Jun Yao

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Department of Electrical and Computer Engineering,
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Professional Preparation

1999–2003	B.S.	Electrical Engineering, Fudan University, Shanghai, China
2003–2006	M.S.	Physics, Fudan University, Shanghai, China
2006–2012	Ph.D.	Applied Physics, Rice University, Houston, TX (Advisors: James M. Tour, Douglas Natelson, Lin Zhong)
2011–2017	Postdoc	Chemistry & Chemical Biology, with Charles M. Lieber, Harvard University, Cambridge, MA

Appointments

2017–present	*Assistant Professor*, Department of Electrical and Computer Engineering, Institute for Applied Life Sciences, University of Massachusetts at Amherst, MA

Honors

NSF CAREER Award (2019).

Technology Development Award by President Office, UMass Amherst (2018).

Top Prize, Innovation Challenge, UMass Amherst (2018).

Nano Venture Forum Prize, Rice University (2011);
23th Quantum Institute Colloquium Award, Rice University (2009);

Publications ("#" corresponding author)

Total peer-reviewed publications = 34, h index = 25
A full list of my published journal articles available: https://scholar.google.com/citations?user=Np4-SNIAAAAJ&hl=en

[35]. Hongyan Gao, Bing Yin, Siyu Wu, Xiaomeng Liu, Tianda Fu, Cheng Zhang, Jian Lin, **Jun Yao**#, "Deterministic Assembly of Three-Dimensional Suspended Nanowire Structures", *Nano Lett*. 19, 5647-5652 (2019).

[34]. Rui Wang, Russell S. Deacon, Jian Sun, **Jun Yao**, Charles M. Lieber, Koji Ishibashi, "Gate Tunable Hole Charge Qubit Formed in a Ge/Si Nanowire Double Quantum Dot Coupled to Microwave Photons", *Nano Lett*. 19, 1052-1060 (2019).

[33]. M. Sistani, M. A. Luong, M. I. den Hertog, E. Robin, M. Spies, B. Fernandez, **Jun Yao**, E. Bertagnolli, A. Lugstein, "Monolithic Axial and Radial Metal-Semiconductor Nanowire Heterostructures", *Nano Lett*. 18, 7692-7697 (2018).

[32]. Bing Yin, Xiaomeng Liu, Hongyan Gao, Tianda Fu, **Jun Yao**#, "Bioinspired and Bristled Microparticles for Ultrasensitive Pressure and Strain Sensors", *Nature Commun*. 9, 5161 (2018).

[31]. Jian Sun, Russell S. Deacon, Rui Wang, **Jun Yao**, Charles M. Lieber, Koji Ishibashi, "Helical Hole State in Multiple Conduction Modes in Ge/Si Core/Shell Nanowire", *Nano Lett*. 18, 6144–6149 (2018).

Prior to UMass ("*" equal contributor)

