

## Qiangfei Xia, Ph.D.

Electrical and Computer Engineering  
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### RESEARCH INTERESTS

- Energy-efficient hardware systems for machine intelligence, security, sensing and communication
- Emerging nanoelectronic devices: design, characterization and understanding
- Enabling fabrication and three-dimensional heterogeneous integration technologies

### EMPLOYMENT HISTORY

9/2018 – Present	<b>University of Massachusetts Amherst</b> <i>Professor of Electrical &amp; Computer Engineering</i>
1/2016 – 8/2018	<b>University of Massachusetts Amherst</b> <i>Associate Professor of Electrical &amp; Computer Engineering</i>
10/2010 – 1/2016	<b>University of Massachusetts Amherst</b> <i>Assistant Professor of Electrical &amp; Computer Engineering</i> <i>(Tenure clock starts on 1/17/2011)</i>
10/2007 – 10/2010	<b>Hewlett Packard Labs</b> <i>Research Associate</i>

### EDUCATION

9/2007	<b>Princeton University</b> <i>Ph.D. in Electrical Engineering</i>
2001/1998	<b>Shanghai Jiao Tong University</b> <i>Master of Science / Bachelor of Engineering</i>

### SELECTED AWARDS & HONORS

- Barbara H. and Joseph I. Goldstein Outstanding Junior Faculty Award, COE, UMass Amherst (2015)
- National Science Foundation (NSF) CAREER Award (2013)
- DARPA Young Faculty Award (YFA) (2012)

### SELECTED RECENT PUBLICATIONS (*Full list at <http://nano.ecs.umass.edu>*)

- **Memristive crossbar arrays for brain-inspired computing**  
[Qiangfei Xia](#) and J.J. Yang  
*Nature Materials*, to appear (2019). (Invited Review)
- **Long short-term memory networks in memristor crossbar arrays**  
C. Li, Z. Wang, M. Rao, D. Belkin, W. Song, H. Jiang, P. Yan, Y. Li, P. Lin, M. Hu, N. Ge, J.P. Strachan, M. Barnell, Q. Wu, R.S. Williams, J.J. Yang and [Qiangfei Xia](#)  
*Nature Machine Intelligence* 1, 49-57(2019). DOI: [10.1038/s42256-018-0001-4](https://doi.org/10.1038/s42256-018-0001-4)
- **Memristor crossbar arrays with 6-nm half-pitch and 2-nm critical dimension**  
S. Pi, C. Li, H. Jiang, W. Xia, H.L. Xin, J.J. Yang and [Qiangfei Xia](#)  
*Nature Nanotechnology* 14, 35-39(2019). DOI: [10.1038/s41565-018-0302-0](https://doi.org/10.1038/s41565-018-0302-0)
- **A provable key destruction scheme based on memristive crossbar arrays**  
H. Jiang, C. Li, R. Zhang, P. Yan, P. Lin, Y. Li, J.J. Yang, D. Holcomb and [Qiangfei Xia](#)  
*Nature Electronics* 1, 548-554(2018). DOI: [10.1038/s41928-018-0146-5](https://doi.org/10.1038/s41928-018-0146-5)
- **Capacitive neural network with neuro-transistors**  
Z. Wang, M. Rao, J.-W. Han, J. Zhang, P. Lin, Y. Li, C. Li, W. Song, S. Asapu, R. Midya, E. Zhuo, H. Jiang, J.H. Yoon, N.K. Upadhyay, S. Joshi, M. Hu, J.P. Strachan, M. Barnell, Q. Wu, H. Wu, Q. Qiu, R.S. Williams, [Qiangfei Xia](#) and J.J. Yang

