

FAN HONG

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EDUCATION AND ACADEMIA EXPERIENCE

**Wyss Institute for Biologically Inspired Engineering &
Harvard Medical School**

Sept 2019 - Present

Postdoctoral Fellow

Advisor: Peng Yin

Arizona State University, USA

Aug 2014 - May 2019

PhD in Chemistry

Research Focus: Molecular programming, Computational DNA/RNA design, Molecular simulation

Thesis: Computational Design and Study of Structural and Dynamic Nucleic Acid Systems

Advisors: Hao Yan, Yan Liu, Alexander A. Green, Petr Sulc

Huazhong University of Science and Technology, China

July 2010 - June 2014

B.S. with honor in Chemistry.

TEACHING EXPERIENCE

Teaching assistant for CHEM113

Giving lectures and help students to conduct basic chemistry experiments

SELECTED AWARDS AND HONORS

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|------------------|---|
| 2019 | Outstanding Graduate Research Assistant (2 out of department wide) |
| 2017 | Best poster award in the Future Trend of DNA nanotechnology |
| 2017 | Outstanding Graduate Research Assistant (4 out of department wide). |
| 2015 | Travel Award for 21st International Conference on DNA Computing and Molecular Programming |
| 2014 | ASU Graduate Fellowship (4 out of department wide) |
| 2014 | Outstanding Graduates of Huazhong University of Science and Technology |
| 2014 | Dalian Institute of Chemical Physics scholarship (Top 1% University Wide) |
| 2013 | The First Paper Prize of the 6th Symposium of Extracurricular Achievement of Undergraduates |
| 2012 | National Endeavour Scholarship (Top 1% University Wide) |
| 2012-2014 | Outstanding Academic Record Awards (Received every year, Top 5% University Wide) |
| 2011 | Outstanding Freshman Scholarship (Top 5% University Wide) |

PATENTS

- Alexander A. Green, **Fan Hong**. Ultraspecific riboregulators having robust single-nucleotide specificity and in vitro and in vivo uses thereof. WO2018026762A1.
- Alexander A. Green, **Fan Hong**, Hao Yan, Soma Chaudary, Anli Tang, Ultraspecific nucleic acid sensors for low-cost liquid biopsies. PCT/US2017/061796

PUBLICATIONS

contributed equally

- Youngeun Kim, Adam B Yaseen, Jocelyn Y Kishi, **Fan Hong**, Sinem K Saka, Kuanwei Sheng, Nikhil Gopalkrishnan, Thomas E Schaus, Peng Yin. Single-stranded RPA for rapid sensitive detection of SARS-Cov-2 RNA. *MedRxiv*.

