia XX**, Zhong JJ*. Induction of ganoderic acid biosynthesis by Mn²⁺ in static liquid cultivation of *Ganoderma lucidum*. *Biotechnol Bioeng*, 2014, 111(11): 2358–2365.
 24. Qi K, Zhong JJ*, **Xia XX***. Triggering respirofermentative metabolism in the Crabtree-negative yeast *Pichia guilliermondii* by disrupting the *CAT8* gene. *Appl Environ Microbiol*, 2014, 80(13): 3879–3887.
 25. Xia X, Lin S, **Xia XX**, Cong FS, Zhong JJ*. Significance of agitation induced shear stress on mycelium morphology and lavendermycin production by engineered *Streptomyces flocculus*. *Appl Microbiol Biotechnol*, 2014, 98(10): 4399–4407.
 26. Wang Q[†], **Xia XX**[†], Huang W, Lin Y, Xu Q, Kaplan DL*. High throughput screening of dynamic silk-elastin-like protein biomaterials. *Adv Funct Mater*, 2014, 24(27): 4303–4310.
 27. Lin Y[†], **Xia XX**[†], Wang M[†], Wang Q, An B, Tao H, Xu Q, Kaplan DL*. Genetically programmable thermoresponsive plasmonic gold/silk-elastin protein core/shell nanoparticles. *Langmuir*, 2014, 30(15): 4406–4414.
 28. **Xia XX**[†], Wang M[†], Lin Y, Xu Q, Kaplan DL*. Hydrophobic drug-triggered self-assembly of nanoparticles from silk-elastin-like protein polymers for drug delivery. *Biomacromolecules*, 2014, 15(3): 908–914.
 29. Dou Y, Xiao JH*, **Xia XX**, Zhong JJ*. Effect of oxygen supply on biomass and helvolic acid production in submerged fermentation of *Cordyceps taii*. *Biochem Eng J*, 2013, 81: 73–79.
 30. Hu X, Tang-Schomer MD, Huang W, **Xia XX**, Weiss AS, Kaplan DL*. Charge-tunable autoclaved silk-tropoelastin protein alloys that control neuron cell responses. *Adv Funct Mater*, 2013, 23(31): 3875–3884.
 31. Lin Y, **Xia XX**, Shang K, Elia R, Huang W, Cebe P, Leisk G, Omenetto F, Kaplan DL*. Tuning chemical and physical cross-links in silk electrogels for morphological analysis and mechanical reinforcement. *Biomacromolecules*, 2013, 14(8): 2629–2635.
 32. Xu YN, **Xia XX**, Zhong JJ*. Induced effect of Na⁺ on ganoderic acid biosynthesis in static liquid culture of *Ganoderma lucidum* via calcineurin signal transduction. *Biotechnol Bioeng*, 2013, 110(7): 1913–1923 (**Spotlight paper, see DOI: 10.1002/bit.24670**).
 33. Fan C, Qi K, **Xia XX***, Zhong JJ*. Efficient ethanol production from corncob residues by repeated fermentation of an adapted yeast. *Bioresource Technol*, 2013, 136: 309–315.
 34. Sun Z, Qin G, **Xia XX**, Mark, CG, Omenetto, F, Kaplan DL*. Photoresponsive retinal-

