



## Mark Horowitz

Yahoo! Founders Professor in the School of Engineering and Professor of Computer Science

Electrical Engineering

### CONTACT INFORMATION

- **Administrator**

Mary Jane Swenson - Administrative Associate

**Email** mswenson@stanford.edu

**Tel** (650) 723-0748

### Bio

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#### BIO

Professor Horowitz's initial work focused on designing high-performance digital systems by combining work in computer-aided design tools, circuit design, and system architecture. Dr. Horowitz's current research interests are quite broad and span using EE and CS analysis methods to problems in molecular biology to creating new design methodologies for analog and digital VLSI circuits. He has worked on many processor designs, from early RISC chips, to creating some of the first distributed shared memory multiprocessors, and is currently working on on-chip multiprocessor designs. Recently he has worked on a number of problems in computational photography. In 1990, he took leave from Stanford to help start Rambus Inc., a company designing high-bandwidth memory interface technology, and has continued work in high-speed I/O at Stanford. His current research includes updating both analog and digital design methods, low energy multiprocessor designs, computational photography, and applying engineering to biology.

#### ACADEMIC APPOINTMENTS

- Professor, Electrical Engineering
- Professor, Computer Science
- Member, Bio-X
- Affiliate, Precourt Institute for Energy
- Member, Stanford Neurosciences Institute

#### HONORS AND AWARDS

- Faculty Researcher Award, SIA (2010)
- Most influential paper, International Symposium of Computer Arch (1994)
- Donald O. Pederson Technical Field Award, IEEE (2006)
- Best Paper Award, ISQED (2005)
- Most Influential Paper, International Symposium on Computer Architecture (1989)
- Jack Kilby Outstanding Paper Award, ISSCC (2003)
- Elected Fellow, Association for Computing Machinery

- Elected Fellow, IEEE

## **BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS**

- Member, National Academy of Engineering (2013 - present)
- Member, American Academy of Arts and Sciences (2013 - present)
- Member, Computer Science and Telecommunications Advisory Board, NAS (2013 - present)

## **PROFESSIONAL EDUCATION**

- PhD, Stanford University (1984)
- MS, MIT (1978)
- BS, MIT (1978)

## **LINKS**

- <http://www-vlsi.stanford.edu/~horowitz>: <http://www-vlsi.stanford.edu/~horowitz>

## **Teaching**

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### **COURSES**

#### **2016-17**

- An Intro to Making: What is EE: OSPBER 40M (Aut, Win)
- An Intro to Making: What is EE: OSPPARIS 40M (Aut)
- Digital MOS Integrated Circuits: EE 213 (Spr)

#### **2015-16**

- An Intro to Making: What is EE: ENGR 40M (Aut, Spr)
- An Intro to Making: What is EE: OSPBER 40M (Aut, Win, Spr)
- An Intro to Making: What is EE: OSPKYOTO 40M (Spr)
- An Intro to Making: What is EE: OSPPARIS 40M (Spr)
- Digital MOS Integrated Circuits: EE 213 (Spr)

#### **2014-15**

- An Intro to Making: What is EE: ENGR 40M (Aut)
- Digital MOS Integrated Circuits: EE 213 (Win)

#### **2013-14**

- An Intro to Making: What is EE: ENGR 40M (Spr)
- Digital MOS Integrated Circuits: EE 313 (Win)
- Introduction to VLSI Systems: EE 271 (Aut)

