

# Wei Sun

Wyss Institute for Biologically Inspired Engineering, Harvard University  
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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., 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., Inorganic Chemistry**, Peking University, China, July 2003.

## Research Interests

My research interests focus on advanced scalable manufacturing of next-generation 3D electronics and opto-electronics from novel inorganic materials. My current work is using biological self-assembly, in particular DNA self-assembly, for digital programming of functional inorganic nano-materials in electronics and plasmonics.

## 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**, 2014, 346, 1258361.
2. Ke, Y.<sup>†</sup>, Ong, L. L.<sup>†</sup>, Sun, W.<sup>†</sup>, Song, J., Dong, M., Shih, W. M., and Yin, P.\* *DNA brick crystals with prescribed depths*. **Nature Chem.**, 2014, 6, 994. (<sup>†</sup> equal contribution)
3. Zhou, F., Sun, W., Ricardo, K. B., Wang, D., Shen, J., Yin, P., and Liu, H.\* *Programmably Shaped Carbon Nanostructure from Shape-Conserving Carbonization of DNA*. **ACS Nano**, 2016, 10, 3069.
4. Jin, Z., Sun, W., Ke, Y., Shih, C.-J., Paulus, G. L. C., Wang, Q. H., Mu, B., Yin, P.\*, and Strano, M. S.\* *Metallized DNA nanolithography for encoding and transferring spatial information for graphene patterning*. **Nature Commun.**, 2013, 4, 1663.
5. 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*

6. 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.
7. 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.
8. 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.
9. 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.
10. 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.
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)thiazolyl]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., 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.
16. 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.
17. Li, Z., Xu, C., Sun, W., Bai, Y., Zhang, C., Fang, C., and Yan, C.\* *Solvent-sensitive charge-transfer absorption behaviours and dual-emissive fluorescent properties of a thiazole-conjugated pyridinium complex.* **New J. Chem.**, 2009, 33, 853.
18. 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.
19. 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.
20. 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.
21. 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  $\pi$ - $\pi$  stacking assembly directed by the H-bonding.* **CrystEngComm**, 2009, 11, 2268.
22. 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.

### *Functional inorganic nanomaterials*

23. 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 upconversion nano-patterns via a photochromic diarylethene: rewritable optical storage with nondestructive readout feature.* **Adv. Mater.**, 2010, 22, 633.
24. 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. 2015 AIChE Annual Meeting, in Salt Lake City, USA, Nov 8-13, 2015  
Scaling-up Nano-Material Integration with DNA Brick Crystals
2. 2015 Foundations of Nanoscience: Self-Assembled Architectures and Devices, in Snowbird, USA, Apr 13-16, 2015  
Programming Inorganic Materials with Structural DNA Nanotechnology
3. IBM Research-Almaden, in San Jose, Apr 10, 2015  
Programmable Nano-Manufacturing with Structural DNA Nanotechnology
4. University of California, Riverside, Apr 1, 2015  
Programmable Nano-Manufacturing with Structural DNA Nanotechnology
5. Massachusetts Institute of Technology, Mar 23, 2015  
Programmable Nano-Manufacturing with Structural DNA Nanotechnology
6. 2014 MRS Fall Meeting & Exhibit, in Boston, USA, Nov 30- Dec 5, 2014  
DNA Brick-Directed Engineering of Inorganic Materials.  
Scaling Nanoparticle Integration for Programmable 3D Plasmonic Architectures.
7. 2014 MRS Spring Meeting & Exhibit, in San Francisco, USA, Apr 21-25, 2014  
Guiding Light Propagation through DNA Crystal-Supported Plasmonic Nano-Particle Arrays.
8. 2013 Molecular Programming Project Workshop, in Oxnard, USA, Dec 13-15, 2013  
Programming Inorganic Nanomaterials with DNA Nanostructures.
9. 2013 MRS Fall Meeting & Exhibit, in Boston, USA, Dec 1-6, 2013  
Shaping Inorganic Nanomaterials by Programmable DNA Nanostructures.

## 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. *Scalable nucleic acid-based nanofabrication.* **PCT/US2015/032198** and **WO2015187390 A3**.
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**.
4. Schaus, T. E., Yin, P., Sun, W., and Zhang, D. Y. *Compositions and methods for self-assembly of polymers with complementary macroscopic and microscopic scale units.* **PCT/US2012/046036**, **EP2758458A4**, and **WO2013009736A2**.

## Awards

1. Dongshi Orient Scholarship, Peking University 2005 – 2006
2. Award for Excellent Teaching, Peking University 2006
3. Award for Social Activity, College of Chemistry and Molecular Engineering, Peking University 2006

## Review Service

- Journals: *Chem. Soc. Rev.*, *Sci. Rep.*, *Inorg. Chem.*, *Adv. Mater.*, *Adv. Funct. Mater.*, *Small*, *Chem. Commun.*, *RSC Advances*, *Mater. Res. Bull.*, *MRS Advances.*, and *Spectrochimica Acta Part A*.
- Conferences: *International Conference on DNA Computing and Molecular Programming*.

## Professional Service

- Judge for the *Graduate Student Award* at 2015 MRS Spring Meeting & Exhibit, in San Francisco, USA.

## Teaching Experience

- Lecturer (3 semesters): *Biomolecular Engineering and Synthetic Biology*, Harvard Medical School.
- Mentor for undergraduate students (9 years): Yaorong Zheng, Zhi Zhu, Chunhu Xu, Can Zhou, Amy Guan, Andrew Payne, Jessica Lovelock, Tianyang Cao, Zhiyu Zhou
- Providing scientific advice and training to the Harvard BIOMOD team in 2011

## References

- Peng Yin

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*Postdoctoral Advisor*

- Chunhua Yan

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