- modified silk-elastin copolymer. *J Am Chem Soc*, 2013, 135 (9): 3675–3679.
35. An B, DesRochers TM, Qin G, **Xia XX**, Thiagarajan G, Brodsky B, Kaplan DL*. The influence of specific binding of collagen-silk chimeras to silk biomaterials on hMSC behavior. *Biomaterials*, 2013, 34(2): 402–412.
 36. Yoon SH, Han MJ, Jeong H, Lee CH, **Xia XX**, Lee DH, Shim JH, Lee SY, Oh TK, Kim JF*. Comparative multi-omics systems analysis of *Escherichia coli* strains B and K-12. *Genome Biol*, 2012, 13(5): 1–13.
 37. Hu X, Park SH, Gil ES, **Xia XX**, Weiss AS, Kaplan DL*. The influence of elasticity and surface roughness on myogenic and osteogenic-differentiation of cells on silk-elastin biomaterials. *Biomaterials*, 2011, 32(34): 8979–8989.
 38. **Xia XX**, Xu Q, Hu X, Qin G, Kaplan DL*. Tunable self-assembly of genetically engineered silk-elastin protein polymers. *Biomacromolecules*, 2011, 12(11): 3844–3850.
 39. **Xia XX**, Qian ZG, Lee SY*. Comparative proteomic and genetic analyses reveal unidentified mutations in *Escherichia coli* XL1-Blue and DH5 α . *FEMS Microbiol Lett*, 2011, 314(2): 119–124.
 40. Qian ZG, **Xia XX**, Lee SY*. Metabolic engineering of *Escherichia coli* for the production of cadaverine: A five carbon diamine. *Biotechnol Bioeng*, 2011, 108(1): 93–103.
 41. **Xia XX**[†], Qian ZG[†], Ki CS, Park YH, Kaplan DL, Lee SY*. Native-sized recombinant spider silk protein produced in metabolically engineered *Escherichia coli* results in a strong fiber. *Proc Natl Acad Sci USA*, 2010, 107(32): 14059–14063.
News and Views in Nature Chemical Biology (Linke WA. Biomaterials: Spider strength and stretchability. Nature Chemical Biology 6:702-703; October 2010)
Featured by MIT Technology Review (3 August 2010)
 42. Qian ZG, **Xia XX**, Lee SY*. Metabolic engineering of *Escherichia coli* for the production of putrescine: A four carbon diamine. *Biotechnol Bioeng*, 2009, 104(4): 651–662.
Editors' Choice, Journal cover paper; Wiley-Blackwell Press Release 'Pioneering research succeeds in producing industrially vital chemical through engineered bacteria' (27 Aug. 2009); Nature Research Highlight 'Bacterial factories' (Nature 461, 14-15; 3 September 2009); BTJ-FORUM 'Metabolic engineering of E. coli' (Biotechnology Journal, 2009, 4: 1376).
 43. Qian ZG[†], **Xia XX**[†], Lee SY*. Proteome-based identification of fusion partner for high-level extracellular production of recombinant proteins in *Escherichia coli*. *Biotechnol Bioeng*, 2008, 101(3): 587–601.
Spotlight 'A proteome-based approach to identifying fusion partner for recombinant protein excretion' (Biotechnology and Bioengineering DOI: 10.1002/bit.22096).
 44. **Xia XX**, Han MJ, Lee SY*, Yoo JS. Comparison of the extracellular proteomes of *Escherichia coli* B and K-12 strains during high cell density cultivation. *Proteomics*, 2008, 8(1): 2089–2103.
 45. Shen YL*, Zhang Y, Sun AY, **Xia XX**, Wei DZ*, Yang SL. High-level production of soluble tumor necrosis factor-related apoptosis-inducing ligand (Apo2L/TRAIL) in high-density cultivation of recombinant *Escherichia coli* using a combined feeding strategy.

- Biotechnol Lett*, 2004, 26: 981–984.
46. Zhang Y, Shen YL*, **Xia XX**, Sun AY, Wei DZ*, Zhou JS, Zhang GJ, Wang LH, Jiao BH. High-cell density cultivation of recombinant *Escherichia coli* for production of TRAIL by using a 2-stage feeding strategy. *Chin J Biotechnol*, 2004, 20(3): 408–413.
 47. **Xia XX**, Shen YL*, Wei DZ*. Purification and characterization of recombinant sTRAIL expressed in *Escherichia coli*. *Acta Bioch Bioph Sin*, 2004, 36 (2): 118–122.
 48. Shen YL*, **Xia XX**, Zhang Y, Liu JW, Wei DZ*, Yang SL. Refolding and purification of Apo2L/TRAIL produced as inclusion bodies in high-cell-density cultures of recombinant *Escherichia coli*. *Biotechnol Lett*, 2003, 25(24): 2097–2101.

BOOK CHAPTERS

1. Jang SH, Han MJ, Lee SY, Choi JH, **Xia XX**. Genome-wide technologies: DNA microarrays, phenotypic microarrays, and proteomics. In *The Metabolic Pathway Engineering Handbook: Tools and Applications (Volume 2)*. (Christina D. Smolke Ed.) CRC Press, USA.

GRANTED PATENTS

1. **Xia XX**, Qin KK, Zhou ML, Qian ZG, Song WW. Thermosensitive hydrogels based on spider silk proteins. Chinese Patent ZL 201510350217.X.
2. Qian ZG, Yu JL, **Xia XX**, Zhong JJ. Application of enoyl-CoA hydratase in the biosynthesis of adipic acid. Chinese Patent ZL 201410200482.5.
3. Lee SY, **Xia XX**, Qian, ZG, Lee JW, Park YH. High molecular weight recombinant silk or silk-like proteins and micro- or nanoscale silk or silk like fibers manufactured using the same. Chinese Patent ZL 201180017801.3.
4. Lee SY, **Xia XX**, Qian ZG, Baek JH. Method for synthesizing protein containing high content of specific amino acid through simultaneous expression with tRNA of the specific amino acid. EP2330186 B1.
5. Lee, SY, **Xia XX**, Qian ZG, Lee, JW, Park, YH. High molecular weight recombinant silk/silk-like proteins and micro or nano-spider silk/silk-like fibers manufactured by using the same. Korean Patent 10-1317420.
6. Lee SY, Qian ZG, **Xia XX**, Jeon YJ. Mutant microorganisms having a high ability to produce putrescine and method for producing putrescine using the same. US 8, 481, 293 B2.
7. Lee SY, Qian ZG, **Xia XX**, Jeon YJ. Variant microorganism having cadaverine producing ability and method for preparing cadaverine using the same. Korean Patent 10-1231897.
8. Lee SY, Qian ZG, **Xia XX**, Jeon YJ. Variant microorganism having putrescine producing ability and method for preparing putrescine using the same. Australian Patent AU 2009234625.
9. Lee SY, Qian ZG, **Xia XX**, Jeon YJ. Variant microorganism having putrescine producing ability and method for preparing putrescine using the same. Korean Patent 10-1188432.
10. Lee SY, **Xia XX**, Qian ZG, Baek JH. Method for preparing protein having high specific amino acid content through co-expression of tRNA of specific amino acid. Korean Patent