## **STANFORD ADVISEES**

### **Master's Program Advisor**

Vickram Gidwani, Liu Jiang

## Publications

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### PUBLICATIONS

- **Why Design Must Change: Rethinking Digital Design** *Micro, IEEE*  
Shacham, O., Azizi, O., Wachs, M., Richardson, S., Horowitz, M.  
; PP (99): 1-1
- **Measurement of Supply Pin Current Distributions in Integrated Circuit Packages**  
Weaver, James, A., Horowitz, Mark, A.
- **Analyzing CMOS Power Supply Networks Using Ariel**, *ACM/IEEEE*  
Stark, D., Horowitz, M.
- **Local inhibition of microtubule dynamics by dynein is required for neuronal cargo distribution** *NATURE COMMUNICATIONS*  
Yogev, S., Maeder, C. I., Cooper, R., Horowitz, M., Hendricks, A. G., Shen, K.  
2017; 8
- **Long-term microfluidic tracking of coccoid cyanobacterial cells reveals robust control of division timing** *BMC BIOLOGY*  
Yu, F. B., Willis, L., Chau, R. M., Zambon, A., Horowitz, M., Bhaya, D., Huang, K. C., Quake, S. R.  
2017; 15
- **Microtubule Organization Determines Axonal Transport Dynamics.** *Neuron*  
Yogev, S., Cooper, R., Fetter, R., Horowitz, M., Shen, K.  
2016; 92 (2): 449-460
- **Rigel: Flexible Multi-Rate Image Processing Hardware** *ACM TRANSACTIONS ON GRAPHICS*  
Hegarty, J., Daly, R., DeVito, Z., Ragan-Kelley, J., Horowitz, M., Hanrahan, P.  
2016; 35 (4)
- **Tomographic Reconstruction and Alignment Using Matrix Norm Minimization** *IEEE JOURNAL OF SELECTED TOPICS IN SIGNAL PROCESSING*  
Song, K., Horowitz, M.  
2016; 10 (1): 47-60
- **Error Control and Limit Cycle Elimination in Event-Driven Piecewise Linear Analog Functional Models** *IEEE TRANSACTIONS ON CIRCUITS AND SYSTEMS I-REGULAR PAPERS*  
Lim, B. C., Horowitz, M.  
2016; 63 (1): 23-33
- **Convolution Engine: Balancing Efficiency and Flexibility in Specialized Computing** *COMMUNICATIONS OF THE ACM*  
Qadeer, W., Hameed, R., Shacham, O., Venkatesan, P., Kozyrakis, C., Horowitz, M.  
2015; 58 (4): 85-93
- **Building Conflict-Free FFT Schedules** *IEEE TRANSACTIONS ON CIRCUITS AND SYSTEMS I-REGULAR PAPERS*  
Richardson, S., Markovic, D., Danowitz, A., Brunhaver, J., Horowitz, M.  
2015; 62 (4): 1146-1155
- **Digital Analog Design: Enabling Mixed-Signal System Validation** *IEEE DESIGN & TEST*  
Lim, B. C., Mao, J., Horowitz, M., Jang, J., Kim, J.  
2015; 32 (1): 44-52
- **Enhancing the performance of the light field microscope using wavefront coding** *OPTICS EXPRESS*  
Cohen, N., Yang, S., Andalman, A., Broxton, M., Grosenick, L., Deisseroth, K., Horowitz, M., Levoy, M.  
2014; 22 (20): 24817-24839
- **Enhancing the performance of the light field microscope using wavefront coding.** *Optics express*  
Cohen, N., Yang, S., Andalman, A., Broxton, M., Grosenick, L., Deisseroth, K., Horowitz, M., Levoy, M.  
2014; 22 (20): 24817-24839