- Nature Communications* 9, 3208(2018). DOI: [10.1038/s41467-018-05677-5](https://doi.org/10.1038/s41467-018-05677-5)
- **Efficient and self-adaptive in-situ learning in multilayer memristor neural networks**  
C. Li, D. Belkin, Y. Li, P. Yan, M. Hu, N. Ge, H. Jiang, E. Montgomery, P. Lin, Z. Wang, W. Song, J.P. Strachan, M. Barnell, Q. Wu, R.S. Williams, J.J. Yang, and [Qiangfei Xia](#)  
*Nature Communications* 9, 2385(2018). DOI: [10.1038/s41467-018-04484-2](https://doi.org/10.1038/s41467-018-04484-2)
  - **Fully memristive neural networks for pattern classification with unsupervised learning**  
Z. Wang, S. Joshi, S. Savel'ev, W. Song, R. Midya, Y. Li, M. Rao, P. Yan, S. Asapu, Y. Zhuo, H. Jiang, P. Lin, C. Li, J.H. Yoon, N. Upadhyay, J. Zhang, M. Hu, J.P. Strachan, M. Barnell, Q. Wu, H. Wu, R.S. Williams, [Qiangfei Xia](#), and J.J. Yang  
*Nature Electronics* 1, 137-145(2018). DOI: [10.1038/s41928-018-0023-2](https://doi.org/10.1038/s41928-018-0023-2)
  - **Analogue signal and image processing with large memristor crossbars**  
C. Li, M. Hu, Y. Li, H. Jiang, N. Ge, E. Montgomery, J. Zhang, W. Song, N. Davila, C.E. Graves, Z. Li, J. P. Strachan, P. Lin, Z. Wang, M. Barnell, Q. Wu, R.S. Williams, J.J. Yang, and [Qiangfei Xia](#)  
*Nature Electronics* 1, 52-59(2018). DOI: [10.1038/s41928-017-0002-z](https://doi.org/10.1038/s41928-017-0002-z)
  - **A novel true random number generator based on a stochastic diffusive memristor**  
H. Jiang, D. Belkin, S.E. Savel'ev, S. Lin, Z. Wang, Y. Li, S. Joshi, R. Midya, C. Li, M. Rao, M. Barnell, Q. Wu, J.J. Yang, and [Qiangfei Xia](#)  
*Nature Communications* 8, 882(2017). DOI: [10.1038/s41467-017-00869-x](https://doi.org/10.1038/s41467-017-00869-x)
  - **Three-dimensional crossbar arrays of self-rectifying Si/SiO<sub>2</sub>/Si memristors**  
C. Li, L. Han, H. Jiang, M. Jang, P. Lin, Q. Wu, M. Barnell, J. J. Yang, H. L. Xin and [Qiangfei Xia](#)  
*Nature Communications* 8, 15666(2017). DOI: [10.1038/ncomms15666](https://doi.org/10.1038/ncomms15666)
  - **Organic electronics: Battery-like artificial synapses**  
J.J. Yang and [Qiangfei Xia](#)  
*Nature Materials* 16, 396-397(2017). DOI: [10.1038/nmat4870](https://doi.org/10.1038/nmat4870)
  - **Memristors with diffusive dynamics as synaptic emulators for neuromorphic computing**  
Z. Wang, S. Joshi, S. E. Savel'ev, H. Jiang, R. Midya, P. Lin, M. Hu, N. Ge, J. P. Strachan, Z. Li, Q. Wu, M. Barnell, G. L. Li, H. L. Xin, R. S. Williams, [Qiangfei Xia](#) and J. J. Yang  
*Nature Materials* 16, 101-108(2017). DOI: [10.1038/nmat4756](https://doi.org/10.1038/nmat4756)
  - **Sub-10 nm Ta channel responsible for superior performance of a HfO<sub>2</sub> memristor**  
H. Jiang, L. Han, P. Lin, Z. Wang, M. Jang, Q. Wu, M. Barnell, J.J. Yang, H.L. Xin and [Qiangfei Xia](#)  
*Scientific Reports* 6, 28525(2016). DOI: [10.1038/srep28525](https://doi.org/10.1038/srep28525)
  - **Nanoscale memristive radiofrequency switches**  
S. Pi, M. Ghadiri-Sadrabadi, J.C. Bardin and [Qiangfei Xia](#)  
*Nature Communications* 6, 7519(2015). DOI: [10.1038/ncomms8519](https://doi.org/10.1038/ncomms8519)
  - **Cross point arrays of 8 nm × 8 nm memristive devices fabricated with nanoimprint lithography**  
S. Pi, P. Lin, and [Qiangfei Xia](#)  
*Journal of Vacuum Science & Technology* B31, 06FA02(2013). DOI: [10.1116/1.4827021](https://doi.org/10.1116/1.4827021)
  - **Memristor-CMOS hybrid integrated circuits for reconfigurable logic**  
[Qiangfei Xia](#), W. Robinett, M. W. Cumbie, N. Banerjee, T. J. Cardinali, J. J. Yang, W. Wu, X. M. Li, W. M. Tong, D. B. Strukov, G. S. Snider, G. Medeiros-Ribeiro and R. S. Williams  
*Nano Letters* 9, 3640-3645(2009). DOI: [10.1021/nl901874j](https://doi.org/10.1021/nl901874j)
  - **Sub-10 nm self-enclosed self-limited nanofluidic channel arrays**  
[Qiangfei Xia](#), K.J. Morton, R.H. Austin and S.Y. Chou  
*Nano Letters* 8, 3830-3833(2008). DOI: [10.1021/nl802219b](https://doi.org/10.1021/nl802219b)
  - **Improved nanofabrication through guided transient-liquefaction**  
S.Y. Chou and [Qiangfei Xia](#)  
*Nature Nanotechnology* 3, 295-300(2008). DOI: [10.1038/nnano.2008.95](https://doi.org/10.1038/nnano.2008.95)