

Xunzhao Yin

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Academic Training:

- Department of Computer Science & Engineering, University of Notre Dame, USA.
 - (August 2013 – present; pursuing Ph.D. degree)
- Department of Electrical Engineering, Tsinghua University, China.
 - (August 2009 – July 2013; Bachelor of Engineering)
- Department of Electrical Engineering, Chinese University of Hong Kong, China.
 - (September 2011 – December 2011; undergraduate exchange student)

Current Research Interests and Related Projects

- Circuit design based on beyond-CMOS devices for edge computing
 - Developed low-power logic-in-memory cells (Boolean logic, ternary content addressable memory, etc.) based on Ferro-FETs (project supported by the STARnet's LEAST Center)
 - Developed interlayer tunnel-FET (SymFET, graphene-based tunnel FET) based logic elements for imaging processing systems (project supported by the STARnet's LEAST Center)
- Circuit design based on beyond-CMOS devices for hardware security
 - Developed logic obfuscation and voltage protector circuits based on tunnel-FETs for hardware security (project supported by the STARnet's LEAST Center)
 - Evaluated power and performance of lightweight encryption circuits based on tunnel-FETs and CMOS (project supported by the STARnet's LEAST Center)
- Circuit and architecture design for computational hard problems
 - Designed CMOS analog circuits based on a deterministic, continuous-time dynamical system theory for solving Boolean satisfiability (SAT) problems (project supported by an NSF EAGER grant)
 - Developed relaxation oscillator circuits based on Ferro-FETs (project to be supported by the E2CDA funding from NSF and SRC)

Refereed Publications:

1. **Xunzhao Yin**, Behnam Sedighi, Melinda Varga, Maria Ercsey-Ravasz, Zoltan Toroczkai and X. Sharon Hu, "Efficient Analog Circuits for Boolean Satisfiability", to be submitted to *IEEE Transactions on VLSI (TVLSI)*.
2. **Xunzhao Yin**, Michael Niemier, and X. Sharon Hu, "Design and Benchmarking of Ferroelectric based TCAM", under review at *Design Automation and Test in Europe (DATE)*, 2017.
3. **Xunzhao Yin**, A. Aziz, Joseph Nahas, Sumeet Gupta, Suman Datta, Michael Niemier, and X. Sharon Hu, "Exploiting Ferroelectric FETs for Low-Power Non-Volatile Logic-in-Memory Circuits," to appear at *International Conference on Computer Aided Design (ICCAD)*, 2016.
4. **Xunzhao Yin**, Behnam Sedighi, Michael Niemier and X. Sharon Hu, "Design of Latches and Flip-Flops using Emerging Tunneling Devices," at *Design Automation and Test in Europe (DATE)*, p. 367-372, 2016.

5. X. Sharon Hu, An Chen, Yier Jin, Michael Niemier, and **Xunzhao Yin**, "Using Emerging technologies for Hardware Security Beyond PUFs", at *Design Automation and Test in Europe (DATE)*, p. 1544-1549, 2016.
6. Y. Bi, K. Shamsi, **Xunzhao Yin**, X. Sharon Hu, Michael Niemier, Y. Jin, "Enhancing Hardware Security with Emerging transistor technologies," *Proceedings of the 26th edition on Great Lakes Symposium on VLSI*, p. 305-310, 2016.
7. Y. Bi, K. Shamsi, J.-S. Yuan, P.-E. Gaillardon, G. de Micheli, **Xunzhao Yin**, X. Sharon Hu, Michael Niemier, and Yier Jin, "Emerging technology based Design of Primitives for Hardware Security," *ACM Journal of Emerging Technologies*, 13(1), Article 3, 2015.

Other Publications and Presentations

1. **Xunzhao Yin**, Michael Niemier and X. Sharon Hu, "Exploiting Ferroelectric FET for Low-Power Non-Volatile Logic-in-Memory Circuits", Poster presentation, to appear at the ACM Student Research Competition, *International Conference on Computer Aided Design (ICCAD)*, Austin, TX, November 2016.
2. **Xunzhao Yin**, An Chen, Yier Jin, Michael Niemier and X. Sharon Hu, "Emerging Technologies for Hardware Security Beyond PUFs", Poster presentation, *Great Chicago Area Systems Research Workshop (GCASR)*, University of Chicago, April 2016.

Awards and Honors

- Recipient of the ACM Student Research Competition (SRC) Grant, International Conference on Computer Aided Design (ICCAD), 2016.
- Certificate/Industrial application report for Intel-Tsinghua joint research project (Topic: Design of Target Recognition and Positioning for Industrial Robots through Machine Vision System), 2015.
- Best Poster Award at Intel China Academic Forum (ICAF) (Topic: Design of Target Recognition and Positioning for Industrial Robots through Machine Vision System), 2013.
- Second Prize (1 out of 1000 contenders), 29th National Undergraduate Research Competition (Challenge Cup) (Topic: Intelligent Vehicle), 2011.
- First Prize (top 1%), National Undergraduate Physics Contest, Chinese Society of Physics, 2009.
- Waiver of National College Examination, Tsinghua University, 2009.
- First Prize (top 0.03%), Chinese Physics Olympiad, 2008.
- Silver Medal (1 out of 10000 contenders), National Olympiad of Physics, 2008.

Other Research Experiences

- Automatic Digital Visual Teaching System. Nano Integrated Circuits and Systems (NICS) Lab, Tsinghua University, October 2012 – July 2013.
 - Designed a target recognition and location system for industrial robots based on machine vision
 - Proposed and received funding from Intel (Chengdu) to support this project, \$20,000, November 2012 – November 2013
- Power Model Implementation for Smart Phones. Power Tutor Sub-group of Dr. Robert Dick, University of Michigan, August 2012 – September 2012.
 - Experimented on the accuracy of battery sensors within smart phones
 - Reconstructed an automatic power model generator for Nexus
- Intelligent Vehicle System. Tsinghua University, Beijing & National Undergraduate Student Research Training (SRT) program, January 2011 – June 2011.

- Applied road mapping and image processing algorithms to the stream data captured by a single camera for road condition detections
- Integrated the road detection strategies with obstacle and traffic light recognition for more flexible vehicle design

Other Skills:

- C, C++, Matlab, Pspice, Verilog, HTML, Java, Hspice, Quartus, Wireshark