- **A Verilog Piecewise-Linear Analog Behavior Model for Mixed-Signal Validation** *IEEE TRANSACTIONS ON CIRCUITS AND SYSTEMS I-REGULAR PAPERS*  
Liao, S., Horowitz, M.  
2014; 61 (8): 2229-2235
- **Darkroom: Compiling High-Level Image Processing Code into Hardware Pipelines** *ACM TRANSACTIONS ON GRAPHICS*  
Hegarty, J., Brunhaver, J., DeVito, Z., Ragan-Kelley, J., Cohen, N., Bell, S., Vasilyev, A., Horowitz, M., Hanrahan, P.  
2014; 33 (4)
- **Large-scale mapping of transposable element insertion sites using digital encoding of sample identity.** *Genetics*  
Gohl, D. M., Freifeld, L., Silies, M., Hwa, J. J., Horowitz, M., Clandinin, T. R.  
2014; 196 (3): 615-623
- **Large-scale mapping of transposable element insertion sites using digital encoding of sample identity.** *Genetics*  
Gohl, D. M., Freifeld, L., Silies, M., Hwa, J. J., Horowitz, M., Clandinin, T. R.  
2014; 196 (3): 615-623
- **Forwarding Metamorphosis: Fast Programmable Match-Action Processing in Hardware for SDN** *SIGCOMM Conference*  
Bosshart, P., Gibb, G., Kim, H., Varghese, G., McKeown, N., Izzard, M., Mujica, F., Horowitz, M.  
ASSOC COMPUTING MACHINERY.2013: 99–110
- **GABAergic Lateral Interactions Tune the Early Stages of Visual Processing in Drosophila** *NEURON*  
Freifeld, L., Clark, D. A., Schnitzer, M. J., Horowitz, M. A., Clandinin, T. R.  
2013; 78 (6): 1075-1089
- **Microfluidic serial digital to analog pressure converter for arbitrary pressure generation and contamination-free flow control** *LAB ON A CHIP*  
Yu, F., Horowitz, M. A., Quake, S. R.  
2013; 13 (10): 1911-1918
- **A Verilog Piecewise-Linear Analog Behavior Model for Mixed-Signal Validation** *35th Annual IEEE Custom Integrated Circuits Conference (CICC) - The Showcase for Circuit Design in the Heart of Silicon Valley*  
Liao, S., Horowitz, M.  
IEEE.2013
- **Design Principles for Packet Parsers** *9th ACM/IEEE Symposium on Architectures for Networking and Communications Systems (ANCS)*  
Gibb, G., Varghese, G., Horowitz, M., McKeown, N.  
IEEE.2013: 13–24
- **An Area-Efficient Minimum-Time FFT Schedule Using Single-Ported Memory** *IFIP/IEEE 21st International Conference on Very Large Scale Integration (VLSI-SoC)*  
Richardson, S., Shacham, O., Markovic, D., Horowitz, M.  
IEEE.2013: 39–44
- **FPU Generator for Design Space Exploration** *21st IEEE Symposium on Computer Arithmetic (ARITH)*  
Galal, S., Shacham, O., Brunhaver, J. S., Pu, J., Vassiliev, A., Horowitz, M.  
IEEE.2013: 25–34
- **The Frankencamera: An Experimental Platform for Computational Photography** *COMMUNICATIONS OF THE ACM*  
Adams, A., Jacobs, D. E., Dolson, J., Tico, M., Pulli, K., Talvala, E., Ajdin, B., Vaquero, D., Lensch, H. P., Horowitz, M., Park, S. H., Gelfand, N., Baek, et al  
2012; 55 (11): 90-98
- **Bringing Up a Chip on the Cheap** *IEEE DESIGN & TEST OF COMPUTERS*  
Wachs, M., Shacham, O., Asgar, Z., Firoozshahian, A., Richardson, S., Horowitz, M.  
2012; 29 (6): 57-65
- **Removing high contrast artifacts via digital inpainting in cryo-electron tomography: An application of compressed sensing** *JOURNAL OF STRUCTURAL BIOLOGY*  
Song, K., Comolli, L. R., Horowitz, M.  
2012; 178 (2): 108-120