PENDING PATENTS

1. Qian ZG, Hu X, **Xia XX**. Adhesive and conductive hydrogels from resilin-like proteins and their preparation and application using the same. Chinese Patent Application 201910170461.6.
2. **Xia XX**, Huang SC, Qian ZG. Resilin silk like block copolymers and method for preparing hydrogels using the same. Chinese Patent Application 201710269401.0.
3. Qian ZG, Chen XF, **Xia XX**. A family of tunable fluorescent biosensors for putrescine and the application using the same. Chinese Patent Application 201710068234.3.
4. Qian ZG, Yu JL, **Xia XX**, Zhong JJ. An improved method for the biosynthesis of glutaric acid. Chinese Patent Application 201410200482.5.

INVITED TALKS

1. Design and fabrication of dynamic silk-resilin materials. The ACB2019 (The 14th Asian Congress on Biotechnology), Taipei, July 1–4, 2019.
2. Design and biosynthesis of genetically engineered silk copolymers. The 2018 Chongqing International Silk conference. Southwestern University, Chongqing, China, December 9–12, 2018.
3. Design and biosynthesis of genetically engineered silk copolymers. The 16th International Symposium on Biopolymers (ISBP), Beijing, China, October 21–24, 2018.
4. Silk-based biomaterials: from synthetic design to biomanufacturing. Metabolic Engineering Summit, Beijing, China, October 22–24, 2017.
5. Design and biosynthesis of genetically engineered silk copolymers. Sheffield Silk Conference, Sheffield, UK, July 24–26, 2017.
6. Microbial biosynthesis and fabrication of advanced protein materials. Youth Forum for Biosynthesis of New Concept Biotechnology Subject in Biology & Interdisciplinary Science and Technology Field, Shanghai, China, July 3, 2017.
7. Synthetic biology for advanced materials: from biomimicry to tailor design. The Seventh International Meeting on Synthetic Biology (SB7.0). National University of Singapore, Singapore, June 13–17, 2017.
8. Synthetic biology for protein biomaterials: from biomimicry to tailor-design. 2016 Cold Spring Harbor Asia Conference on Synthetic Biology, Suzhou, China, November 28-December 2, 2016.
9. Synthetic biology-guided design and synthesis of protein biomaterials. The 2nd Symposium on Synthetic Microbiology and Biomanufacturing, Hangzhou, China, June 17–19, 2016.
10. Design and biosynthesis of protein-based biomaterials. 7th Sino-Japan Symposium on Chemical Engineering, Beijing, China, October 16–18, 2015.

11. Microbial cell factories for protein-based materials. Copenhagen Bioscience Conferences: Cell factories and biosustainability, Copenhagen, Denmark, May 17–21, 2015.
12. Design and biosynthesis of protein-based biomaterials. 2014 International Symposium on Synthetic Biology, Beijing, October 26–27, 2014.
13. Design and synthesis of genetically engineered silk biomaterials. International Silk Conference 2014, Shanghai-Suzhou, October 9–11, 2014.
14. Microbial biosynthesis of novel functional biomaterials. 2014 Annual Meeting of Chinese Society for Microbiology, Harbin, China, August 15–19, 2014.
15. Design and synthesis of protein polymer materials based on synthetic biology. The 4th Symposium of Chemical Engineering for Young Scientists, Beijing, May 22–23, 2014.
16. Design and biosynthesis of protein-based biomaterials. International Symposium on Bioprocess and Biomolecular Engineering, Shanghai, China, Nov. 11–13, 2013
17. Design and biosynthesis of protein-based biomaterials. The 7th Sino-US Joint Conference of Chemical Engineering, Beijing, China, Oct. 14–18, 2013
18. Design and biosynthesis of protein-based biomaterials. IUMRS-ICAM2013 International Conference on Advanced Materials, Qingdao, China, Sep. 22–28, 2013
19. Synthesis and applications of recombinant protein biomaterials. Multi-Interdisciplinary Symposium on the Frontiers of Diagnosis and Therapy of Diseases of Cardiovascular System, Academy of Military Medical Sciences, Beijing, December 15, 2012.
20. Metabolic engineering of *Escherichia coli* for the production of large spider dragline silk proteins. Asia Pacific Biochemical Engineering Conference 2009 (APBioChEC'09), Kobe, Japan, Nov. 24–28, 2009.

TEACHING

Undergraduate course

Metabolic Engineering BI410

Graduate course

Metabolic Engineering and Synthetic Biology