

**CHUNHAI FAN**  
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Chinese Academy of Sciences (CAS)  
Shanghai 201800, China

### **CONTACT INFORMATION**

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### **ACADEMIC TRAINING**

B.S., Department of Biochemistry, Nanjing University (1992-1996)  
Ph.D., School of Life Sciences, Nanjing University (1996-2000)  
Postdoctoral fellow, Institute of Polymer and Organics Solids/California Nanosystem Institute,  
University of California, Santa Barbara (2001-2003)

### **PROFESSIONAL EXPERIENCE**

2004-present, Professor, Shanghai Institute of Applied Physics (SINAP), Chinese Academy of  
Sciences (CAS)  
2009-present, Chief, Division of Physical Biology, SINAP  
2012-present, Chief, Bioimaging Center, Shanghai Synchrotron Radiation Facility, SINAP  
2015-present, CAS Professor

2012-present, Adjunct Professor, School of Life Sciences, ShanghaiTech University  
2016-present, Adjunct Professor, The Biodesign Institute, Arizona State University

### **HONORS AND AWARDS**

Shanghai Rising Star for Young Scientists (2005)  
CCS Award for Young Scientists (Chinese Chemical Society, 2006)  
NSFC Award for Outstanding Young Scientists (National Science Foundation of China, 2007)  
1<sup>st</sup>-class CAIA Prize for Science and Technology (Chinese Association for Instrumental  
Analysis, 2007-2009)  
National Award for Young Scientists of China (2011)  
CAS Award for Young Scientists (Chinese Academy of Sciences, 2012)  
Award for Shanghai Leading Scientists (2013)  
High Cited Researchers (Thomson Reuters, 2014, 2015, 2016)  
ISE Fellow (International Society of Chemistry, 2014)  
FRSC (Fellow of Royal Society of Chemistry, 2015)  
The Natural Science Prize (1<sup>st</sup> class) in Shanghai (2014)  
The National Natural Science Prize (2<sup>nd</sup> class) of China (2016)  
AAAS Fellow (American Association for the Advancement of Science, 2017)

## **MEMBERSHIP**

American Association for the Advancement of Science (AAAS, Elected Fellow)--2011  
American Chemical Society (ACS)--2003  
Chinese Chemical Society (CCS)--2004  
Royal Society of Chemistry (RSC, Fellow)--2010  
International Society of Chemistry (ISE, Elected Fellow)--2012  
Chinese Institute of Electronics (CIE, Fellow) --2010  
Chinese Society of Biomedical Engineering (Vice chair of the Division of Nanobiomedical Engineering)--2015  
Faculty of 1000--2015

## **SERVICE**

Scientific Advisory Board, Shanghai Institute of Applied Physics, CAS  
Scientific Advisory Board, State Key Laboratory of Sensor Technologies  
Core member, International Center for Sensor Science and Engineering (ICSSE), Illinois Institute of Technology

## **EDITOR & REVIEW ACTIVITIES**

*ACS Applied Materials & Interfaces* (Associate Editor)

Editorial Board or Editorial Advisory Board: *ChemBioChem*, *ChemPhysChem*, *Scientific Reports*; *ACS Sensors*; *Journal of Materials Chemistry*; *Advanced Healthcare Materials*; *ChemNanoMat*; *Particle & Particle Systems Characterization*; *Electroanalysis*; *Chemical Sensors*; *Chinese Journal of Analytical Chemistry*; *Acta Chimica Acta*, *Science China-Chemistry*, *Progress in Chemistry*

Guest Editor: *Advanced Materials*; *PLOS Computational Biology*; *Current Organic Chemistry*; *Biotechnology Journal*

**Regular reviewer** for over 20 peer-reviewed journals including Nature Nanotechnology, Nature Chemistry, Nature Photonics, Nature Communications, JACS, Angew. Chem. Int. Ed., Adv. Mat., Anal. Chem., Nucleic Acids Res., Biomaterials, Biosensors and Bioelectronics.

**Grant reviewer** for National Science Foundation (NSF), Research Grant Council (RGC, Hong Kong), Czech Science Foundation, Agency for Science (Singapore), Austrian Science Fund, Croatian Science Foundation, National Science Centre (Poland), Ho-Am Prize Award (Korea), National Science Foundation of China (NSFC), Ministry of Science and Technology of China (MOST).