- **CMOS Image Sensors With Multi-Bucket Pixels for Computational Photography** *IEEE JOURNAL OF SOLID-STATE CIRCUITS*  
Wan, G., Li, X., Agranov, G., Levoy, M., Horowitz, M.  
2012; 47 (4): 1031-1042
- **CPU DB: Recording Microprocessor History** *COMMUNICATIONS OF THE ACM*  
Danowitz, A., Kelley, K., Mao, J., Stevenson, J. P., Horowitz, M.  
2012; 55 (4): 55-63
- **Avoiding Game Over: Bringing Design to the Next Level** *49th ACM/EDAC/IEEE Design Automation Conference (DAC)*  
Shacham, O., Galal, S., Sankaranarayanan, S., Wachs, M., Brunhaver, J., Vassiliev, A., Horowitz, M., Danowitz, A., Qadeer, W., Richardson, S.  
IEEE.2012: 623-629
- **A New IC with Level-Crossing ADC Readout Architecture for PET Detector Signals** *IEEE Nuclear Science Symposium / Medical Imaging Conference Record (NSS/MIC) / 19th Room-Temperature Semiconductor X-ray and Gamma-ray Detector Workshop*  
Lau, F. W., Choi, H. H., Horowitz, M. A., Levin, C. S.  
IEEE.2012: 2486-2488
- **Design Automation Framework for Application-Specific Logic-in-Memory Blocks** *23rd IEEE International Conference on Application-Specific Systems, Architectures and Processors (ASAP)*  
Zhu, Q., Vaidyanathan, K., Shacham, O., Horowitz, M., Pileggi, L., Franchetti, F.  
IEEE.2012: 125-132
- **Rethinking DRAM Power Modes for Energy Proportionality** *45th IEEE/ACM Annual International Symposium on Microarchitecture (MICRO)*  
Malladi, K. T., Shaeffer, I., Gopalakrishnan, L., Lo, D., Lee, B. C., Horowitz, M.  
IEEE COMPUTER SOC.2012: 131-142
- **Removing Overhead From High-Level Interfaces** *49th ACM/EDAC/IEEE Design Automation Conference (DAC)*  
Kelly, K., Wachs, M., Stevenson, J., Richardson, S., Horowitz, M.  
IEEE.2012: 783-789
- **Towards Energy-Proportional Datacenter Memory with Mobile DRAM** *39th Annual International Symposium on Computer Architecture (ISCA)*  
Malladi, K. T., Nothaft, F. A., Periyathambi, K., Lee, B. C., Kozyrakis, C., Horowitz, M.  
IEEE.2012: 37-48
- **Understanding Sources of Inefficiency in General-Purpose Chips** *COMMUNICATIONS OF THE ACM*  
Hameed, R., Qadeer, W., Wachs, M., Azizi, O., Solomatnikov, A., Lee, B. C., Richardson, S., Kozyrakis, C., Horowitz, M.  
2011; 54 (10): 85-93
- **Energy-Efficient Floating-Point Unit Design** *IEEE TRANSACTIONS ON COMPUTERS*  
Galal, S., Horowitz, M.  
2011; 60 (7): 913-922
- **Defining the Computational Structure of the Motion Detector in Drosophila** *NEURON*  
Clark, D. A., Bursztyn, L., Horowitz, M. A., Schnitzer, M. J., Clandinin, T. R.  
2011; 70 (6): 1165-1177
- **Cortical representations of olfactory input by trans-synaptic tracing** *NATURE*  
Miyamichi, K., Amat, F., Moussavi, F., Wang, C., Wickersham, I., Wall, N. R., Taniguchi, H., Tasic, B., Huang, Z. J., He, Z., Callaway, E. M., Horowitz, M. A., Luo, et al  
2011; 472 (7342): 191-196
- **Latency Sensitive FMA Design** *20th IEEE Symposium on Computer Arithmetic (ARITH)*  
Galal, S., Horowitz, M.  
IEEE COMPUTER SOC.2011: 129-138
- **Joint DAC/IWBDA Special Session Design and Synthesis of Biological Circuits** *48th ACM/IEEE/EDAC Design Automation Conference (DAC)*  
Densmore, D., Horowitz, M., Krishnaswamy, S., Shen, X., Arkin, A., Winfree, E., Voigt, C.  
ASSOC COMPUTING MACHINERY.2011: 114-115
- **Global Convergence Analysis of Mixed-Signal Systems** *48th ACM/IEEE/EDAC Design Automation Conference (DAC)*

