Wei Sun

Wyss Institute for Biologically Inspired Engineering, Harvard University
Department of Systems Biology, Harvard Medical School
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Education and Academic Experience

- Postdoctoral scholar (January, 2010 - present)

  Wyss Institute for Biologically Inspired Engineering, Harvard University

  Department of Systems Biology, Harvard Medical School

  Advisor: *Peng Yin*

- Research assistant (September, 2008 – December, 2009)

  College of Chemistry and Molecular Engineering, Peking University, China

  Advisor: *Chunhua Yan*

- **Ph.D. in Inorganic Chemistry**, Peking University, China, July 2008.

  Thesis: Synthesis, Properties, and Applications in Digital Circuits of 5-Methoxy-2-(2-pyridyl)-thiazole-derived Fluorescent Switch

  Advisor: *Chunhua Yan*

- **B.S. in Inorganic Chemistry,** Peking University, China, July 2003.

Research Interests

My research interests focus on advanced scalable manufacturing of 3D nano-devices in next generation electronics and opto-electronics. My current work is using self-assembled DNA structures as templates for digital synthesis and assembly of functional inorganic nano-materials.

Peer Reviewed Publications

DNA-based digital fabrication

(* corresponding author)

1. Sun, W., Boulais, E., Hakobyan, Y., Wang, W. L., Guan, A., Bathe, M.*, and Yin, P.*. *Casting inorganic structures with DNA molds.* **Science**, DOI: 10.1126/science.1258361, 2014 in press.

2. Ke, Y.[†], Ong, L. L.[†], Sun, W.[†], Song, J., Dong, M., Shih, W. M., and Yin, P.*. *DNA brick crystals with prescribed depths.* **Nature Chem.**, 2014, 6, 994. ([†] equal contribution)

3. Jin, Z., Sun, W., Ke, Y., Shih, C.-J., Paulus, G. L. C., Wang, Q. H., Mu, B., Yin, P.*, and Strano, M. S.*. *Metalized DNA nanolithography for encoding and transferring spatial information for graphene patterning.* **Nature Commun.**, 2013, 4, 1663.

4. Surwade, S., Zhou, F., Wei, B., Sun, W., Powell, A., O'Donnell, C., Yin, P.[*], and Liu, H.[*]. *Nanoscale growth and patterning of inorganic oxides using DNA nanostructure templates.* **J. Am. Chem. Soc.**, 2013, 135, 6778.

Molecular switches and logic circuits

5. Sun, W., Zhou, C., Xu, C., Y. Zhang, Y., Li, Z., Fang, C., Sun, L., and Yan, C.*. *Intramolecular charge transfer in 5-methoxy-2-(2-pyridyl)thiazole-derived fluorescent molecules with different acceptor or donor substituents.* **J. Phys. Chem. A**, 2009, 113, 8635.

6. Sun, W., Zhou, C., Xu, C., Fang, C., Zhang, C., Li, Z., and Yan, C.*. *A fluorescent switch-based computing platform in defending information risk.* **Chem. Eur. J.**, 2008, 14, 6342.

7. Sun, W., Xu, C., Fang, C., Zhu, Z., and Yan, C.*. *Chemical-driven reconfigurable arithmetic functionalities within a fluorescent tetrathiafulvalene derivative*. **J. Phys. Chem. C**, 2008, 112, 16973.

8. Sun, W., Zheng, Y., Xu, C., Fang, C., and Yan, C.*. *Fluorescence-based reconfigurable and resettable molecular arithmetic mode*. **J. Phys. Chem. C**, 2007, 111, 11706.

9. Zheng, M., Sun, W., Jin, J.*, and Yan, C.. *Molecular keypad locks based on gated photochromism and enhanced fluorescence by protonation effects.* **J. Fluor.**, 2014, 24, 1169.

10. Jiang, Y., Wang, H., Gao, B., Hao, Y., Xu, C., Wang, L., Chen, Q., Sun, W., Yan, C., and Sun, H.*. *Excited state dynamics of 2-MPT-derived fluorescent molecular switches.* **IEEE J. Quantum Elect.**, 2011, 47, 1163.

11. Xu, C., Sun, W., Zhang, C., Zhou, C., Fang, C., and Yan, C.*. *Luminescence switching of a cyclometalated iridium(III) complex via a redox-active tetrathiafulvalene-based ligand.* **Chem. Eur. J.**, 2009, 15, 8717.

12. Xu, C., Sun, W., Zheng, Y., Fang, C., Zhou, C., Jin, J., and Yan, C.*. *Logic circuits constructed within an ion-sensitive fluorescent molecule 1,2-di[5-methoxy-2-(2-pyridyl)thiazoly]ethyne.* **New J. Chem.**, 2009, 33, 838.

13. Xu, C., Sun, W., Zhang, C., Bai, Y., Fang, C., Li, W., Huang, Y., and Yan, C.*. *Chemical approaches for mimicking logic functions within fluorescent MPT dyes.* **Science in China Series B: Chem.**, 2009, 52, 700.