1. Thomas Schuhmann*, **Jun Yao***, Guosong Hong, Tianming Fu and Charles M. Lieber, "Syringe-injectable electronics with a plug-and-play input/output interface," *Nano Lett.* 17, 5836−5842 (2017).
2. Yunlong Zhao*, **Jun Yao***, Lin Xu, Max Mankin, Yinbo Zhu, Heng-An Wu, Liqiang Mai, Qingjie Zhang, Charles M. Lieber, "Shape-controlled deterministic assembly of nanowire", *Nano Lett.* 16, 2644-2650 (2016).
3. **Jun Yao**, Hao Yan, Shamik Das, James Klemic, James Ellenbogen, and Charles M. Lieber, "Nanowire nanocomputer as a finite-state machine", *Proc. Natl. Acad. Sci. USA* 111, 1259-1264 (2014).
4. Wooyoung Shim*, **Jun Yao***, and Charles M. Lieber, "Programmable resistive-switch nanowire transistor logic circuits", *Nano Lett.* 14, 5430-5436 (2014).
5. Andrew P. Higginbotham, F. Kuemmeth, T. W. Larsen, **Jun Yao**, Hao Yan, Charles M. Lieber, and Charles M. Marcus, "Antilocalization of coulomb blockage in a Ge/Si nanowire", *Phys. Rev. Lett.* 112, 216806 (2014).
6. Andrew P. Higginbotham, T. W. Larsen, **Jun Yao**, Hao Yan, Charles M. Lieber, and Charles M. Marcus, "Hole spin coherence in a Ge/Si heterostructure nanowire", *Nano Lett.* 14, 3582-3586 (2014).
7. **Jun Yao**, Hao Yan, and Charles M. Lieber, "A nanoscale combing technique for the large-scale assembly of highly aligned nanowires", *Nature Nanotechnol.* 8, 329-335 (2013).
8. **Jun Yao***, Jian Lin*, Yanhua Dai, Gedeng Ruan, Zheng Yan, Lei Li, Zhong Lin, Douglas Natelson, and James M. Tour, "Highly transparent nonvolatile resistive memory devices from silicon oxide and graphene", *Nature Commun.* 3, 1101 (2012).
9. Lei Ren, Qi Zhang, **Jun Yao**, Zhengzong Sun, Ryosuke Kaneko, Zheng Yan, Sebastien Nanot, Zhong Jin, Iwao Kawayama, Masayoshi Tonouchi, James M. Tour, and Junichiro Kono, "Terahertz and infrared spectroscopy of gated large-area graphene", *Nano Lett.* 12, 3711-3715 (2012).
10. Zheng Yan, **Jun Yao**, Zhengzong Sun, Yu Zhu, and James M. Tour, "Controlled ambipolar-to-unipolar conversion in graphene field-effect transistor through surface coating with poly(ethylene imine)/poly(ethylene glycol) films", *Small* 8, 59-62 (2012).
11. **Jun Yao**, Lin Zhong, Douglas Natelson, and James M. Tour, "In situ probing of the conducting filament in a silicon oxide resistive switch", *Sci. Rep.* 2, 242 (2012).

12. Zhengzong Sun, Cary L. Pint, Daniela C. Marcano, Chenguang Zhang, **Jun Yao**, Gedeng Ruan, Zheng Yan, Yu Zhu, Robert H. Hauge, and James M. Tour, "Toward hybrid superlattices in graphene", *Nature Commun.* 2, 559 (2011).
13. Zheng Yan, Zhiwei Peng, Zhengzong Sun, **Jun Yao**, Yu Zhu, Zheng Liu, Pulickel M. Ajayan, and James M. Tour, "Growth of bilayer graphene on insulating substrates", *ACS Nano* 5, 8187-8192 (2011) .
14. **Jun Yao**, Lin Zhong, Douglas Natelson, and James M. Tour, "Silicon oxide: a non-innocent surface for molecular electronics and nanoelectronics", *J. Am. Chem. Soc.* 133, 941-948, 2011.
15. Zhong Jin, **Jun Yao**, Carter Kittrell, and James M. Tour, "Large-Scale growth and characterizations of nitrogen-doped monolayer graphene sheets", *ACS Nano* 5, 4112-4117, (2011).
16. Zheng Yan, Zhengzong Sun, Wei Lu, **Jun Yao**, Yu Zhu, and James M. Tour, "Controlled modulation of electronic properties of graphene by self-assembled monolayers on SiO_2 substrates", *ACS Nano* 5, 1535-1540, 2011.
17. **Jun Yao**, Lin Zhong, Douglas Natelson, and James M. Tour, "Intrinsic resistive switching and memory effects in silicon oxide", *Appl. Phys. A* 102, 835-839, 2011.
18. Yu Zhu, Wei Lu, Zhengzong Sun, Dmitry V. Kosynkin, **Jun Yao**, and James M. Tour, "High throughput preparation of large area transparent electrodes using non-functionalized graphene nanoribbons", *Chem. Mater.* 23, 935-939, 2011.
19. **Jun Yao**, Lin Zhong, Douglas Natelson, and James M. Tour, "Making memory out of silicon oxide filaments", *EE Times Europe*, December 2010, p 11 (magazine article).
20. Zhengzong Sun, Zheng Yan, **Jun Yao**, Elvira Beitler, Yu Zhu, and James M. Tour, "Growth of graphene from solid carbon source", *Nature* 468, 549-552, 2010.
21. **Jun Yao**, Zhengzong Sun, Lin Zhong, Douglas Natelson, and James M. Tour, "Resistive switches from silicon oxide", *Nano Lett.* 10, 4105-4110, 2010. (**Front-page news of *The New York Times* on Aug. 31, 2010**).
22. Zhengzong Sun, Everett C. Salas, **Jun Yao**, James M. Tour, and Andreas Lüttge, "Microbially mediated transformation of graphene oxide", *GeoChimica et Cosmochimica Acta* 74, A1009, 2010.
23. Noe T. Alvarez, Christopher E. Hamilton, Cary L. Pint, Alvin Orbaek, **Jun Yao**, Andrew L. Frosinini, Andrew R. Barron, James M. Tour, and Robert H. Hauge, "Wet catalyst-support films for production of vertical aligned carbon nanotubes", *ACS Appl. Mater. Interfaces* 2, 1851-1856, 2010.
24. **Jun Yao**, Zhong Jin, Lin Zhong, Douglas Natelson, and James M. Tour, "Two-terminal nonvolatile memories from single-walled carbon nanotubes", *ACS Nano* 12, 4122-4126, 2009.
25. **Jun Yao**, Lin Zhong, Zengxing Zhang, Tao He, Patrick J. Wheeler, Douglas Natelson, and James M. Tour, "Resistive switching in nanogap systems on SiO_2 substrates", *Small* 24, 2910-2915, 2009.