## **RESEARCH INTERESTS**

Biosensors; Biophotonics; DNA nanotechnology & computation

**SELECTED PUBLICATIONS** (From >350 papers; ~30,000 google citations; H-index: 85)

1. J. Li, A. A. Green\*, H. Yan\*, **C. Fan\***, Engineering nucleic acid structures for programmable molecular circuitry and intracellular biocomputation. *Nature Chem.* **9**, 1056 (2017).
2. H. Zhang, J. Chao\*, D. Pan, H. Liu, Y. Qiang, K. Liu, C. Cui, J. Chen, Q. Huang, J. Hu, L. Wang, W. Huang, Y. Shi\* and **C. Fan\***, DNA origami-based shape IDs for single-molecule nanomechanical genotyping. *Nature Commun.* **8**, 28341 (2017).
3. M. Liu, Q. Li, L. Liang, J. Li, K. Wang, J. Li, M. Lv, N. Chen, H. Song, J. Lee, J. Shi, L. Wang, R. Lal\*, **C. Fan\***, Realtime visualization of clustering and intracellular transport of gold nanoparticles by correlative imaging. *Nature Commun.* **8**, 15646 (2017).
4. X. Qu, D. Zhu, G. Yao, S. Su, J. Chao, H. Liu, X. Zuo, L. Wang, J. Shi, L. Wang, W. Huang, H. Pei\*, **C. Fan\***, An Exonuclease III-Powered on-particle Stochastic DNA Walker. *Angew. Chem. Int. Ed.* **56**, 1855 (2017).
5. Y. Zhang, Z. Cui, H. Kong, K. Xia, L. Pan, J. Li, Y. Sun, J. Shi, L. Wang, Y. Zhu\* and **C. Fan\***, One-shot immunomodulatory nanodiamond agents for cancer immunotherapy. *Adv. Mater.* **28**, 2699 (2016).
6. Y. Zhang, Q. Li, L. Guo, Q. Huang, J. Shi, Y. Yang, D. Liu\* and **C. Fan\***, Ion-Mediated Polymerase Chain Reactions Performed with an Electronically Driven Microfluidic Device. *Angew. Chem. Int. Ed.* **55**, 12450 (2016).
7. H. Liu, J. Wang, S. Song, **C. Fan\*** and K. V. Gothelf\*, A DNA-based system for selecting and displaying the combined result of two input variable. *Nature Commun.* **6**, 10089 (2015).
8. M. Lin, J. Wang, G. Zhou, J. Wang, N. Wu, J. Lu, J. Gao, X. Chen, J. Shi, X. Zuo\*, **C. Fan\***, Programmable engineering of biosensing interface with tetrahedral DNA nanostructures for ultrasensitive DNA detection. *Angew. Chem. Int. Ed.* **54**, 2151 (2015).
9. G. Yao, J. Li, J. Chao, H. Pei, H. J. Liu, Y. Zhao, J. Y. Shi, Q. Huang, L. H. Wang, W. Huang and **C. Fan\***, Gold-Nanoparticle-Mediated Jigsaw-Puzzle-like Assembly of Supersized Plasmonic DNA Origami. *Angew. Chem. Int. Ed.* **54**, 2966 (2015).
10. L. Liang, J. Li, Q. Li, Q. Huang\*, J. Y. Shi, H. Yan and **C. Fan\***, Single-Particle Tracking and Modulation of Cell Entry Pathways of a Tetrahedral DNA Nanostructure in Live Cells. *Angew. Chem. Int. Ed.* **53**, 7745 (2014).
11. F. Yang, X. L. Zuo, Z. H. Li, W. P. Deng, J. Y. Shi, G. J. Zhang, Q. Huang, S. P. Song and **C. Fan\***, A Bubble-Mediated Intelligent Microscale Electrochemical Device for Single-Step Quantitative Bioassays. *Adv. Mater.* **26**, 4671 (2014).
12. Y. Fu, D. Zeng, J. Chao, Y. Q. Jin, Z. Zhang, H. Liu\*, D. Li, H. W. Ma, Q. Huang, K. V. Gothelf and **C. Fan\***, Single-Step Rapid Assembly of DNA Origami Nanostructures for Addressable Nanoscale Bioreactors. *J. Am. Chem. Soc.* **135**, 696 (2013).
13. H. Pei, L. Liang, G. B. Yao, J. Li, Q. Huang and **C. Fan\***, Reconfigurable Three-Dimensional DNA Nanostructures for the Construction of Intracellular Logic Sensors. *Angew. Chem. Int. Ed.* **51**, 9020 (2012).
14. H. Pei, F. Li, Y. Wan, M. Wei, H. Liu\*, Y. Su, N. Chen, Q. Huang and **C. Fan\***, Designed Diblock Oligonucleotide for the Synthesis of Spatially Isolated and Highly Hybridizable Functionalization of DNA-Gold Nanoparticle Nanoconjugates. *J. Am. Chem. Soc.* **134**, 11876 (2012).