- Youn, S., Kim, J., Horowitz, M.  
ASSOC COMPUTING MACHINERY.2011: 498–503
- **Global convergence analysis of mixed-signal systems** *Design Automation Conference (DAC)*  
Youn, S., Kim, J., Horowitz, M.  
2011: 498-503
  - **Energy-efficient floating point unit design** *Computers, IEEE Transactions on*  
Galal, S., Horowitz, M.  
2011; 99: 1-1
  - **Analog signal multiplexing for PSAPD-based PET detectors: simulation and experimental validation** *PHYSICS IN MEDICINE AND BIOLOGY*  
Lau, F. W., Vandembroucke, A., Reynolds, P. D., Olcott, P. D., Horowitz, M. A., Levin, C. S.  
2010; 55 (23): 7149-7174
  - **Analysis of the Intact Surface Layer of Caulobacter crescentus by Cryo-Electron Tomography** *JOURNAL OF BACTERIOLOGY*  
Amat, F., Comolli, L. R., Nomellini, J. F., Moussavi, F., Downing, K. H., Smit, J., Horowitz, M.  
2010; 192 (22): 5855-5865
  - **RETHINKING DIGITAL DESIGN: WHY DESIGN MUST CHANGE** *IEEE MICRO*  
Shacham, O., Azizi, O., Wachs, M., Qadeer, W., Asgar, Z., Kelley, K., Stevenson, J. P., Richardson, S., Horowitz, M., Lee, B., Solomatnikov, A., Firoozshahian, A.  
2010; 30 (6): 9-24
  - **Subtomogram alignment by adaptive Fourier coefficient thresholding** *JOURNAL OF STRUCTURAL BIOLOGY*  
Amat, F., Comolli, L. R., Moussavi, F., Smit, J., Downing, K. H., Horowitz, M.  
2010; 171 (3): 332-344
  - **The Frankencamera: An Experimental Platform for Computational Photography** *ACM TRANSACTIONS ON GRAPHICS*  
Adams, A., Jacobs, D. E., Dolson, J., Tico, M., Pulli, K., Talvala, E., Ajdin, B., Vaquero, D., Lensch, H. P., Horowitz, M., Park, S. H., Gelfand, N., Baek, et al  
2010; 29 (4)
  - **Fast, Non-Monte-Carlo Estimation of Transient Performance Variation Due to Device Mismatch** *IEEE TRANSACTIONS ON CIRCUITS AND SYSTEMS I-REGULAR PAPERS*  
Kim, J., Jones, K. D., Horowitz, M. A.  
2010; 57 (7): 1746-1755
  - **3D segmentation of cell boundaries from whole cell cryogenic electron tomography volumes** *JOURNAL OF STRUCTURAL BIOLOGY*  
Moussavi, F., Heitz, G., Amat, F., Comolli, L. R., Koller, D., Horowitz, M.  
2010; 170 (1): 134-145
  - **Static control logic for microfluidic devices using pressure-gain valves** *NATURE PHYSICS*  
Weaver, J. A., Melin, J., Stark, D., Quake, S. R., Horowitz, M. A.  
2010; 6 (3): 218-223
  - **Timing Robustness in the Budding and Fission Yeast Cell Cycles** *PLOS ONE*  
Mangla, K., Dill, D. L., Horowitz, M. A.  
2010; 5 (2)
  - **Energy-Performance Tradeoffs in Processor Architecture and Circuit Design: A Marginal Cost Analysis** *37th International Symposium on Computer Architecture*  
Azizi, O., Mahesri, A., Lee, B. C., Patel, S. J., Horowitz, M.  
ASSOC COMPUTING MACHINERY.2010: 26–36
  - **Chapter Thirteen-Alignment of Cryo-Electron Tomography Datasets** *Methods in enzymology*  
Amat, F., Castaño-Diez, D., Lawrence, A., Moussavi, F., Winkler, H., Horowitz, M.  
Elsevier.2010: 343–367
  - **2010 Timing Robustness in the Budding and Fission Yeast Cell Cycles.** *PLoS ONE*  
K, M., DL, D., A, H. M.  
2010; 2 (5): e8906