26. Zengxing Zhang, Zhengzong Sun, **Jun Yao**, and James M. Tour, "Transforming carbon nanotube devices into nanoribbon devices", *J. Am. Chem. Soc*. 131, 13460-13463, 2009.
27. **Jun Yao**, Lin Zhong, Douglas Natelson, and James M. Tour, "Etching-dependent reproducible memory switching in vertical SiO_2 structures", *Appl. Phys. Lett*. 93, 253101, 2008.
28. Tao He, Meng Lu, **Jun Yao**, and James M. Tour, "Reversible modulation of conductance in silicon device via UV/Visible-light irradiation", *Adv. Mater*. 20, 4541-4546, 2008.
29. **Jun Yao** and Zhongqin Yang, "Spin accumulation in a ballistic Rashba bar", *Phys. Rev. B* 73, 033314, 2006.
30. **Jun Yao**, Yu-Chang Chen, Massimiliano Di Ventra, and Zhongqin Yang, "Effect of atomic geometry on shot noise in aluminum quantum point contacts", *Phys. Rev. B* 73, 233407, 2006.

Patents

1. James M. Tour, **Jun Yao**, Jian Lin, Gunuk Wang, Krishna Palem, "Addressable SiO_x memory array with incorporated diodes", US Patent **9,385,163**, issued Jul. 5, 2016.
2. James M. Tour, **Jun Yao**, Douglas Natelson, Lin Zhong, Tao He, "Electronic devices containing switchable conductive silicon oxide as a switching element and methods for production and use thereof", US Patent **9,129,676**, issued Sep. 8, 2015.
3. James M. Tour, Yubao Li, Alexander Sinitskii, Lin Zhong, Mian Dong, **Jun Yao**, "Vertically-stacked electronic devices having conductive carbon films", US Patent **8,395,901**, issued Mar. 12, 2013.
4. Zvi Or-Bach, James M. Tour, **Jun Yao**, Brian Cronquist, "Method for fabrication of a semiconductor element and structure thereof", US Patent **7,973,559**, issued Jul. 5, 2011
5. James M. Tour, **Jun Yao**, "Invisible/transparent nonvolatile memory", US Patent Application **13/985,956**, filed Feb. 16, 2012.
6. James M. Tour, **Jun Yao**, Burt Fowler, Glenn Mortland, "SiO_x-based nonvolatile memory architecture", US Patent Application **13/821,632**, filed Sep. 8, 2011.

Synergistic Activities

- **Review service**: 8-year (ongoing) reviewer for leading scientific journals, including *Nature Nanotechnology*, *PNAS*, *Advanced Materials*, *Nano Letters*, *ACS Nano*, *Nanoscale*, etc;
- **Science promotion**: featured '*Behind the Scenes*' discover story by NSF (2010);

- **Technology commercialization**: (i) Developed memory technology lead to startup company Weebit Nano (https://weebit-nano.com); (ii) co-founder, eBiologics, Inc. (2018).
- **Student advisory**: advisor to undergraduate/graduate students for *Innovation Challenge*, a series of entrepreneurship competitions aimed at bringing research to the next level of technology and engaging dialogs to public audience. Winner of 1st place award (2018).

Research Support

NSF (Career)	CBET-1844904	(PI)	$500,000	03/01/19-02/28/24
NSF	ECCS-1917630	(co-PI)	$366,316	09/01/19-08/31/22