2. **Fan Hong**, John Schreck, Petr Šulc*. Understanding DNA interactions in crowded environments with a coarse-grained model. *Nucleic Acid Research*, in press.
3. **Fan Hong**, Duo Ma, Kaiyue Wu, Lida A. Mina, Rebecca C. Luiten, Yan Liu, Hao Yan*, Alexander A. Green* . Precise and Programmable Detection of Mutations Using Ultraspecific Riboregulators. *Cell*, 2020, 180, 1018-1032.
 - Featured as the cover story of the issue
 - Research Highlight: Pinpointing RNA mutations, *Nat. Methods*. 2020, 17, 365
 - Media coverage : ASU Now, ASU Biodesign, EurekAlert, TechnologyNetworks, ScienceDaily, Phys.org, Science Codex, GENnews, GenomeWeb , featured on Coriell Institute website.
4. **Fan Hong**, Petr Šulc*. Strand displacement: a fundamental mechanism in RNA biology? *Journal of Structural Biology*. 2019. 207, 241-249.
5. **Fan Hong**, Shuoxing Jiang, Xiang Lan, Raghu Pradeep Narayanan, Petr, Sulc, Fei Zhang*, Yan Liu*, Hao Yan*. Layered-Crossover Tiles with Precisely Tunable Angles for 2D and 3D DNA Crystal Engineering, *J. Am. Chem. Soc.* 2018, 140, 14670-14676
6. Fei Zhang, **Fan Hong**, Hao Yan. Nanoscale Mazes. *Nature Nanotechnology* 2017, 12, 189190.
7. **Fan Hong**, Fei Zhang Yan Liu*, Hao Yan*. DNA origami: scaffolds to creating high order structure. *Chem. Rev.*, 2017,117, 12584-12640.
8. Shuoxing Jiang#, **Fan Hong**#, Hao Yan*, Yan Liu*. Understanding the Elementary steps in DNA tile-based self-assembly. *ACS Nano*, 2017, 11, 93709381.
9. **Fan Hong**, Shuoxing Jiang, Tong Wang, Yan Liu*, Hao Yan*. 3D framework DNA structures with layered DNA motifs, *Angew. Chem. Int. Ed.*, 2016, 128(41): 13024-13027.
10. Xiaowen Ou, **Fan Hong**, Fan Xia*, A highly sensitive and facile graphene oxide-based nucleic acid probe: Label-free detection of telomerase activity in cancer patient's urine using AIEgens, *Biosensors and Bioelectronics*, 2016, 89, 417-421
11. Wei Guo#, **Fan Hong**#, Nannan Liu, Jiayu Huang, Boya Wang, Xiaoding Lou, Fan Xia*. Target-Specific 3D DNA Gatekeepers for Biomimetic Nanopores, *Advanced Materials*, 2015, 27, 2090-2095.
12. Boya Wang, Ruixue Duan, **Fan Hong**, Fan Xia*, Real-time monitoring of enzyme-free strand displacement cascades by colorimetric assays. *Nanoscale*, 2015, 7, 5719-5725.
13. Di Kang, Ruixue Duan, Yerpeng Tan, **Fan Hong**, et al, Fan Xia*, Speeding up the self-assembly of DNA nanodevice by variety of polar solvents. *Nanoscale*, 2014, 6, 14153-14157.
14. Abdul Hakeem, **Fan Hong**, Fan Xia*, Dual Stimuli-Responsive Nano-Vehicle for Controlled Drug Delivery: Mesoporous Silica Nanoparticles End-Capped with Natural Chitosan, *Chem. Comm.* 2014,50, 13268-13271.
15. Yongmei Jia, Ruixue Duan, **Fan Hong**, Fan Xia*. Electrochemical Biocomputing: A New Class of Molecular-Electronic Logic Devices. *Soft Matter*, 2013, 9, 6571-6577.

PRESENTATIONS AND TALKS

2. Talk, De-Novo-Designed Ultra-Specific Riboregulators for Gene Regulation and Low Cost Paper-Based Diagnostics, *Gorden Conference:RNA nanotechnology*, Jan, 2019, Ventura, CA
3. Poster, Rapid, low-cost nucleic acid detection using paper-based synthetic biology, *Biotechnology for the nation*, Nov, 2018, Johns Hopkins Applied Physics Lab Washington DC.

4. Poster, Computational study of DNA interactions undercrowded environment, *Statistical Physics in Biology*, Oct, 2018, Tempe, AZ.
5. Poster, De-Novo-Designed Ultra-Specific Riboregulators, *Synthetic Biology: Engineering, Evolution & Design (SEED)*, June, 2018, Scottsdale, AZ.
6. Poster, De-novo-designed ultraspecific riboregulators for gene regulation in vivo and in low-cost paper-based diagnostics, *the 23rd International Conference on DNA Computing and Molecular Programming*, Aug, 2017, Austin, TX.
7. Poster, Layered crossover motifs for DNA nanostructure design. *DNAtec17 Workshop: The Future trend of DNA nanotechnology*, June, 2017, Dresden.
8. Poster, Framework DNA origami structure based on layered crossover motifs. *The Foundation of Nanoscience Conference.*, Apr, 2016, Dresden.
9. Poster, Thermodynamics and Kinetics of DNA Tile binding during the nucleation process in the DNA self-assembly. *the 21st International Conference on DNA Computing and Molecular Programming*, June, 2015, Boston.

JOURNAL REVIEW

Journal of American Chemical Society
 ACS Applied Materials & Interface
 ACS Applied Electronic Materials
 Chemical Communications

EXPERTISE AND SKILLS

Programming & Tools	Python, R, Matlab, C++, LINUX, Latex, Javascript, mySQL
Data Science	Machine Learning, Deep Neural Networks, Reinforcement Learning, Bayesian Statistics, Tensorflow, Pytorch
Experimental	PCR, Cloning, purification, genome editing, DNA crystal growth, AFM, TEM.