14. Fu, X., Sun, W., Fang, C.*, Guo, R., and Yan, C.*. *Molecular logic function materials.* **Prog. Chem.**, 2009, 21, 957.

15. Li, Z., Xu, C., Sun, W., Bai, Y., Zhang, C., Fang, C., and Yan, C.*. *Solvent-sensitive charge-transfer absortpion behaviours and dual-emissive fluorescent properties of a thiazole-conjugated pyridinium complex.* **New J. Chem.**, 2009, 33, 853.

16. Fu, X., Yue, Y., Guo, R., Li, L., Sun, W., Fang, C., Xu, C., and Yan, C.*. *An enhanced fluorescence in a tunable face-to-face π-π stacking assembly directed by the H-bonding.* **CrystEngComm**, 2009, 11, 2268.

17. Li, Z., Liao, L., Sun, W., Xu, C., Zhang, C., Fang, C., and Yan, C.*. *Reconfigurable cascade circuit in a photo- and chemical-switchable fluorescent diarylethene derivative.* **J. Phys. Chem. C**, 2008, 112, 5190.

18. Li, Z., Sun, W., Yue, Y., Zheng, M., Xu, C., Jin, J., Fang, C., and Yan, C.*. *Synthesis of a Solvent-sensitive highly fluorescent derivative of perfluorocyclopentene.* **Tetrahedron Lett.**, 2007, 48, 7675.

19. Yue, Y., Sun, W., Gao, E., Fang, C., Xu, S., and Yan, C.*. *Syntheses and crystal structures of three Mn(II) complexes with 2-hydroxynicotinate.* **Inorg. Chim. Acta**, 2007, 360, 1466.

20. Fang, C., Zhu, Z., Sun, W., Xu, C., and Yan, C.*. *New TTF derivatives: several molecular logic gates based on their switchable fluorescent emissions.* **New J. Chem.**, 2007, 31, 580.

21. Zheng, M., Jin, J., Sun, W., and Yan, C.*. *A new series of fluorescent 5-methoxy-2-pyridylthiazoles with a pH-sensitive dual-emission.* **New J. Chem.**, 2006, 30, 1192.

Functional inorganic nanomaterials

22. Zhang, C., Zhou, H., Liao, L., Feng, W., Sun, W., Li, Z., Xu, C., Fang, C., Sun, L., Zhang, Y., and Yan, C.*. *Luminescence modulation of ordered up-conversion nano-patterns via a photochromic diarylethene: rewritable optical storage with nondestructive readout feature.* **Adv. Mater.**, 2010, 22, 633.

23. Zhou, H., Xu, C., Sun, W., and Yan, C.*. *Clean and flexible modification strategy for carboxyl/aldehyde-functionalized upconversion nanoparticles and their optical applications.* **Adv. Funct. Mater.**, 2009, 19, 3892.

Academic Talks

1. 2014 MRS Spring Meeting & Exhibit, in San Francisco, USA, Apr 21-25, 2014

Guiding light propagation through DNA crystal-supported plasmonic nano-particle arrays.

2. 2013 Molecular Programming Project Workshop, in Oxnard, USA, Dec 13-15, 2013

Programming inorganic nanomaterials with DNA nanostructures.

3. 2013 MRS Fall Meeting & Exhibit, in Boston, USA, Dec 1-6, 2013

Shaping inorganic nanomaterials by programmable DNA nanostructures.

4. International Workshop on Organic Photoswitchable Multifunctional Materials, in Shanghai, P. R. China, Oct 25−27, 2009

Digital logic functionalities implemented in MPT-derived fluorophores.

Patents and Patent Applications

1.Sun, W., and Yin, P. *Method for forming nanoparticles having predetermined shapes.* **PCT/US2012/044846**, **WO2013006411 A1**, **CN103732529A**, and **EP2726402A1**.

2. Shen, J., Sun, W., and Yin, P. *High-resolution nucleic acid lithography.* **U.S. Provisional patent, filed May, 2014**.

3. Schaus, T. E., Zhang, D. Y., Sun, W., and Yin, P. *Spatial sequestration of dynamic nucleic acid circuits*. **PCT/US2012/036193** and **WO 2012151328 A3**.

Awards

1. Dongshi Orient Scholarship, Peking University 2005 − 2006

2. Award for Excellent Teaching, Peking University 2006

Review Service

- Journals: *Small, Chem. Commun., RSC Advances, Inorg. Chem.,* and *Mater. Res. Bull.*.
- Conferences: *International Conference on DNA Computing and Molecular Programming*.

Students Supervised

- Undergraduate students: Yaorong Zheng, Zhi Zhu, Chunhu Xu, Can Zhou, Amy Guan
- Exchange students: Andrew Payne, Jessica Lovelock, Tianyang Cao, Zhiyu Zhou

References

- Peng Yin

Associate Professor of Systems Biology

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Postdoctoral Advisor

- Chunhua Yan

Cheung Kong Professor of Chemistry and Molecular Engineering

Peking University

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Ph.D. Advisor

- Mark Bathe

Associate Professor of Biological Engineering

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Collaborator

- Michael S. Strano

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- Haitao Liu

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