15. N. Lu, H. Pei, Z. L. Ge, C. R. Simmons, H. Yan\* and **C. Fan\***, Charge Transport within a Three-Dimensional DNA Nanostructure Framework. *J. Am. Chem. Soc.* **134**, 13148 (2012).
16. P. Chen, D. Pan, **C. Fan\***, J. Chen, K. Huang, D. F. Wang, H. L. Zhang, Y. Li, G. Y. Feng, P. J. Liang, L. He and Y. Shi\*, Gold nanoparticles for high-throughput genotyping of long-range haplotypes. *Nature Nanotechnol.* **6**, 639 (2011).
17. H. Pei, N. Lu, Y. L. Wen, S. P. Song, Y. Liu, H. Yan\* and **C. Fan\***, A DNA Nanostructure-based Biomolecular Probe Carrier Platform for Electrochemical Biosensing. *Adv. Mater.* **22**, 4754 (2010).
18. S. Song, Z. Liang, J. Zhang, L. Wang, G. Li\* and **C. Fan\***, Gold-Nanoparticle-Based Multicolor Nanobeacons for Sequence-Specific DNA Analysis. *Angew. Chem. Int. Ed.* **48**, 8670 (2009).
19. G. Liu, Y. Wan, V. Gau, J. Zhang, L. Wang, S. Song and **C. Fan\***, An enzyme-based E-DNA sensor for sequence-specific detection of femtomolar DNA targets. *J. Am. Chem. Soc.* **130**, 6820 (2008).
20. J. Zhang, S. Song, L. Zhang, L. Wang, H. Wu, D. Pan and **C. Fan\***, Sequence-specific detection of femtomolar DNA via a chronocoulometric DNA sensor (CDS): Effects of nanoparticle-mediated amplification and nanoscale control of DNA assembly at electrodes. *J. Am. Chem. Soc.*, **128**, 8575 (2006).

~20 invited reviews in Chem. Rev., Acc. Chem. Res., Chem. Soc. Rev. etc.

More papers: <http://physbio.sinap.ac.cn/publication-e.htm>

## **PATNETS**

8 US/International patents; 50+ Chinese patents

## **INVITED BOOKS/CHAPTERS**

1. "DNA Nanotechnology: From Structure to Function", 2013, Springer, Editor: Chunhai Fan (eds.)
2. "DNA Nanotechnology", 2011, Science Press (China), Editors: Chunhai Fan, Dongsheng Liu (eds.)
3. Hui Xu, Lihua Wang, Chunhai Fan, "Bioanalysis and bioimaging with fluorescent conjugated polymers and conjugated polymer nanoparticles", in "Functional Nanoparticles for Bioanalysis, Nanomedicine and Bioelectronic Devices", 2012, ACS Books, Maria Hepel, C.J. Zhong (eds.)
4. Wenbing Hu, Qing Huang, Chunhai Fan, "Nanomaterial-Based Antibacterial Paper" (chapter 15), P427-464, in "Nano-Antimicrobials, Progress and Prospects", 2012, Springer-Verlag (Berlin), Nicola Cioffi, Mahendra Rai (eds.)
5. Di Li, Chunhai Fan, "Optical Detection of Non-amplified Genomic DNA" (Chapter 6), in "Detection of Non-Amplified Genomic DNA", 2012, Springer, G. Spoto and R. Corradini (eds.)
6. Hui Xu, Lihua Wang, Chunhai Fan, "Bioanalysis and Bioimaging with Fluorescent Conjugated Polymers and Conjugated Polymer Nanoparticles" (Chapter 4), in "Functional Nanoparticles for Bioanalysis, Nanomedicine, and Bioelectronic Devices", 2012, Symposium Series 1112, Maria Hepel, Chuan-Jian Zhong (eds.)

## **CONFERENCEES AND INVITED SPEAKER**

Founding chair and co-chair for “The International Workshop for DNA Nanotechnology (Annual meeting, 2009, 2012, 2013, 2014, 2015, 2016)

Future Trends in DNA-based Nanotechnology (DNAtech 17), co-chair (Chunhai Fan, Michael Mertig, Hao Yan), 2017

More than 100 PLENARY, KEYNOTE AND INVITED talks in international and national conferences.

Invited talks at Stanford University (SystemX Seminars), University of California-San Diego, University of California-Santa Barbara, Cologne University (Germany), Aarhus University (Denmark), Seoul National University (Korea), Osaka University (Japan) and a number of Chinese Universities.