About Us Faculty Research News Undergraduate Students
Graduate Students Alumni & Community Industry

Jianhua (Joshua) Yang

Professor
201G Marcus Hall
201G Marcus Hall
University of Massachusetts
100 Natural Resources Road
Amherst, MA 01003-929

jjyang@umass.edu
(413) 545-4514

Education | **Research** | **Publications** | **Honors** | **Experience** | **Links**

B.S. Mechanical Engineering, Southeast University 1997

M.S. Materials Science Program, University of Wisconsin at Madison 2003

Ph.D. Materials Science Program, University of Wisconsin at Madison 2006

Departments

Electrical and Computer Engineering

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Nanoelectronics and Nanoionics for computing and energy applications.

Current research thrusts are unconventional computing technologies:

1. High performance Non-volatile random access memories;

2. Analog computing using resistance analog switches;

3. Neuromorphic / Synaptic computing using memristive devices.

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Education | Research | **Publications** | Honors | Experience | Links

Selective papers (from over 100 papers)

1. **J. Joshua Yang**, M. D. Pickett, X. Li, D. A. A. Ohlberg, D. R. Stewart, and R. S. Williams “Memresistive switching mechanism for metal/oxide/metal nano-devices” *Nature Nanotechnology* 3, 429 (2008).
2. **J. Joshua. Yang**, F. Miao, D. Ohlberg, D. Stewart, R. S Williams “Electroforming mechanism of metal/oxide/metal memristive switches”, *Nanotechnology* 20, 215201(2009).
3. J. Borghetti, G. S. Snider, P. J. Kuekes, **J. Joshua Yang**, D. R. Stewart and R. S. Williams “‘Memristive’ switches enable ‘stateful’ logic operations via material implication”, *Nature* 464, 873 (2010).

4. **J. Joshua Yang**, J. Borghetti, D. Murphy, D. R. Stewart and R. S. Williams "A family of electronically reconfigurable nanodevices", *Advanced Materials* 21, 3754 (2009).
5. **J. Joshua Yang**, J. P. Strachan, Q. Xia, D. A. A. Ohlberg, P. J. Kuekes, R. D. Kelley, W. F. Stickle, D. R. Stewart, G. Medeiros-Ribeiro, R. S. Williams, "Diffusion of adhesion layer metals controls nanoscale memristive switching", *Advanced Materials* 22, 4034 (2010).
6. **J. Joshua Yang**, C.-X. Ji, X. Ke, M. S. Rzchowski, and Y. A. Chang, "Over 70% tunneling magnetoresistance at room temperature for a CoFe and AlOx based magnetic tunnel junction", *Applied Physics Letters* 89, 202502 (2006).
7. **J. Joshua Yang***, M.-X. Zhang, John Paul Strachan, Feng Miao, Matthew D. Pickett, Ronald D. Kelley, G. Medeiros-Ribeiro, R. Stanley Williams "High switching endurance in TaOx memristive devices", *Applied Physics Letters* 97, 232102 (2010).
8. **J. Joshua Yang***, M.-X. Zhang, M. D. Pickett, F. Miao, J. P. Strachan, W. Li, W. Yi, D. A. A. Ohlberg, B. J. Choi, W. Wu, J. H. Nickel, G. Medeiros-Ribeiro and R. Stanley Williams, "Engineering nonlinearity into memristors for passive crossbar applications", *Applied Physics Letters* 100, 113501 (2012)).
9. F. Miao, J. P. Strachan, **J. Joshua Yang*,** M.-X. Zhang, I. Goldfarb, A. C. Torrezan, P. Eschbach, R. D. Kelley, G. Medeiros-Ribeiro and R. S. Williams **"**Anatomy of a nanoscale conduction channel reveals the mechanism of a high-performance memristor", *Advanced Materials* 23, 5633 (2012).
10. **J. Joshua Yang***, I. Inoue, C. S. Hwang and T. Mikolajick, "Metal oxide memories based on thermochemical and valence change mechanisms", *MRS Bulletin* 37, 131 (2012).
11. **J. Joshua Yang***, Dmitri B. Strukov and Duncan R. Stewart, "Memristive devices for computing", *Nature Nanotechnology* 8, 13 (2013).
12. B. J. Choi, A. C. Torrezan, K. J. Norris, F. Miao, J. P.Strachan, M.-X. Zhang, D. A. A. Ohlberg, N. P. Kobayashi**, J. Joshua Yang,*** and R. S. Williams, "Electrical performance and scalability of Pt dispersed SiO2 nanometallic resistance switch", *Nano Letters* 13, 3217 (2013).
13. B. J. Choi, , A. C. Torrezan, J. P. Strachan , P. G. Kotula, A.J. Lohn, M.J. Marinella, Z. Li, R. S. Williams, and **J. Joshua Yang***, "High-speed and low-energy nitride memristors", *Advanced Functional Materials*, 26, 5290 (2016).
14. M. Hu, J. P. Strachan, Z. Li, E. M. Grafals, N. Davila, C. Graves, S. Lam, N. Ge, R. S. Williams, and **J Joshua Yang**, "Dot-product engine for neuromorphic computing: programming 1T1M crossbar to accelerate matrix-vector multiplication", the 53rd Design Automation Conference (*DAC*), (2016).
15. Z. Wang, H. Jiang, M. H. Jang, P. Lin, A. Ribbe, Q. Xia, and **J. Joshua Yang***, "Electrochemical metallization switching with a platinum group metal in different oxides" *Nanoscale* 8, 14023 (2016).
16. B. J. Choi, J. Zhang, K. Norris, G. Gibson, K. M.Kim, W. Jackson, M. X. Zhang, Z. Li, **J. Joshua Yang***, and R. S. Williams*, "Trilayer Tunnel Selectors for Memristor Memory Cells", *Advanced Materials* 28, 356 (2016).
17. 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, Q. Xia, and **J.**