- **An integrated framework for joint design space exploration of microarchitecture and circuits**  
Azizi, O., Mahesri, A., Stevenson, J., P., Patel, S., J., Horowitz, M.  
2010
- **An efficient test vector generation for checking analog/mixed-signal functional models**  
Lim, B., C., Kim, J., Horowitz, M., A.  
2010
- **Intent-leveraged optimization of analog circuits via homotopy**  
Jeeradit, M., Kim, J., Horowitz, M.  
2010
- **Fortifying analog models with equivalence checking and coverage analysis**  
Horowitz, M., Jeeradit, M., Lau, F., Liao, S., Lim, B., Mao, J.  
2010
- **ALIGNMENT OF CRYO-ELECTRON TOMOGRAPHY DATASETS** *METHODS IN ENZYMOLOGY, VOL 482: CRYO-EM, PART B: 3-D RECONSTRUCTION*  
Amat, F., Castano-Diez, D., Lawrence, A., Moussavi, F., Winkler, H., Horowitz, M.  
2010; 482: 343-367
- **Understanding Sources of Inefficiency in General-Purpose Chips** *37th International Symposium on Computer Architecture*  
Hameed, R., Qadeer, W., Wachs, M., Azizi, O., Solomatnikov, A., Lee, B. C., Richardson, S., Kozyrakis, C., Horowitz, M.  
ASSOC COMPUTING MACHINERY.2010: 37–47
- **Energy-Performance Tunable Logic** *IEEE JOURNAL OF SOLID-STATE CIRCUITS*  
Nezamfar, B., Alon, E., Horowitz, M.  
2009; 44 (9): 2554-2567
- **On-Die Power Supply Noise Measurement Techniques** *IEEE TRANSACTIONS ON ADVANCED PACKAGING*  
Alon, E., Abramzon, V., Nezamfar, B., Horowitz, M.  
2009; 32 (2): 248-259
- **1 mm(3) Resolution Breast-Dedicated PET System** *IEEE Nuclear Science Symposium/Medical Imaging Conference*  
Lau, F. W., Fang, C., Reynolds, P. D., Olcott, P. D., Vandenbroucke, A., Spanoudaki, V. C., Olutade, F., Horowitz, M. A., Levin, C. S.  
IEEE.2009: 5378–5381
- **Using a configurable processor generator for computer architecture prototyping**  
Solomatnikov, A., Firoozshahian, A., Shacham, O., Asgar, Z., Wachs, M., Qadeer, W., Horowitz, M. A.  
2009
- **Area-efficiency in CMP core design: co-optimization of microarchitecture and physical design** *SIGARCH Comput. Archit. New*  
Azizi, O., Mahesri, A., Patel, S., J., Horowitz, M.  
2009; 37 (2): 56-65
- **Energy-Performance Tunable Logic** *IEEE Custom Integrated Circuits Conference*  
Nezamfar, B., Horowitz, M.  
IEEE.2009: 183–186
- **A Memory System Design Framework: Creating Smart Memories** *36th Annual International Symposium on Computer Architecture*  
Firoozshahian, A., Solomatnikov, A., Shacham, O., Asgar, Z., Richardson, S., Kozyrakis, C., Horowitz, M.  
ASSOC COMPUTING MACHINERY.2009: 406–417
- **Front-End Electronics for a 1 mm(3) Resolution Avalanche Photodiode-Based PET System with Analog Signal Multiplexing** *IEEE Nuclear Science Symposium/Medical Imaging Conference*  
Lau, F. W., Vandenbroucke, A., Reynolds, P. D., Olcott, P. D., Horowitz, M. A., Levin, C. S.  
IEEE.2009: 3146–3149
- **IN FIELD, ENERGY-PERFORMANCE TUNABLE FPGA ARCHITECTURES** *19th International Conference on Field Programmable Logic and Applications*

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- Nezamfar, B., Horowitz, M.  
IEEE.2009: 262–267
- **Stochastic Steady-State and AC Analyses of Mixed-Signal Systems** *46th ACM/IEEE Design Automation Conference (DAC 2009)*  
Kim, J., Ren, J., Horowitz, M. A.  
IEEE.2009: 376–381
  - **Leveraging Designer's Intent: A Path Toward Simpler Analog CAD Tools** *IEEE Custom Integrated Circuits Conference*  
Kim, J., Jeeradit, M., Lim, B., Horowitz, M. A.  
IEEE.2009: 613–620
  - **Comparative Evaluation of Memory Models for Chip Multiprocessors** *ACM TRANSACTIONS ON ARCHITECTURE AND CODE OPTIMIZATION*  
Leverich, J., Arakida, H., Solomatnikov, A., Firoozshahian, A., Horowitz, M., Kozyrakis, C.  
2008; 5 (3)
  - **Architecture and inherent robustness of a bacterial cell-cycle control system** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*  
Shen, X., Collier, J., Dill, D., Shapiro, L., Horowitz, M., McAdams, H. H.  
2008; 105 (32): 11340-11345
  - **Integrated regulation for energy-efficient digital circuits** *IEEE Custom Integrated Circuits Conference*  
Alon, E., Horowitz, M.  
IEEE-INST ELECTRICAL ELECTRONICS ENGINEERS INC.2008: 1795–1807
  - **A 90 nm CMOS 16 Gb/s transceiver for optical interconnects** *IEEE Radio Frequency Integrated Circuits Symposium (RFIC)*  
Palermo, S., Emami-Neyestanak, A., Horowitz, M.  
IEEE-INST ELECTRICAL ELECTRONICS ENGINEERS INC.2008: 1235–46
  - **Digital circuit design trends** *20th Symposium on VLSI Circuits*  
Horowitz, M., Stark, D., Alon, E.  
IEEE-INST ELECTRICAL ELECTRONICS ENGINEERS INC.2008: 757–61
  - **A 24 Gb/s software programmable analog multi-tone transmitter** *20th Symposium on VLSI Circuits*  
Amirkhany, A., Abbasfar, A., Savo, J., Jeeradit, M., Garlepp, B., Kollipara, R. T., Stojanovic, V., Horowitz, M.  
IEEE-INST ELECTRICAL ELECTRONICS ENGINEERS INC.2008: 999–1009
  - **Markov random field based automatic image alignment for electron tomography** *4th International Conference on Electron Tomography*  
Amat, F., Moussavi, F., Comolli, L. R., Elidan, G., Downing, K. H., Horowitz, M.  
ACADEMIC PRESS INC ELSEVIER SCIENCE.2008: 260–75
  - **Verification of Chip Multiprocessor Memory Systems Using A Relaxed Scoreboard** *41st Annual IEEE/ACM International Symposium on Microarchitecture*  
Shacham, O., Wachs, M., Solomatnikov, A., Firoozshahian, A., Richardson, S., Horowitz, M.  
IEEE COMPUTER SOC.2008: 294–305
  - **Circuit-Level Requirements for MOSFET-Replacement Devices** *IEEE International Electron Devices Meeting*  
Kam, H., King-Liu, T., Alon, E., Horowitz, M.  
IEEE.2008: 427–427
  - **The case for simple, visible cache coherency**  
Kunz, R., Horowitz, M.  
2008
  - **Circuit-level requirements for MOSFET-replacement devices** *Electron Devices Meeting, 2008. IEDM 2008. IEEE International*  
Kam, H., King-Liu, T., Alon, E., Horowitz, M.  
2008: 1-1
  - **Markov random field based automatic image alignment for electron tomography** *Journal of Structural Biology*  
Amat, F., Moussavi, F., Comolli, L. R., Elidan, G., Downing et al, K., H.  
2008; 161 (3): 260-75



- **A High-speed, Low-power 3D-SRAM Architecture** *IEEE Custom Integrated Circuits Conference*  
Nho, H. H., Horowitz, M., Wong, S. S.  
IEEE.2008: 201–204
- **Processor performance modeling using symbolic simulation** *IEEE International Symposium on Performance Analysis of Systems and Software*  
Azizi, O., Collins, J., Patil, D., Wang, H., Horowitz, M.  
IEEE COMPUTER SOC.2008: 127–138
- **A 14-mW 6.25-Gb/s transceiver in 90-nm CMOS** *IEEE International Solid-State Circuits Conference (ISSCC)*  
Poulton, J., Palmer, R., Fuller, A. M., Greer, T., Eyles, J., Dally, W. J., Horowitz, M.  
IEEE-INST ELECTRICAL ELECTRONICS ENGINEERS INC.2007: 2745–57
- **An optical interconnect transceiver at 1550 nm using low-voltage electroabsorption modulators directly integrated to CMOS** *JOURNAL OF LIGHTWAVE TECHNOLOGY*  
Roth, J. E., Palermo, S., Helman, N. C., Bour, D. P., Miller, D. A., Horowitz, M.  
2007; 25 (12): 3739-3747
- **A heuristic for optimizing stochastic activity networks with applications to statistical digital circuit sizing** *OPTIMIZATION AND ENGINEERING*  
Kim, S., Boyd, S. P., Yun, S., Patil, D. D., Horowitz, M. A.  
2007; 8 (4): 397-430
- **Veiling glare in high dynamic range imaging** *ACM SIGGRAPH 2007 Conference*  
Talvala, E., Adams, A., Horowitz, M., Levoy, M.  
ASSOC COMPUTING MACHINERY.2007
- **Power optimization for SRAM and its scaling** *IEEE TRANSACTIONS ON ELECTRON DEVICES*  
Morifuji, E., Patil, D., Horowitz, M., Nishi, Y.  
2007; 54 (4): 715-722
- **Chip multi-processor generator** *44th ACM/IEEE Design Automation Conference*  
Solomatnikov, A., Firoozshahian, A., Qadeer, W., Shacham, O., Kelley, K., Asgar, Z., Wachs, M., Hameed, R., Horowitz, M.  
IEEE.2007: 262–263
- **Variable domain transformation for linear PAC analysis of mixed-signal systems** *IEEE/ACM International Conference on Computer-Aided Design*  
Kim, J., Jones, K. D., Horowitz, M. A.  
IEEE.2007: 887–894
- **Fast, non-monte-carlo estimation of transient performance variation due to device mismatch** *44th ACM/IEEE Design Automation Conference*  
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